



# ENVIRONMENT

## Classroom Study Material

April 2022 - December 2022



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# ENVIRONMENT

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## NOTE:

Dear Students,

PT 365 documents comprehensively covers the important current affairs of last 1 year (365 days) in a consolidated manner to aid Prelims preparation.

In our endeavour to further enhance the document in the interest of the aspirants, following additions have been incorporated:



### **Summarised Infographics:** Topics such as:

- ◆ Important environmental organisations
- ◆ Key concepts and processes related to environment
- ◆ Protection status of major species

have been summarised and added in form of interactive infographics to improve ease of understanding, provide for smoother learning experience and ensure enhanced retention of the content.



### **thumbnails:** Pictorial and interactive thumbnails of important information such as:

- ◆ Whether India is a member/party to an initiative/organisation/convention etc.
- ◆ Protection Status of species in news
- ◆ Whether an organisation is an NGO

have been added for easier recognition and quick revision of content.



**Consolidated Maps:** They have been used to provide geographical and contextual information about places in news.



**Know the terms:** They have been added to clarify important concepts and terms.



**Quiz:** QR based Smart quiz has been added to test the aspirant's learnings and understanding.



**SMART QUIZ**

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# 1. CLIMATE CHANGE

## 1.1. GLOBAL SCENARIO

### 1.1.1. IPCC'S SIXTH ASSESSMENT REPORT: PART III

#### Why in news?

The IPCC released the third part of the Sixth Assessment Report (AR6), titled '**Climate Change 2022: Mitigation of Climate Change**', the Working Group III contribution to the Sixth Assessment Report.

#### About the report

- Provides an updated global assessment of climate change mitigation progress and pledges and examines the sources of global emissions.
- Other reports of AR6-**
  - Report of Working Group I- '**Climate Change 2021: The Physical Science Basis**', released in August 2021.
  - Report of Working Group II- '**Climate Change 2022: Impacts, Adaptation and Vulnerability**' released in February 2022.
  - '**Synthesis Report**' scheduled to release in 2023.


**INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE**

HQ  
Geneva,  
Switzerland

**Genesis:** An intergovernmental organization created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP).

**Objective:** To provide governments at all levels with scientific information that they can use to develop climate policies.

- IPCC is the **UN body for assessing the science related to climate change**.

**Membership:** 195 members  Member

**Other Key Information:**

- Prepares **Assessment Reports**, special reports, and methodology reports assessing the state of knowledge of climate change.
- However, it **does not itself engage in scientific research**.
- In 2007, the IPCC was awarded the Nobel Peace Prize.

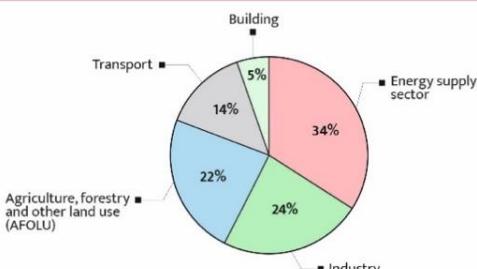
**Mitigation targets for achieving Climate goals as per IPCC AR6**

 <b>To limit global warming to 1.5°C</b> Global GHG emissions peak before 2025, reduced by 43% by 2030.  Reach Global net zero CO <sub>2</sub> emissions 1.5°C in the early 2050s.  Methane reduced by 34% by 2030.	 <b>To limit global warming to 2°C</b> Global GHG emissions peak before 2025, reduced by 27% by 2030.  Reach Global net zero CO <sub>2</sub> emissions around the early 2070s.
--	--

**For both-**

- Rapid and deep GHG emissions reductions immediate GHG in all sectors follow throughout 2030, 2040 and 2050.
- Negative CO<sub>2</sub> emissions after the point of net zero.

#### Key Findings and Observations of the report

Parameters	Key Trends	Sectoral share of total net anthropogenic GHG emissions in 2019 (in GtCO <sub>2</sub> -eq)										
Emission trends	<ul style="list-style-type: none"> <li><b>2010–2019:</b> Total net anthropogenic GHG emissions continued to rise.</li> <li><b>1850-present:</b> Cumulative net CO<sub>2</sub> emissions rose.</li> <li><b>Net anthropogenic GHG emissions increased since 2010</b> across all major sectors globally.</li> <li><b>Average annual GHG emissions during 2010–19 higher than any previous decade.</b> <ul style="list-style-type: none"> <li>Rate of growth between 2010 and 2019 lower than previous decade.</li> </ul> </li> </ul>	 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Energy supply sector</td> <td>34%</td> </tr> <tr> <td>Industry</td> <td>24%</td> </tr> <tr> <td>Agriculture, forestry and other land use (AFOLU)</td> <td>22%</td> </tr> <tr> <td>Transport</td> <td>14%</td> </tr> <tr> <td>Building</td> <td>5%</td> </tr> </table>	Energy supply sector	34%	Industry	24%	Agriculture, forestry and other land use (AFOLU)	22%	Transport	14%	Building	5%
Energy supply sector	34%											
Industry	24%											
Agriculture, forestry and other land use (AFOLU)	22%											
Transport	14%											
Building	5%											
Variation in Regional contributions to global GHG emissions	<ul style="list-style-type: none"> <li><b>At least 18 countries sustained GHG emission reductions</b> for longer than 10 years.</li> <li>Least Developed Countries (LDCs) and Small Island Developing States (SIDS) have much lower per capita emissions than the global average, excluding CO<sub>2</sub> emitted from <b>land use, land-use change and forestry (LULUCF)</b>.</li> <li><b>10% of households with the highest per capita emissions</b> contribute a disproportionately large share of global household GHG emissions.</li> </ul>											

Inadequate Current policies	<ul style="list-style-type: none"> <li>Projection of median global warming of <b>3.2°C by 2100</b> without a strengthening of policies.</li> </ul>
Climate finance	<ul style="list-style-type: none"> <li>Financial flows are <b>3-6 times lower than levels needed by 2030</b> to limit warming to below <b>1.5°C or 2°C</b>.</li> </ul>

## 1.1.2. METHANE EMISSION

### Why in news?

Recently, the 'Global Methane Assessment: 2030 Baseline Report' was released by Climate and Clean Air Coalition (CCAC) and United Nations Environment Programme (UNEP).

### More on news

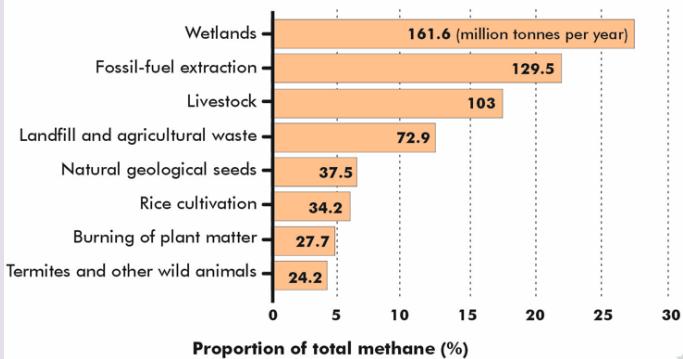
- Report was launched at **Climate and Clean Air Ministerial Meeting** at 27th Conference of Parties (COP27) to United Nations Framework Convention on Climate Change (UNFCCC).
  - Examines baseline projections of methane emissions over the coming decade and implications for Global Methane Pledge (GMP) target.
- Key findings:**
  - Amount of Methane in the atmosphere is **260% of pre-industrial levels**.
  - Human-driven methane emissions are responsible for nearly **45% of current net warming**.
  - 2021 saw the **largest annual increase** recorded.

### About Methane (CH<sub>4</sub>)

- Characteristics:**
  - Colourless and odourless gas.
  - Primary component of natural gas.
- Powerful GHG:**
  - Lifespan in atmosphere: 20 years (fewer than CO<sub>2</sub>).
  - Global Warming Potential: more than 80 times greater than that of CO<sub>2</sub>.
- Responsible for:**
  - More than 25% of global warming.
  - ~1/2 of the growth in tropospheric ozone formation.

### WHERE IS METHANE COMING FROM?

Most of the increase in emissions seems to be biological in origin, rather than having been released from below Earth's surface during the extraction of fossil fuels.



### Related News

#### Global Methane Pledge (GMP)

- Recently, Australia joined GMP.
- Launched at COP26 in 2021 to catalyse action to reduce methane emissions.
- Led by: United States and European Union.
- Aim: To collectively reduce methane emissions by at least 30% below 2020 levels by 2030.
- Membership: More than 100 country participants, together responsible for 45% of global human-caused methane emissions.
  - India did not sign the pledge because of its concerns over the impact on trade, on the country's vast farm sector, and the role of livestock in the rural economy.



#### Global Energy Monitor (GEM)

- As per GEM, just 30 fossil fuel companies account for nearly half of the planet-warming methane emitted by the world's energy sector.
- A non-profit organization which aims to develop and share information in support of the worldwide movement for clean energy.

#### International Methane Emissions Observatory (IMEO)

- According to a report by IMEO, cutting methane emissions is fastest way to tackle climate change in short-term.
- An initiative by UNEP, launched in 2021, with support from European Commission
- Aim: To catalyse reduction of methane emissions, starting with fossil fuel sector.
- Core implementing partner of Global Methane Pledge.

#### NASA's Earth Surface Mineral Dust Source Investigation (EMIT) Mission

- Methane 'Super-Emitters' were mapped by NASA's Earth Surface Mineral Dust Source Investigation (EMIT).
- EMIT mission helped to identify more than 50 super-emitters of methane gas in central Asia, west Asia and southwestern United States.
- Super-emitters:** Facilities, equipment, and other infrastructure, typically in the fossil-fuel, waste, or agriculture sectors, that emit methane at high rates.

### **1.1.3. OCEAN ACIDIFICATION AND ARCTIC ICE**

## Why in news?

A team of researchers has flagged **changing chemistry of western region of the Arctic Ocean** after discovering acidity levels **increasing three to four times faster** than ocean waters elsewhere.

## About Ocean acidification

- Reduction in the pH of the ocean over an extended period of time.
  - Primary cause: Uptake of CO<sub>2</sub> from the atmosphere.
  - Impacts: Harmful to life forms relying on carbonate-based shells and skeleton, altered marine food chains etc.

## About Arctic Region

- Geographic region spreading around the North Pole.
  - Generally defined as the **area within the Arctic Circle**, a line of latitude about  $66.5^{\circ}$  north of the Equator.
  - **Significance of Arctic:**
    - Melting of ice due to Climate change **making region more accessible for economic exploitation** (oil & gas reserves, metals and minerals).
    - Possibilities to **open Northern Sea Route** as a **new trade route**.
    - Helps **circulate world's ocean currents**.
    - Characterized as **world's climate change "barometer"**.

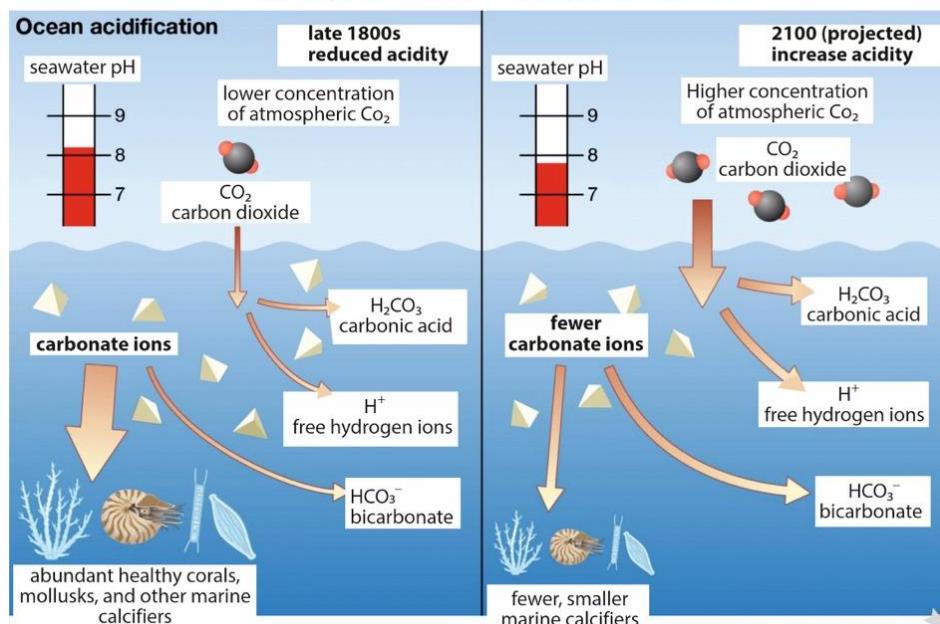
India in Arctic

- Arctic research programme since 2007 with several expeditions undertaken till date.
  - Unveiled its first Arctic policy.
  - One of the Observers in the Arctic Council.
  - Indian Arctic station 'Himadri' is located at Norway and serves as a hub of Indian scientific investigations since 2008.

## Related information: Global Ocean Acidification Observing Network (GOA-ON)

- A collaborative international network, established in 2012.
  - Aim: To detect and understand the drivers of ocean acidification in estuarine-coastal-open ocean environments, the resulting impacts on marine ecosystems, and to make the information available to optimize modelling studies.

## How does Ocean Acidification work?



ARCTIC REGION

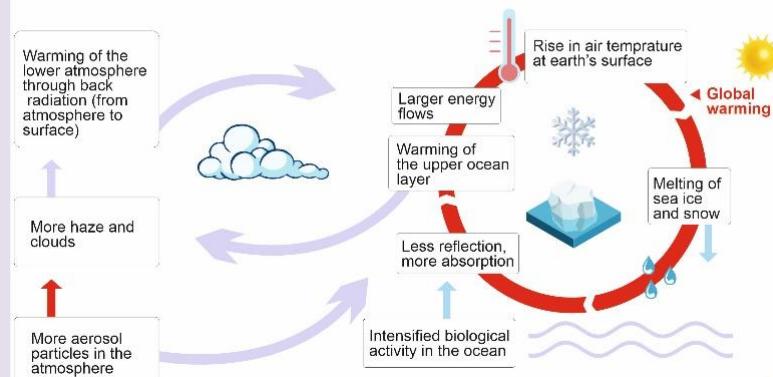


**Related News:**
**Arctic Amplification**

- Arctic is heating up **4 times as fast as rest of world** due to Arctic amplification (AA).
- **AA:** Enhancement of near-surface air temperature change over Arctic relative to lower latitudes
- **Causes of AA:** Global warming, Ice-albedo feedback, lapse rate feedback, water vapour feedback and ocean heat transport.
- **Impact:** Affects fauna of the region especially, Polar Bears, whales and seals; would open up new sea-trade routes; would facilitate further extraction of natural resources.

**Arctic Amplification**

The dynamics of global warming


**Zombie Ice or doomed ice**

- Zombie ice from massive Greenland ice sheet will eventually raise global sea level by at least 10 inches.
- It's the ice that is still attached to thicker areas of ice, but is no longer getting fed by those larger glaciers because parent glaciers are getting less replenishing snow.

**Arctic Report Card 2022**

- Released by: US National Oceanic and Atmospheric Administration (NOAA), annually since 2006
- A peer-reviewed source that provide an up-to-date environmental information on Arctic.
- Key highlights of Report
  - Arctic continues to warm more than twice as fast as rest of globe.
  - Persistent summer sea ice due to cooler surface waters and north winds at Chukchi Sea.

## 1.2. INTERNATIONAL CONFERENCES, CONVENTIONS AND INITIATIVES

### 1.2.1. 27TH CONFERENCE OF THE PARTIES (COP 27)

**Why in news?**

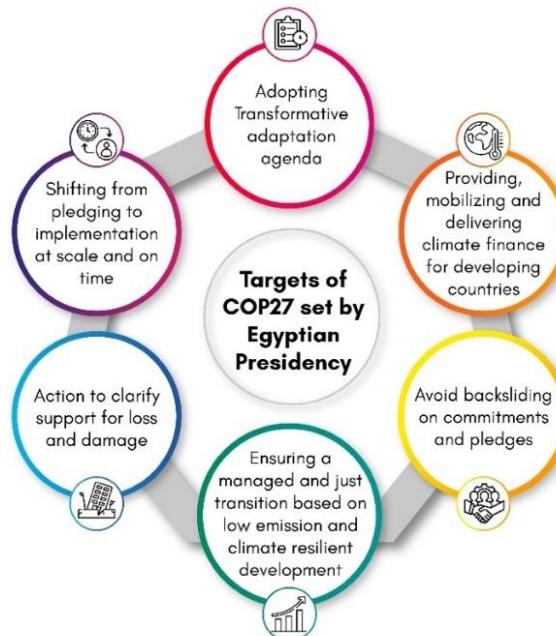
The 27th Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), held at Sharm El-Sheikh, Egypt, recently concluded.

**Major Outcomes of COP26 (2021 in Glasgow): Glasgow Climate Pact**

- First-ever COP decision to explicitly target action against fossil fuels calling for a “phasedown of unabated coal” and “phase-out” of inefficient fossil-fuel subsidies.
- Finalization of International Carbon Markets.
- Sharm el-Sheikh Work Programme on the Global Goal on Adaptation.
  - Post COP26, Bonn Climate Change Conference was held with outcomes such as first technical dialogue of the Global Stocktake, Draft of a “Global Goal on Adaptation” (GGA), etc.

**About COP27**

- **Significance:** Aims to build on previous successes, including the Glasgow Climate Pact of COP26 and pave the way for higher ambition on mitigation, adaptation and climate finance, with focus on loss and damage.
- Also included the 17th session of the COP serving as the meeting of the **Parties to the Kyoto Protocol (CMP 17)**, and the fourth session of the COP serving as the meeting of the **Parties to the Paris Agreement (CMA 4)**.
- Concluded with release of **Sharm el-Sheikh Implementation Plan**.



## Key outcomes of the COP27

Areas of discussion	Important Decisions and Developments
Climate targets	<ul style="list-style-type: none"> <li>Countries requested to <b>revisit and strengthen their 2030 climate targets by the end of 2023</b>, as necessary to align with the Paris Agreement.</li> </ul>
Mitigation	<ul style="list-style-type: none"> <li><b>Finalised the details of Mitigation work programme</b> to urgently scale up mitigation ambition and implementation in this decade.</li> </ul>
Adaptation	<ul style="list-style-type: none"> <li><b>Development of a framework for the global goal on adaptation</b> to be undertaken through a structured approach under the <b>Glasgow–Sharm el-Sheikh work programme in 2023 at COP28</b>.</li> <li><b>New pledges, totalling more than USD 230 million</b>, made to the Adaptation Fund.</li> </ul>
Finance	<ul style="list-style-type: none"> <li><b>Sharm el-Sheikh dialogue launched on Article 2.1c</b> of the Paris Agreement to report back at COP28.           <ul style="list-style-type: none"> <li>Article 2.1c – reads “financial flows” should be aligned with global temperature targets.</li> </ul> </li> </ul>
Loss and damage	<ul style="list-style-type: none"> <li><b>New funding arrangements established for loss and damage</b>.           <ul style="list-style-type: none"> <li>Will assist developing countries that are particularly vulnerable to the adverse effects of climate change.</li> <li><b>A transitional committee</b> to be set up to make recommendations for the operationalization of the new funding arrangements at COP28.</li> </ul> </li> <li><b>Institutional arrangements for operationalization of the Santiago network</b>.           <ul style="list-style-type: none"> <li>The host of the secretariat of the network will be selected by 2023.</li> </ul> </li> </ul>
Energy	<ul style="list-style-type: none"> <li>Call to transition towards <b>low-emission energy systems</b>.</li> <li>Call to accelerate efforts towards the <b>phasedown of unabated coal power</b> and <b>phase-out of inefficient fossil fuel subsidies</b>.</li> </ul>
Financial system reform	<ul style="list-style-type: none"> <li><b>Multilateral development banks and international financial institutions encouraged to reform their operational model, channels and instruments</b> to address the global climate emergency.</li> </ul>
Just transition	<ul style="list-style-type: none"> <li><b>A work programme on just transition</b> launched.</li> <li>Includes annual “high-level ministerial round tables”, with the first taking place at COP28 next year.</li> </ul>
Agriculture	<ul style="list-style-type: none"> <li><b>Koronivia Joint Work for Agriculture (KJWA)</b> given another four-year lease by establishment of the four-year Sharm el-Sheikh joint work on implementation of climate action on agriculture and food security.           <ul style="list-style-type: none"> <li>KJWA is the <b>only programme to focus on agriculture and food security under UNFCCC</b>.</li> </ul> </li> </ul>
Technology transfer and deployment	<ul style="list-style-type: none"> <li><b>First joint work programme of the Technology Executive Committee and the Climate Technology Centre and Network</b>, set up for 2023–2027.</li> </ul>
Other	<ul style="list-style-type: none"> <li>First COP cover decision to mention food, rivers, nature-based solutions, tipping points and the right to a healthy environment.</li> </ul>

For details on Initiatives launched during COP27, please refer to the ‘Appendix: Major Initiatives launched during COP27’ at the end of the document.

Related Developments	
<b>Breakthrough Agenda sets priorities</b> <ul style="list-style-type: none"> <li>Signatories to Breakthrough Agenda have mapped out Priority Actions, to be delivered by COP28 climate summit, to help make <b>clean technologies cheaper and cleaner</b>.</li> <li><b>Launched at COP26</b> by a coalition of about 45 world leaders (<b>India is also a signatory</b>).</li> <li><b>Objective:</b> To provide a framework for countries, businesses and civil society for <b>decarbonisation under five key sectors of power, road transport, steel, hydrogen and agriculture</b>.</li> <li>Priority Actions include agreements to:           <ul style="list-style-type: none"> <li><b>Develop common definitions</b> for low-emission and near-zero emission steel, hydrogen and sustainable batteries.</li> <li><b>Ramp up deployment</b> of essential infrastructure projects.</li> <li><b>Set a common target date</b> to phase out polluting cars and vehicles, consistent with Paris Agreement.</li> <li><b>Stimulate global demand</b> for green industrial goods.</li> </ul> </li> </ul>	 <p><b>About First Movers Coalition</b></p> <ul style="list-style-type: none"> <li><b>Launched by:</b> US and World Economic Forum (WEF) at COP26 in Glasgow, Scotland.           <ul style="list-style-type: none"> <li>India has joined the <b>First Movers Coalition Steering Board</b>.</li> </ul> </li> <li><b>A global initiative harnessing the purchasing power of companies to decarbonize 7 “hard to abate” industrial sectors.</b> <ul style="list-style-type: none"> <li>Includes Aluminum, Aviation, Chemicals, Concrete, Shipping, Steel, and Trucking sector accounting for 30% of global emissions.</li> </ul> </li> <li>Seeks to <b>commercialize zero-carbon technologies</b> and <b>to scale up critical emerging technologies</b> essential for the Net-Zero Transition.</li> </ul>

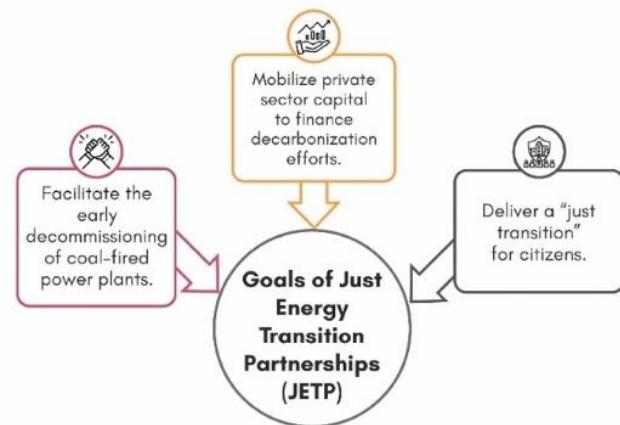
- Drive investment in agriculture research, development & demonstration.

- Priority actions supported by various initiatives including:
  - First Movers Coalition
  - Climate Investment Funds: largest multilateral climate fund focused on transformational climate innovation in 72 middle- and low-income countries (including India).
  - Mission Possible Partnership: an alliance of leading climate organizations

#### Indonesia Just Energy Transition Partnerships (JETP)

- Recently, Indonesia Just Energy Transition Partnership to mobilise \$20 billion was presented at the side-lines of the G20 summit.
- JETP: Climate finance agreements in which donor countries work together to-
  - Accelerate the early retirement of high-emission infrastructure in partner countries.
  - Provide support for investment in renewable energy and related infrastructure.

**First JTEP:** Announced in 2021 by South Africa and an International Partners Group (IPG) of France, Germany, the United Kingdom, the United States of America, and the European Union.



## United Nations Framework Convention on Climate Change



**Genesis:** Intergovernmental treaty opened for signature at the “Rio Earth Summit” in 1992 and entered into force in 1994.

### Objective:

- ◆ To stabilize greenhouse-gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time-frame sufficient to allow ecosystems to adapt naturally to climate change.
- ◆ To ensure that food production is not threatened.
- ◆ To enable economic development to proceed in a sustainable manner.



**Membership:** Has near-universal membership, 198 parties.



**Other key information:**  
Key Agreements established under the Convention: Kyoto Protocol and Paris Climate Agreement

### Operating Mechanism of UNFCCC



### 1.2.1.1. INDIA'S LONG-TERM LOW EMISSION DEVELOPMENT STRATEGY (LT-LEDS)

#### Why in news?

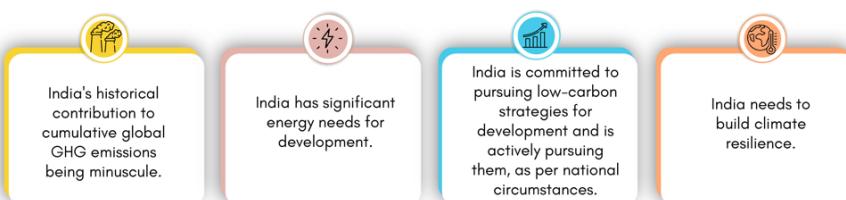
India has submitted its Long-Term Low Emission Development Strategy (LT-LEDS) to the United Nations Framework Convention on Climate Change (UNFCCC) recently.

#### About Long-term low-emission development strategies (LT-LEDS).

- Parties to the UNFCCC agreed to formulate and communicate LT-LEDS under Article 4.19 of the Paris Agreement.
- During COP 26 at Glasgow, Parties that have not yet done so had been urged to communicate their LT-LEDS by COP 27.

### India's Long-Term Low Emission Development Strategy (LT-LEDS)

#### Key considerations for India's approach



- Formulated mindful of Article 2.
- Considers common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.
- Not mandatory** unlike NDCs.
- Typically, broader in scope than NDCs and incorporate developmental goals as well as required levels of investment and government expenditure.

#### About India's Long-Term Low Emission Development Strategy (LT-LEDS)

- Lays out the steps to achieve net zero carbon emission by 2070.
- Rests on 7 key transitions to low-carbon development pathways.
- Informed by the vision of LiFE, Lifestyle for the Environment.

### Long-Term Low Emission Development Strategy (LT-LEDS)

Elements	Current policies and targets
 Low carbon development of electricity systems consistent with development	<ul style="list-style-type: none"> <li>NDC Target: 50% of non-fossil capacity by 2030.</li> <li>Renewable Purchase Obligations for distribution companies, open access consumers and captive power plants.</li> <li>Green energy corridors to strengthen transmission networks in 8 Renewable Energy (RE) rich States.</li> <li>A three-fold rise in nuclear installed capacity by 2032.</li> </ul>
 Integrated, efficient, inclusive low-carbon transport system	<ul style="list-style-type: none"> <li>20% ethanol blending in petrol by 2025.</li> <li>Indian Railways to become net-zero by 2030.</li> <li>Leapfrogging to directly reach Bharat Stage VI emissions.</li> <li>A National Master Plan for Multi-modal Connectivity - PM Gati Shakti.</li> </ul>
 Adaptation in urban design, energy and material-efficiency in buildings, and sustainable urbanisation	<ul style="list-style-type: none"> <li>National Urban Policy Framework (NUPF).</li> <li>National Building Code, Energy Conservation Building Code, Eco-Niwas Samhita (an energy conservation building code for residential buildings).</li> <li>India Cooling Action Plan</li> <li>National Mission on Sustainable Habitat.</li> <li>Extended Producer Responsibility 2021, and Plastic Waste Management (Amendment) Rules 2021.</li> </ul>
 Economy-wide decoupling of growth from emissions and development of an efficient, innovative low-emission industrial system	<ul style="list-style-type: none"> <li>National Missions for Enhanced Energy Efficiency and Sustainable Habitat, Standards and Labelling Scheme, and the Energy Efficiency Financing Platform.</li> <li>Fuel switching through promotion of natural gas and the National Policy on Bio-Fuels.</li> <li>Material efficiency through policies on resource efficiency, plastic and e-waste, and steel recycling.</li> <li>Green hydrogen technology and infrastructure promotion.</li> </ul>
 CO2 removal and related engineering solutions	<ul style="list-style-type: none"> <li>R&amp;D and building human and infrastructure capacity to evolve technologies and methodologies like Carbon Capture Utilisation and Storage (CCUS).</li> </ul>
 Enhancing Forest and vegetation cover consistent with socio-economic and ecological considerations	<ul style="list-style-type: none"> <li>NDC target: Create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent by 2030.</li> <li>Other voluntary contributions: <ul style="list-style-type: none"> <li>To restore 26 million ha degraded land by 2030.</li> <li>12 National Biodiversity Targets, in line with 20 global Aichi biodiversity goals.</li> </ul> </li> <li>Major policies and institutions: National Mission for a Green India, National Afforestation Programme, Nagar Van Yojana, National REDD+ (Reducing Emissions from Deforestation and forest Degradation) Strategy 2018 etc.</li> <li>Major greening efforts of the National Highways Authority of India (NHAI) and Indian Railways.</li> </ul>
 Economic and financial aspects of low-carbon development	<ul style="list-style-type: none"> <li>Business Responsibility and Sustainability Report (BRSR) by SEBI for mandatory sustainability reporting.</li> <li>Inclusion of Renewable energy projects under Priority Sector Lending (PSL).</li> <li>Sustainable Finance Group established by RBI to lead regulatory initiatives in the area of investments linked to climate risk and sustainable finance.</li> </ul>

#### Related News: 'In Our LiFEtime' campaign

- Launched by:** National Museum of Natural History (NMNH), under the Ministry of Environment Forest and Climate Change and United Nations Development Programme (UNDP).
- Objective:** To encourage youth between the ages of 18 to 23 years to become message bearers of sustainable lifestyles.
  - The youth will be encouraged to submit their climate actions that contribute to lifestyles for the environment within their capacity, which are sustainable and scalable, and serve as good practices that can be shared globally.

### 1.2.2. 50 YEARS OF STOCKHOLM CONFERENCE

#### Why in news?

Recently, **Stockholm+50 meeting** was held at Stockholm, Sweden to commemorate the 50 years since the **1972 United Nations Conference on the Human Environment** (also known as the Stockholm Conference), which made the environment a pressing global issue for the first time.

#### More about news

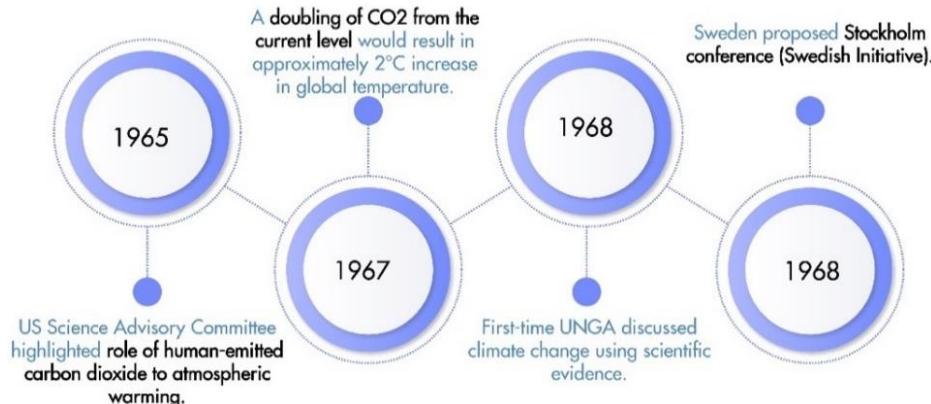
- Stockholm+50 theme:** A healthy planet for the prosperity of all — our responsibility, our opportunity.
- Stockholm+50 agenda:**
  - To share experiences and initiatives to protect the planet.
  - Sustainable recovery from the COVID -19 pandemic.

## About conference

## Stockholm

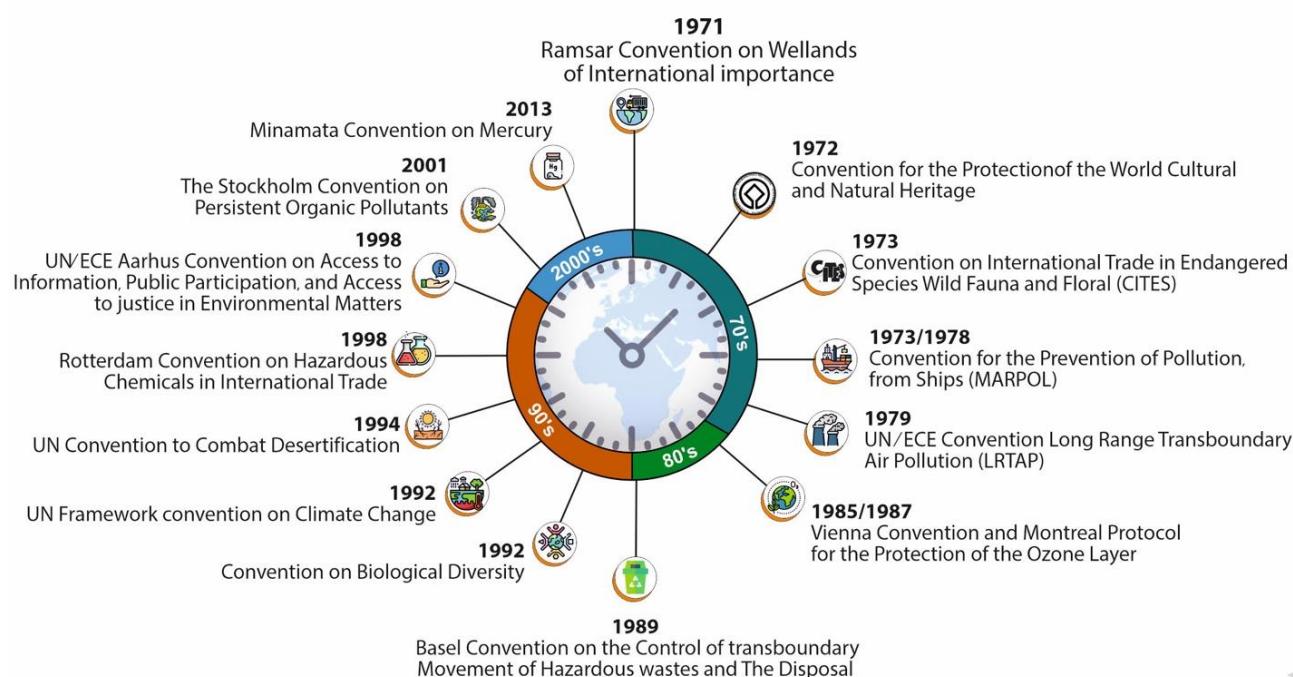
# EVOLUTION TO STOCKHOLM CONFERENCE

- UN's first major conference on international environmental issues.
- Organized in 1972 to coordinate global efforts to promote sustainability and safeguard the natural environment with the theme 'Only One Earth'.
  - 122 countries adopted the Stockholm Declaration on to 26 principles and an action plan.
- 3 dimensions of the conference:
  - Countries agreeing **not to harm each other's environment** or the areas beyond national jurisdiction;
  - Action plan to **study the threat to Earth's environment**; and
  - **Establishment of an international body called the UN Environment Programme (UNEP)** to bring in cooperation among countries.
- Other outcome & success of Stockholm Conference
  - Identification of a theme of sustainable development: 20 years later, the **1992 UN Conference on Environment and Development – the Earth Summit – in Rio de Janeiro** defined sustainable development.
  - Establishing Key Principles
    - ✓ **Precautionary principle:** The Vienna Convention for the Protection of the Ozone Layer was the first multilateral environmental agreement (MEA) that codified precautionary measures in 1985.
    - ✓ **Polluter-pays principle (PPP):** Those producing pollution should bear the costs of managing it to prevent damage to human health and the environment.



**India's Prime Minister at the time, Indira Gandhi, was the only foreign head of government out of 113 nations in attendance at the Stockholm conference.**

## Multilateral Environment Agreements (MEAs) under UNEP



### Stockholm 50+ Recommendations for actionable agenda

- Placing human well-being at the center of a healthy planet and prosperity for all.
- Recognizing and implementing the right to a clean, healthy and sustainable environment.
- Adopting system wide changes in our current economic system.

- Accelerate transformations of high impact sectors.
- Help developing countries tackle environmental challenges by providing access and support for digital and technological solutions.

### 1.2.3. MONTREAL PROTOCOL

#### Why in news?

International Day for the Preservation of the Ozone Layer was celebrated on 16 September with the theme **Montreal Protocol@35**: global cooperation protecting life on earth.

#### About Montreal Protocol, 1987

- **Protocol of Vienna Convention** for the Protection of the Ozone Layer, 1985.
- Governments, scientists and industry work together to **cut out 99% of all ozone-depleting substances (ODS)**.
- **Membership:** Ratified by all 198 UN Member States (including India).
- **Kigali Agreement:**
  - Adopted in 2016 and **entered into force in 2019**.
  - Provided a path to achieve an **80% reduction in HFCs consumption by 2047**.
  - Adopted because **Montreal Protocol** led to **replacement of chlorofluorocarbons (CFCs) with Hydrofluorocarbons (HFCs)** which do **not destroy the Ozone layer** but are extremely potent in causing **global warming**.



#### India and Montreal Protocol

- Became a Party to Montreal Protocol in 1992
- Has successfully met phase out targets of all ODS as per Montreal Protocol Schedule.
- Approved the ratification of Kigali Amendment to Montreal Protocol in 2021.
  - Accordingly, India has to start **phase down by 2028** and **cut HFC emission by 15% of 2024-26 levels by the year 2047**.



#### DO YOU KNOW?

Montreal Protocol is to date **one of the rare treaties to achieve universal ratification**.

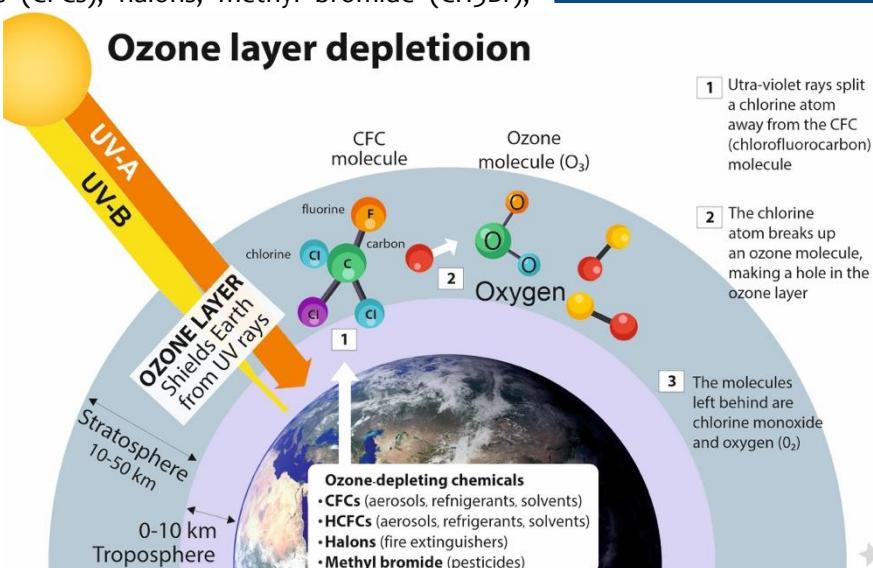


#### DO YOU KNOW?

Nearly 90% of **Earth's ozone resides** in the Ozone Layer.

#### About Ozone ( $O_3$ ) and Ozone-depleting substance (ODS)

- **Ozone layer:** Concentrated in **Stratosphere, absorbs UV rays**.
- **Thinning of the ozone layer:** 1985, ozone hole over the Antarctic.
- **ODS:** Man-made chemicals having high Ozone depleting potential (ODP).
  - E.g.: chlorofluorocarbons (CFCs), halons, methyl bromide ( $CH_3Br$ ), bromochloromethane ( $CH_2BrCl$ ) etc.
- **Uses of ODS:** Refrigerators, air conditioners, fire extinguishers, foams etc.
- **Impact of ozone layer depletion:** Increases risk of skin cancer and cataracts, weakens human immune systems, decreases agricultural productivity, affects terrestrial and aquatic biogeochemical cycles etc.



#### Related news: Ozone Depleting Gas Index

- Released by: US' National Oceanic and Atmospheric Administration (NOAA).
- Tracks the overall stratospheric concentration of ozone-depleting chlorine (ODC) and bromine from long-lived ODSs relative to its peak concentration in the early 1990.
  - Ozone concentration is commonly measured through Dobson Unit.
- Key finding: Overall concentration of ODC in the mid-latitude stratosphere in 2022 are back to those observed in 1980 before ozone depletion was significant.

## 1.2.4. UN OCEAN CONFERENCE (UNOC)

### Why in news?

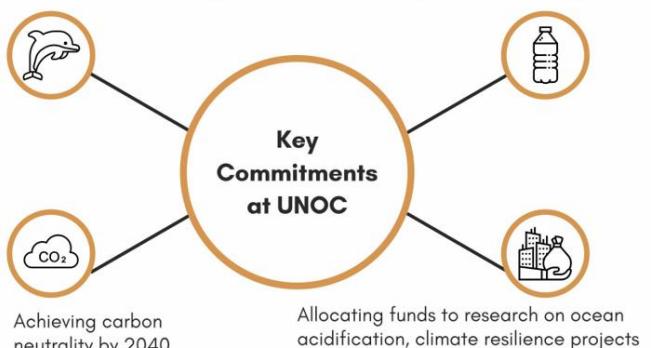
The second UNOC, co-hosted by Kenya and Portugal at Lisbon, ended with the Lisbon Declaration, a political declaration entitled 'Our Ocean, Our Future: call for action'.

### About UNOC

- First UNOC held in 2017 at UN Headquarters in New York, co-hosted by the Governments of Fiji and Sweden.
- Key Highlights of second UNOC**
  - India was a participant and committed to a Coastal Clean Seas Campaign and will work toward a ban on single use plastics.
  - Over 150 countries collectively agreed to scale up science-based and innovative actions to address ocean emergency, supporting the implementation of SDG 14 (Life Below Water).
    - This is in line with the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).
  - Emphasized the particular importance of implementing the Paris Agreement (2015) and Glasgow Climate Pact (2021) to help ensure the health, productivity, sustainable use, and resilience of the ocean.
  - States made voluntary commitments to conserve or protect at least 30% of the global ocean by 2030 within Marine Protected Areas, and other effective area-based conservation measures.
  - UNESCO launched its key State of the Ocean Report (pilot edition) during the event.

Protecting or exceeding 30% of National Maritime Zones by 2030

Reducing plastic pollution and Increasing renewable energy use



## 1.2.5. INNOVATION ROADMAP OF THE MISSION INTEGRATED BIOREFINERIES (IRMIB)

### Why in news?

India announced launch of 'Innovation Roadmap of the Mission Integrated Biorefineries' (IRMIB) at Global Clean Energy Action Forum.

### About IRMIB

- Developed by:** Co-leads of Mission Integrated Bio-refineries (MIB) with active inputs from Brazil, Canada, EC and the UK.
- Aims to fill the void by:**
  - identifying gaps and challenges in current biorefining value chains,
  - prioritising Eight key actions to support the Mission,
  - guiding the Mission's overall path in achieving its goal.

### About Mission Integrated Bio-refineries (MIB)

- 7th mission under Mission Innovation (MI).
- Launched in April 2022.
- Aim: Greater international collaboration and financing for Energy RD&D during the next five years.
- Members:**
  - Co-lead: India and Netherlands
  - Core mission members: Brazil and Canada
  - Mission support group: European Commission and UK

### About Mission Innovation (MI)

- Global initiative to catalyze action and investment in research, development and demonstration to make clean energy affordable, attractive and accessible to all this decade.
- Consists of 22 countries and EU.
  - India is a founding member.
- First phase of the mission launched alongside the Paris Agreement in 2015.
  - Mission Innovation 2.0, second phase of MI, was launched in 2021.



- Goal:** To develop and demonstrate innovative solutions to accelerate the commercialization of integrated biorefineries.
- Target:** To replace 10% of fossil-based fuels, chemicals and materials with bio-alternatives by 2030.
- Prioritizes eight collaborative actions** organized around 3 Pillars of-
  - Supporting Research, Development and Demonstration (RD&D).
  - Accelerating Pilots and Demonstrations.
  - Improving Policy and Market Conditions.

**Related news:** Funding Opportunity on Sustainable Aviation Fuels and Hydrogen Valley Platform were also launched.

- National Funding Opportunity on Sustainable Aviation Fuels** to support and conduct RD&D to foster technological innovations in advanced biofuels for aviation applications.
- Hydrogen Valley Platform:** Developed by the Fuel Cells and Hydrogen Joint Undertaking, A global initiative to optimise the hydrogen demand and supply by onsite generation and utilization, utilize the renewable resources effectively, and water excess areas with geographical identity.

## 1.2.6. MISSION LIFE (LIFESTYLE FOR ENVIRONMENT)

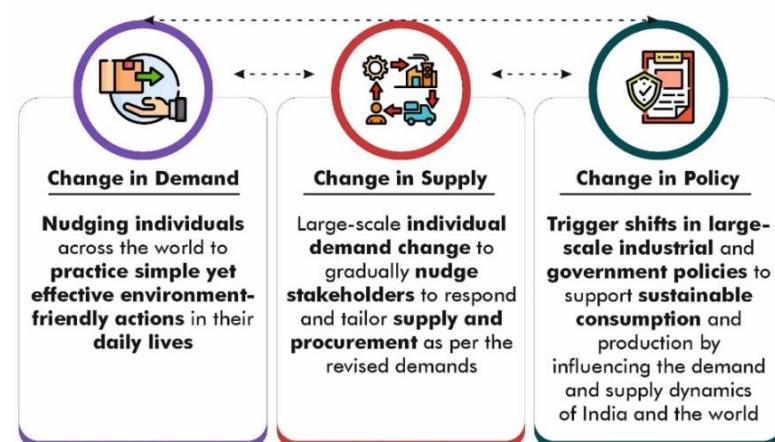
### Why in News?

Recently, the Prime Minister (PM) launched **Mission LiFE** (**Lifestyle for Environment**) at the **Statue of Unity** at Kevadia, Gujarat to protect the environment.

### About Mission LiFE: Objectives and Implementation

- India-led global mass movement.**
- Aim:** To nudge individual and collective action to protect and preserve the environment.
- Concept introduced** by the Indian PM at the **UNFCCC COP-26 in Glasgow**.
- Targets:** Mobilise at least 1 billion Indians and other global citizens to take individual and collective action for protecting and preserving the environment in the period 2022 to 2027.
  - Within India, at least **80% of all villages and urban local bodies** aimed to become environment-friendly by **2028**.
- Mission Duration:** 5-year programme, visualizing **three core shifts** in our collective approach towards sustainability.
  - In 2022-23, the mission will focus on Phase I.
- Implementation:** NITI Aayog to curate and incubate in the first year.
  - Subsequently implementation by the **Ministry of Environment, Forest and Climate Change (MoEFCC)** in a non-linear and non-sequential manner.
- Vision:** To live a **lifestyle that is in tune with our planet and does not harm it**. People living such a lifestyle are called "**Pro-Planet People (P3)**".

### Three phases of Mission LiFE Approach\*



\*\* - Each proceeding phase will organically feed into the next phase. At the same time, all phases are equally simultaneous in nature.



- Recently at the **World Economic Forum's (WEF) Davos Agenda 2022**, India's PM introduced the "P3 movement" that underlines India's climate change commitments.
- Lists 75 lifestyle practices under 7 categories** (refer image), these actions are.

### 1.2.7. CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

#### Why in News?

Recently, India opposed CBAM or carbon border tax proposed by European Union (EU) in 27<sup>th</sup> edition of Conference of Parties (COP) in Sharm El Sheikh.

#### About Carbon Border Adjustment Mechanism (CBAM)

- Plan from the **European Union (EU)**, proposed in **2021**.
- Will tax carbon-intensive products**, such as iron and steel, cement, fertilizer, aluminium, electricity, and hydrogen, **from 2026**.
- Aim:** To eliminate the difference in carbon price paid by companies subjected to the EU's Emissions Trading System (ETS) or its domestic compliance-based carbon market.
- Part of the "Fit for 55 in 2030 package"-** EU's plan to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels, in line with the European Climate Law.
- Functioning:**
  - EU importers buy carbon certificates corresponding to the carbon price on the lines of EU's carbon pricing rules.
  - Deductions can be claimed from their CBAM liability if Non-EU producer has already paid for the emission in the country of production.
- Also known as a **carbon border tax** or a **carbon leakage instrument**.



### 1.2.8. INTERNATIONAL SOLAR ALLIANCE (ISA)

#### Why in news?

In its General Assembly meeting, ISA approved the 'Solar Facility'.

#### About Solar Facility

- A payment guarantee mechanism expected to stimulate investments into solar projects, with **two financial components**:



## International Solar Alliance (ISA)



**Genesis:** A treaty-based intergovernmental organisation launched jointly by India and France at COP-21 in Paris in 2015 to provide a dedicated platform for cooperation among solar resource rich countries and the wider global community.



**Objective:** Guided by its 'Towards 1000' strategy which aims

- to mobilise USD 1,000 billion of investments in solar energy solutions by 2030.
- Delivering energy access to 1,000 million people using clean energy solutions.
- Installation of 1,000 GW of solar energy capacity.



**Membership:** 92 countries have signed and ratified the ISA Framework Agreement.



### Other key information:

- UN General Assembly conferred **Observer Status to the ISA in 2021**.
- The ISA assembly is the apex decision-making body of the 110-members.
- It is open for all member states.
- Major Initiatives under ISA
  - ISA Solar Technology and Application Resource Centre (ISTAR C) to support capacity building efforts in the ISA member countries through training.
  - ISA Solar Fellowship for Mid-Career Professionals, for the creation of a skilled and qualified professional manpower for management of solar energy projects etc.
  - One Sun One World One Grid (OSOWOG), building a global ecosystem of interconnected renewable energy resources, launched in partnership with ISA and World Bank Group.



- **Solar Payment Guarantee Fund** to provide a partial guarantee and enable investments in geographies that do not receive investments.
- **Solar Insurance Fund** to reduce the burden of insurance premium for solar developers in pre-revenue phase of project.
- **Objective:** To attract private capital to flow into “underserved markets” in Africa.
- The assembly also re-elected India and France as its President and Co-President.

### Related news: MoU between International Solar Alliance (ISA) and International Civil Aviation Organisation (ICAO)

- MoU was signed to check growth of CO<sub>2</sub> emissions in the sector and idea of ICAO becoming a partner organisation of ISA was mooted by India.
  - Aviation sector responsible for around 2.5% of global CO<sub>2</sub> emissions.
  - In 2015, India's Cochin International Airport became world's first fully Solar powered airport.



### About International Civil Aviation Organisation (ICAO)

- Established under Convention on International Civil Aviation, also known as 'Chicago Convention'.
- **Objective:** Committed towards reducing carbon emissions in aviation sector.
- **Headquarters:** Montreal, Quebec, Canada
- **Membership:** Funded and directed by 193 national governments.
- **Other Key Information:** Functions
  - Maintain ICAO Secretariat supporting diplomatic interactions
  - Research new air transport policy and standardize innovations as directed and endorsed by governments through ICAO Assembly.

## 1.2.9. GLOBAL ENVIRONMENT FACILITY (GEF) COUNCIL

### Why in news?

The 62nd meeting will be the final council of GEF Trust Fund (GEF-7), closing four-year funding cycle, and commencing GEF-8 cycle.

### More on the news

- GEF-7 safeguard the world's forests, land, water, climate, and oceans, build green cities, protect threatened wildlife, and tackle marine plastic pollution.
- **Key highlights of the GEF-7 Council**
  - Leaders' Pledge for Nature to reverse species loss by 2030 by protecting land and ocean territory with globally important biodiversity.

- **29 donor countries have pledged \$5.33 billion for GEF-8 replenishment period i.e. July 2022 to June 2026 to meet nature and climate targets.**
- **Address threats from climate change, land degradation, and chemicals and waste, and easing pressures on ocean and international waters.**

### About GEF Council

- **GEF's main governing body.**
- **Composition:** 32 members appointed by constituencies of GEF member countries-
  - 14 from developed countries
  - 16 from developing countries.
  - 2 from economies in transition.
- **Members rotate at different intervals** determined by each constituency.
- **India presently a member of a constituency** comprised of the following countries: Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka.
- **Meets twice annually.**
- **Makes decisions by consensus.**
- **Functions:** Develops, adopts and evaluates the operational policies and programs for GEF-financed activities.

**GLOBAL ENVIRONMENT FACILITY (GEF)**



**Washington, D.C., USA**

**Genesis:** Established during 1992 Rio Earth Summit and is only multilateral fund working across all aspects of environmental health.

**Objective:** Support developing countries' work to address the world's most pressing environmental issues with five focal areas – biodiversity loss, chemicals and waste, climate change, international waters, and land degradation.

**Membership:** 185 member countries 

**Other Key Information:**

- Funds managed by Global Environment Facility (GEF): Special Climate Change Fund (SCCF) and Least Developed Countries Fund (LDCF)
- Also supports Montreal Protocol, Global Ship Ballast Water Treaty, UN Law of the Sea Treaty, MARPOL treaty for shipping (International Convention for the Prevention of Pollution From Ships) and UN Agreement on conservation and management of straddling fish stocks and highly migratory fish stocks.



Washington, D.C., USA

<b>Funds managed by the Global Environment Facility (GEF)</b>	
<b>Special Climate Change Fund (SCCF)</b>	<b>Least Developed Countries Fund (LDCF)</b>
<ul style="list-style-type: none"> <li>● <b>Established in 2001</b>, to finance projects relating to:           <ul style="list-style-type: none"> <li>○ Adaptation;</li> <li>○ Technology transfer and capacity building;</li> <li>○ Energy, transport, industry, agriculture, forestry, and</li> <li>○ Waste management and Economic diversification.</li> </ul> </li> <li>● Open to all vulnerable developing countries.</li> <li>● The GEF's <b>new climate change adaptation strategy for the 2022-2026 period</b> will focus SCCF support in the following two priority areas:           <ul style="list-style-type: none"> <li>○ <b>Supporting the adaptation needs of Small Island Developing States (SIDS).</b></li> <li>○ <b>Strengthening technology transfer, innovation, and private sector engagement.</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>● <b>Established in 2001</b> to support a work programme to assist Least Developed Country Parties (LDCs).</li> <li>● <b>Only existing fund</b> with mandate to <b>finance the preparation and implementation of National Adaptation Programs of Action (NAPAs).</b> <ul style="list-style-type: none"> <li>○ NAPAs use existing information to identify a country's priorities for adaptation actions.</li> </ul> </li> <li>● Also supports the implementation of <b>National Adaptation Plans (NAPs)</b>, and the <b>Least Developed Countries work program</b> under the UNFCCC.</li> </ul>

### Related news:

#### GEF Small Grants Programme (SGP)

- 2022 marks the 7<sup>th</sup> phase of SGP and is **jointly implemented by the Ministry of Environment, Forest and Climate Change, UNDP and The Energy and Resources Institute (TERI)**.
- A **corporate program of the GEF**, launched in 1992 during Rio Earth Summit.
- Provides **financial and technical support to local civil society** to develop and implement innovative local actions that address global environmental issues.
- Works closely with and complements other GEF projects and programs, supporting 136 countries and **funds grants up to \$50,000**.

## 1.2.10. OTHER INITIATIVES IN NEWS

<b>Major Economies Forum (MEF) on climate and Energy</b>	<ul style="list-style-type: none"> <li>MEF meeting was aimed to build on the progress achieved at COP 26 by further strengthening climate action while also addressing urgent energy and food security concerns arising from Russia-Ukraine war.</li> <li>Launched in 2009 by US President.</li> <li><b>Aim:</b> Facilitating dialogue among major emitting countries, both developed and developing, to advance efforts against climate change.</li> <li><b>Major Participating countries:</b> Australia, Brazil, Canada, China, EU, France, Germany, India, Japan, UK etc. <ul style="list-style-type: none"> <li>Together they account for roughly 80% of global GDP and global GHG emissions.</li> </ul> </li> <li><b>New initiatives that were announced-</b> <ul style="list-style-type: none"> <li><b>Global Methane Pledge Energy Pathway:</b> Tackling methane leaks, venting, and flaring from the oil and gas sector.</li> <li><b>Collective 2030 Zero-Emission Vehicle Goal and Green Shipping Challenge</b> to reduce emissions in transport sector.</li> <li><b>Clean Energy Technologies Demonstration Challenge</b> to break dependence on fossil fuels.</li> <li>Efforts to Enhance Food Security by increasing fertilizer efficiency.</li> </ul> </li> <li><b>India also called upon</b> the members of MEF to launch a global movement on LiFE.</li> </ul>	 <b>Member</b>
<b>World Green Economy Summit (WGES)</b>	<ul style="list-style-type: none"> <li><b>Union Minister of Environment, Forest and Climate Change attended</b> Ministerial Roundtable for Green Economy at WGES in Dubai, UAE.</li> <li><b>WGES:</b> Led by UAE, aims to propel action to deliver a sustainable future. <ul style="list-style-type: none"> <li>Brings together world-class experts in critical sectors from around the world to directly focus on advancing global green economy and sustainability agenda.</li> </ul> </li> </ul>	
<b>Clean Energy Ministerial (CEM)</b>	<ul style="list-style-type: none"> <li><b>India is hosting</b> the Clean Energy Ministerial (CEM) senior officials' meetings. <ul style="list-style-type: none"> <li>Discussions on topics such as energy transition, Clean Power, Green Steel, and Hydrogen held as part of meeting.</li> </ul> </li> <li><b>A high-level global forum of 29 member countries.</b></li> <li><b>Aim:</b> To promote policies and programs that advance clean energy technology through sharing of knowledge and best practices.</li> </ul>	 <b>Member</b>
<b>Global Clean Energy Action Forum (GCEAF)</b>	<ul style="list-style-type: none"> <li>Union Minister of Science and Technology to take part in GCEAF at Pittsburg, US.</li> <li>GCEAF is first-of-its-kind meeting where 30 countries will participate.</li> <li>A joint convening of 13th Clean Energy Ministerial (CEM13) and 7th Mission Innovation Ministerial (MI-7) hosted by US Department of Energy and Carnegie Mellon University.</li> </ul>	
<b>Science Based Targets initiative (SBTi)</b>	<ul style="list-style-type: none"> <li>A partnership between CDP (a global non-profit), United Nations Global Compact, World Resources Institute (WRI) and World Wide Fund for Nature (WWF).</li> <li>Drives climate action in private sector by enabling organizations to set science-based emissions reduction targets.</li> <li>Also the lead partner of Business Ambition for 1.5°C campaign. <ul style="list-style-type: none"> <li>Campaign is a call from a global coalition of UN agencies, business and industry leaders mobilizing companies to set net-zero science-based targets.</li> </ul> </li> </ul>	
<b>Zero-Emission Vehicle Transition Council (ZEVTC)</b>	<ul style="list-style-type: none"> <li><b>A global forum formed in 2020.</b></li> <li><b>Aim:</b> To accelerate the pace of the global transition to zero emission vehicles (ZEVs). <ul style="list-style-type: none"> <li>At COP26, India, represented by NITI Aayog, participated in the fourth ministerial dialogue of the ZEVTC.</li> </ul> </li> <li><b>Brings together ministers and representatives</b> of some of the world's largest automobile markets to collectively address key challenges in the transition to ZEVs, to enable faster, cheaper, and easier transition to EVs for all.</li> </ul>	 <b>Member</b>
<b>Leaders in Climate Change Management (LCCM)</b>	<ul style="list-style-type: none"> <li><b>National Institute of Urban Affairs (NIUA) and World Resources Institute (WRI)</b> jointly announced LCCM.</li> <li><b>A practice-based learning program.</b></li> <li><b>Aim:</b> Building capacity among urban professionals to lead climate action across sectors and geographies in India.</li> <li>Envisions capacitating 5,000 professionals and preparing them to champion climate change adaptation and mitigation solutions.</li> <li><b>Administrative Training Institute (ATI), Mysuru</b> became the first delivery partner of LCCM program.</li> </ul>	
<b>Green Events Tool (GET)</b>	<ul style="list-style-type: none"> <li><b>Gulf Organisation for Research &amp; Development (GORD), UNFCCC secretariat and UNEP</b> unveiled an online GET to facilitate eco-friendly events.</li> </ul>	

	<ul style="list-style-type: none"> <li>Platform first introduced at UN Climate Change Conference (COP26) in Glasgow, Scotland in 2021.</li> <li>Aim: To encourage actions to reduce negative impacts of events, including their carbon footprint, at planning and implementation stages.</li> </ul>
Global Climate Observing System (GCOS)	<ul style="list-style-type: none"> <li>The GCOS Implementation Plan 2022, was released by the World Meteorological Organisation (WMO), identifying gaps in earth observations and areas that require improvement.</li> <li>It regularly assesses the status of global climate observations of atmosphere, land and ocean and produces guidance for its improvement.</li> <li>Co-sponsored by:           <ul style="list-style-type: none"> <li>World Meteorological Organization,</li> <li>Intergovernmental Oceanographic Commission of United Nations Educational, Scientific and Cultural Organization,</li> <li>United Nations Environment Programme, and</li> <li>International Science Council.</li> </ul> </li> </ul>
Global Alliance for Industry Decarbonization	<ul style="list-style-type: none"> <li>International Renewable Energy Agency (IRENA), co-founding partner Siemens Energy, and 13 companies including Tata Steel and Jindal Steel Works have launched Global Alliance for Industry Decarbonization.           <ul style="list-style-type: none"> <li>Decarbonisation: Process of reducing anthropogenic CO<sub>2</sub> emissions.</li> </ul> </li> <li>Formed under Bali Declaration.</li> <li>Aim: To accelerate net-zero ambitions and decarbonization of industrial value chains in pursuit of Paris Agreement climate goals.</li> <li>Will strengthen dialogue and coordinate action by industrial stakeholders from across the public and private sectors.</li> <li>First meeting of Alliance to take place at UNFCCC COP27.</li> </ul>

## 1.3. CLIMATE MITIGATION AND ADAPTATION

### 1.3.1. INDIA'S UPDATED NDCS

#### Why in news?

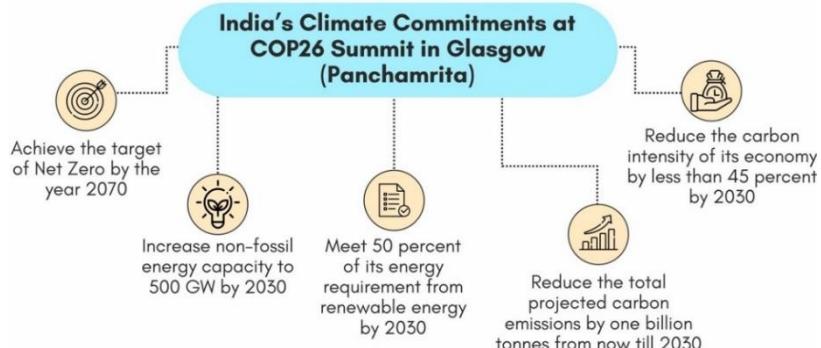
India recently submitted its Updated Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC).

#### About India's NDCs

- First NDC submitted to UNFCCC in 2015.
- India's updated NDCs:
  - Prepared after carefully considering India's national circumstances and the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC).
  - Represents the framework for India's transition to cleaner energy for the period 2021-2030.
  - Updates two of the three quantitative targets of 2015 NDCs related to emissions intensity and share of non-fossil fuels in installed electricity capacity.
  - Two panchamrita commitments (promises made during COP26 in Glasgow) not converted into official targets i.e. of 500 GW non fossil fuel energy & emissions of at least one billion tonnes of carbon dioxide by 2030.

#### About Nationally Determined Contributions (NDCs)

- Post-2020 climate actions requested by the Paris Agreement from each Party.
  - 'Glasgow Climate Pact', signed by the countries during the COP26 of UNFCCC had requested Parties to revisit and strengthen the 2030 targets in their NDCs by the end of 2022.
- In their NDCs, countries communicate-
  - actions they will take to reduce their GHG emissions in order to reach the goals of the Paris Agreement and
  - actions they will take to build resilience to adapt to the impacts of rising temperatures.
- Submitted every 5 years to the UNFCCC secretariat.
- Manifestations of the Paris Agreement's 'ratcheting mechanism'— wherein countries must revise their pledges to be more ambitious every five years.



## INDIA'S NATIONALLY DETERMINED CONTRIBUTION (NDC)

QUANTITATIVE TARGETS					
		Targets for 2030	Previous NDC, 2015	Updated NDC, 2022	Progress
	1.	Reduce the emissions intensity of its GDP	By 33 to 35% by 2030 from 2005 level.	By 45% by 2030 from 2005 level.	Estimated reduction of 28% over 2005 levels
	2.	Cumulative electric power installed capacity from non-fossil fuel-based energy resources with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF).	About 40%	About 50%	42.3% achieved by end of November, 2022
	3.	Create an additional carbon sink through additional forest and tree cover.	2.5 to 3 billion tonnes of Co2 equivalent	Same as earlier	
QUALITATIVE TARGETS					
		Previous NDC, 2015	Updated NDC, 2022		
	4.	Put forward and further propagate a <b>healthy and sustainable way of living</b> based on traditions and values of conservation and moderation.	Put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE' - 'Lifestyle for Environment' as a key to combating climate change.		
	5.	Adopt a <b>climate friendly and a cleaner path</b> than the one followed hitherto by others at corresponding level of economic development.	Same as earlier		
	6.	<b>Better adapt to climate change</b> by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.	Same as earlier		
	7.	<b>Mobilize domestic and new &amp; additional funds</b> from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.	Same as earlier		
	8.	<b>Build capacities, create domestic framework and international architecture</b> for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.	Same as earlier		

### 1.3.2. ADAPTATION GAP REPORT 2022

#### Why in news?

The Adaptation Gap Report 2022: 'Too Little, Too Slow – Climate adaptation failure puts world at risk', was recently released by the UN Environment Programme (UNEP).

#### Related news: Principles for Locally Led Adaptation (LLA)

- The **Global Commission on Adaptation (GCA)** developed a set of principles to strengthen locally led adaptation.
  - GCA was established by Netherlands and the leaders of 22 other convening countries (including India) in 2018 with the mandate to accelerate adaptation by elevating the political visibility of adaptation and focusing on concrete solutions.
- The Principles, launched at the **2021 Climate Adaptation Summit**, are intended to **guide the adaptation community** as it moves programs, funding and practices towards adaptation that is increasingly owned by local partners.

### Key Findings of the report

- More than 8 out of 10 countries** (84% of Parties to the UNFCCC) have at least one national adaptation planning instrument.
- Combined adaptation and mitigation finance flows in 2020 fell at least US\$17 billion short** of the **US\$100 billion** pledged to developing countries.
- Adaptation finance gap** in developing countries is likely **5 to 10 times greater than current international adaptation finance flows**.

**UN Environment Programme (UNEP)**

**Genesis:** An intergovernmental organization established in June 1972 as **an outcome from the United Nations Conference on the Human Environment** (Stockholm Conference, 1972).

**Objective:** Sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development and serves as an authoritative advocate for the global environment.

**Membership:** 193 Member States

**Other key information:**

- Works under the umbrella of the UN 2030 Agenda for Sustainable Development, identifying and addressing the most relevant environmental issues of our time.
- Structure: Chaired by its Executive Director.
- Depends on voluntary contributions for 95% of its income.
- Administers, or provides secretariat functions for many multilateral environmental agreements (MEAs) and other entities

**Major Reports:**

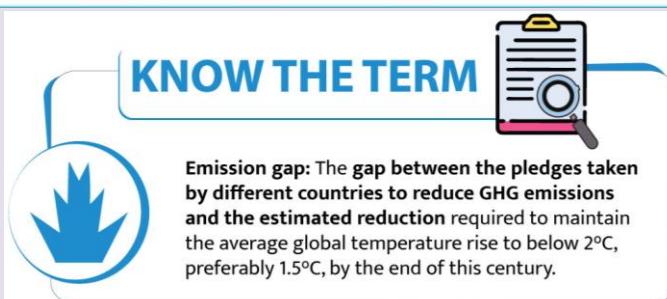
- Global Environment Outlook (GEO) Report
- Adaptation Gap Report
- Triple Emergency
- Cooling Emissions And Policy Synthesis Report (published by UNEP in association with Cooling Emissions And Policy Synthesis Report)

The diagram illustrates the agreements administered by UNEP, arranged in a grid. The top row contains three agreements: Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention), 1989; Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989; and Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, 1998. The bottom row contains four agreements: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973; Vienna Convention for the Protection of the Ozone Layer, 1985; Convention on Biological Diversity (CBD), 1992; and Stockholm Convention of Persistent Organic Pollutants, 2001. A legend indicates that circles with numbers represent MEAs, while diamonds represent other agreements.

### Related News: Emissions Gap Report 2022 released by UNEP

- An annual report that assesses the emission gap.
- Key Findings of the report**
  - To get on track for limiting global warming to **below 2.0°C and 1.5°C**, **global GHG emissions must be reduced by 30% and 45% respectively**, compared with current policy projections.
  - India is the third largest GHG emitter** (China is at 1<sup>st</sup> and US at 2<sup>nd</sup>), but its per capita emission remains far below the world average at 2.4 tCO2e.
  - The bottom 50% of households contribute 12% of the global total GHG emissions, whereas the top 1% emit contribute 17% of the total.

### KNOW THE TERM



### 1.3.3. CARBON CAPTURE UTILISATION AND STORAGE (CCUS)

#### Why in News?

NITI Aayog launched carbon capture utilisation and storage (CCUS) policy framework and its deployment mechanism in India.

#### Initiative for CCUS in India

- National Centres of Excellence:** Establishment of two National Centres of Excellence in CCUS at **IIT Bombay and JNCASR, Bengaluru**.
  - These centres will facilitate capturing & mapping of current R&D and innovation activities in the domain and also develop networks of researchers, industries and stakeholders.
- Mission Innovation Challenge on CCUS** to enable near-zero CO<sub>2</sub> emissions from power plants and carbon-intensive industries.
- Accelerating CCS Technologies (ACT)** to facilitate R&D and innovation that can lead to development of safe and cost-effective CCUS technologies.

## About the policy framework

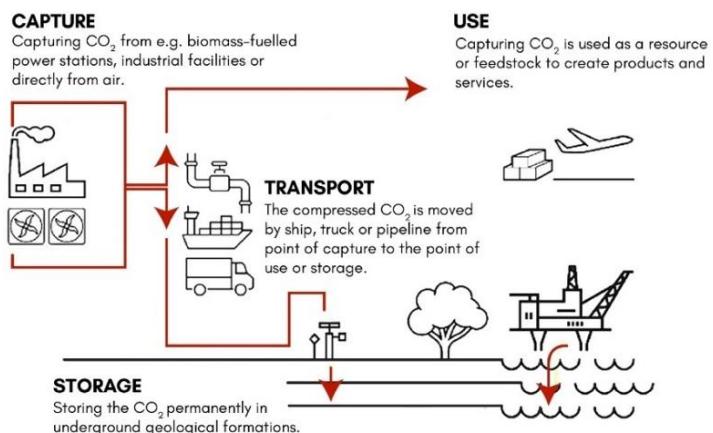
- Aims to develop and implement a practicable framework to accelerate research and development on CCUS in India.
- Explores the importance of the technology as an emission reduction strategy to achieve deep decarbonization from the hard-to-abate sectors like steel, cement etc.

## About CCUS

- Encompasses technologies to remove CO<sub>2</sub> from flue gas and the atmosphere, followed by recycling the CO<sub>2</sub> for utilization and determining safe and permanent storage options.
  - Flue gases are produced when coal, oil, natural gas, wood or any other fuel is combusted in an industrial furnace, a power plant's steam-generating boiler, or other large combustion device.
- CO<sub>2</sub> captured using CCU technologies are converted into fuel (methane and methanol), refrigerants, building materials etc.
  - Captured gas is used directly in fire extinguishers, pharma, food and beverage industries as well as the agricultural sector.
- Different Carbon Capture technologies for different applications are as follows:

Technology	Details
Chemical Solvent	<ul style="list-style-type: none"> <li>Preferred when dealing with gas streams that are lean in CO<sub>2</sub>.</li> <li>Have relatively lower pressures such as flue gas streams from power plants etc.</li> </ul>
Physical Solvent	<ul style="list-style-type: none"> <li>Work well on gas streams with relatively higher CO<sub>2</sub> concentration and pressure such as pre-combustion capture in case of gasification projects.</li> </ul>
Adsorption	<ul style="list-style-type: none"> <li>Suitable for gas streams with moderate to high pressure and moderate CO<sub>2</sub> concentration such as steam methane reforming (SMR) flue gas.</li> </ul>
Cryogenic Separation	<ul style="list-style-type: none"> <li>Preferred in cases where cost of power is low.</li> </ul>

## Carbon capture, utilisation and storage (CCUS)



### 1.3.4. UNIFORM CARBON TRADING MARKET

#### Why in news?

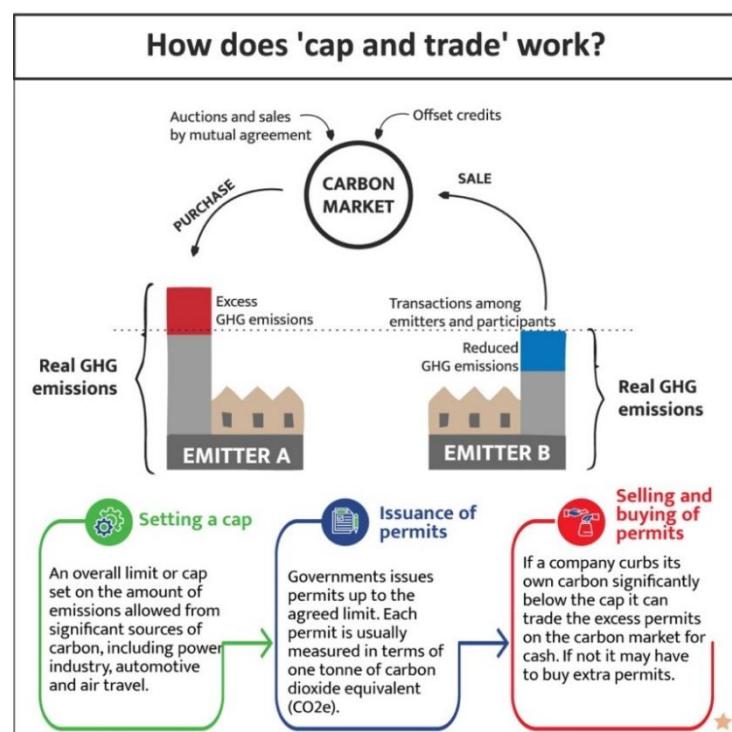
The central government is considering implementation of a carbon trading scheme that will subsume all carbon trading mechanisms in India.

#### More on the news

The government proposes to begin with a voluntary carbon market and gradually shift to 'cap and trade', where industries are given emission targets like in EU emission trading system markets.

#### About Carbon trading/carbon emissions trading

- Market-based system of buying and selling permits and credits for carbon emission.
  - Most use model- cap and trade.
- The idea of cap-and-trade originated with the Kyoto Protocol.



- Kyoto Protocol created 3 market mechanisms: Emissions Trading, Clean Development Mechanism, Joint implementation.
- Paris Agreement under Article 6, created a new market mechanism and a framework for non-market approaches mechanism.
- Can exist at international, national, state or local level.
  - E.g., in 2021, China launched the world's largest market for carbon emissions trading.

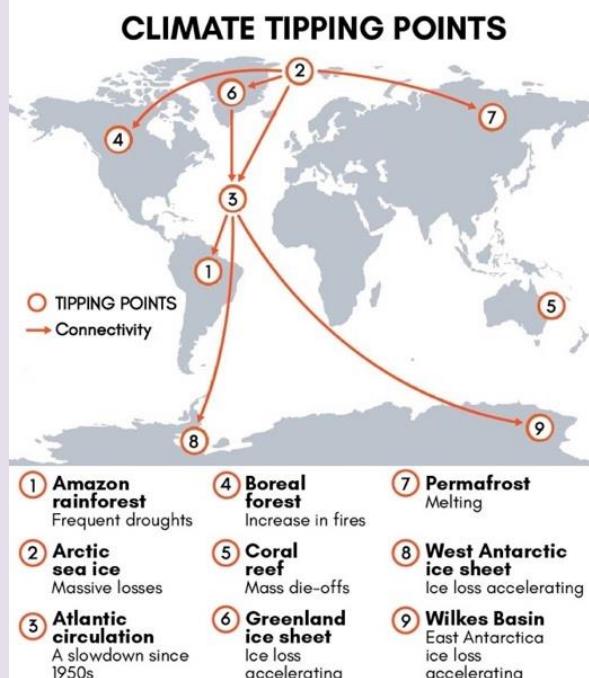
Market approaches under the Paris Agreement (Article 6)	
 <b>Internationally Transferred Mitigation Outcomes (ITMO)</b>	 <b>Sustainable Development Mechanism(SDM)</b>
<b>Market Mechanism 1 (Article 6.2)</b> <ul style="list-style-type: none"> <li>➢ Allows countries on voluntary direct bilateral cooperation basis to sell any extra emission reductions they have achieved compared to their Nationally Determined Contributions (NDCs) target.</li> </ul>	<b>Market Mechanism 2 (Article 6.4)</b> <ul style="list-style-type: none"> <li>➢ Trading of emissions reductions created anywhere in the world by the public or private sector.</li> </ul>

Related news: Digital Monitoring, Reporting and Verification (D-MRV) Systems
<ul style="list-style-type: none"> <li>• With growing interest of countries to participate in carbon markets to meet their climate change goals, innovative D-MRV are evolving to track reductions in GHG emissions.</li> <li>• Represent the first step in end-to-end digitalization of post-2020 carbon markets.</li> <li>• Based on AI, machine learning, blockchain, smart sensors, drones etc.</li> </ul>

Existing carbon trading mechanisms in India	
 <b>Renewable Energy Certificate (REC)</b>	 <b>Energy Saving Certificates (ESCs) under Perform, Trade and Achieve (PAT) scheme</b>

## 1.4. OTHER CLIMATE RELATED NEWS AND CONCEPTS

First Carbon-Neutral Panchayat	<ul style="list-style-type: none"> <li>• Palli in Jammu became India's first carbon-neutral panchayat.</li> <li>• <b>Carbon neutrality:</b> Balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks.           <ul style="list-style-type: none"> <li>○ <b>Carbon sequestration:</b> Removing carbon oxide from the atmosphere and then storing it.</li> </ul> </li> </ul>
Climate Tipping points	<ul style="list-style-type: none"> <li>• For the first time, since wide availability of satellite images, Scientists observed <b>breakup of Conger Ice Shelf</b> in eastern Antarctica.           <ul style="list-style-type: none"> <li>○ <b>Reason:</b> Rising temperatures with both North and South Pole seeing warmer than average temperature <b>despite opposite seasons.</b></li> </ul> </li> <li>• Also, new research highlighted that <b>Antarctica is approaching a climate tipping point by 2060</b>- when Antarctic ice could begin melting at a runaway rate.</li> <li>• <b>Climate tipping points:</b> Points where any small change could push the earth system into abrupt or irreversible change.           <ul style="list-style-type: none"> <li>○ Globally 9 climate tipping points including the Antarctic Ice Sheet.</li> </ul> </li> </ul>



<b>Greenwashing</b>	<ul style="list-style-type: none"> <li>Reserve Bank of India <b>Deputy Governor called for a taxonomy on green finance to avoid the risk of greenwashing.</b></li> <li>Term coined by environmentalist <b>Jay Westerveld</b> in 1986.</li> <li><b>Practice of misleading general public</b> into believing that companies, sovereigns or civic administrators are <b>doing more for the environment than they actually are.</b></li> <li>May involve making a product or policy <b>seem more environmentally friendly or less damaging</b> than it is in reality.</li> </ul> <p>The diagram illustrates seven common forms of greenwashing, each represented by a colored circle and an icon:</p> <ul style="list-style-type: none"> <li><b>Fibbing:</b> make environment claims that are simply false (green circle, plant icon)</li> <li><b>Vagueness:</b> being purposely non-specific about operations or materials (yellow circle, target icon)</li> <li><b>Less Evils:</b> applying a do-good label to an environmentally unfriendly product (orange circle, box icon)</li> <li><b>Irrelevance:</b> Claiming to avoid using a material or practice that is already illegal or non-standard (blue circle, person icon)</li> <li><b>Hidden Trade-off:</b> suggesting a product is "green" based on a single environment attribute (pink circle, gear icon)</li> <li><b>No Proof:</b> making an environment claim that cannot be substantiated (purple circle, document icon)</li> <li><b>Fibbing:</b> make environment claims that are simply false (green circle, plant icon)</li> </ul>
<b>Keeling curve</b>	<ul style="list-style-type: none"> <li>CO<sub>2</sub> levels measured at <b>Mauna Loa Atmospheric Baseline Observatory (MLAO), Hawaii</b>, run by US National Oceanic and Atmospheric Administration (NOAA), are now comparable to what they were 4 million years ago.</li> <li><b>MLAO:</b> Site for daily record of global atmospheric CO<sub>2</sub> concentration since 1958 under Keeling Curve.             <ul style="list-style-type: none"> <li><b>Location-</b> Slopes of Mauna Loa volcano, world's largest active volcano</li> </ul> </li> <li>Other gases measured- carbon monoxide, methane, nitrous oxide, sulfur dioxide etc.</li> <li><b>Keeling Curve:</b> Named after Dr. Charles David Keeling, longest uninterrupted instrumental record of atmospheric CO<sub>2</sub> in the world.</li> </ul> <div style="border: 1px solid orange; padding: 10px; margin-top: 10px;"> <p style="text-align: center;"><b>KEELING CURVE</b></p> </div>

## 1.5. REPORTS AND INDICES

Reports	Details
<b>State of the Global Climate Report 2021</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> World Meteorological Organization (WMO)</li> <li><b>Gives details of climate indicators</b> such as temperatures, ocean heat, ocean acidification, sea level rise, sea ice, glaciers and extreme weather.</li> <li><b>Complements the IPCC Sixth Assessment report.</b></li> </ul> <div style="border: 1px solid orange; padding: 10px; margin-top: 10px;"> <p style="text-align: center;"><b>World Meteorological Organization (WMO)</b></p>   <p>Geneva, Switzerland</p> <p><b>Genesis:</b> An intergovernmental organization established by the ratification of the WMO Convention in 1950.          ◆ Originates from the International Meteorological Organization (IMO), which dates back to 1873.</p> <p><b>Objective:</b> Dedicated to international cooperation and coordination on the state and behaviour of the Earth's atmosphere, its interaction with the land and oceans, the weather and climate it produces, and the resulting distribution of water resources.</p> <p><b>Membership:</b> 193 Member States and Territories.</p> <p><b>Other key information:</b>          ◆ Its supreme body is the World Meteorological Congress.          ◆ It is a specialized agency of the United Nations (UN).</p> </div>

	<p><b>Key findings</b></p> <ul style="list-style-type: none"> <li>• Global mean sea level reached a new record high in 2021, rising an average of 4.5 mm per year over the period 2013–2021.           <ul style="list-style-type: none"> <li>◦ Sea levels along almost the entire Indian coast rising faster than the global average.</li> </ul> </li> <li>• Countries with the highest numbers of internal displacements (due to Hydro-meteorological hazards): China, Vietnam and Philippines.</li> </ul>
Global Ocean Observing System (GOOS) Report Card, 2022  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> World Meteorological Organisation in partnership with Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO) and other GOOS partners (Annually since 2017)           <ul style="list-style-type: none"> <li>◦ GOOS: A permanent global system for observations, modeling, and analysis of marine and ocean data.</li> </ul> </li> <li>• <b>Highlighted biological observations for the first time</b> and identifies gap in system.           <ul style="list-style-type: none"> <li>◦ Pointed at inequality in operational services across oceans like Indian, Atlantic and Southern Ocean.</li> </ul> </li> </ul>
Greenhouse Gas Bulletin, 2022  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> World Meteorological Organization (WMO) (annually).</li> <li>• <b>Key findings</b> <ul style="list-style-type: none"> <li>◦ Atmospheric levels of 3 main GHGs - carbon dioxide, methane and nitrous oxide reached new record highs in 2021.</li> <li>◦ Emissions will also increase by 10.6% by 2030 from 2010 levels.</li> </ul> </li> </ul>
Climate Investment Opportunities in India's Cooling Sector  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> World Bank</li> <li>• <b>Key highlights</b> <ul style="list-style-type: none"> <li>◦ By 2030, over 160-200 million people across India could be exposed to lethal heat waves annually.</li> <li>◦ By 2030, around 34 million people will face job losses due to heat stress related productivity decline.</li> <li>◦ By 2037, demand for cooling is likely to be eight times more than current levels, leading to an expected rise of 435% in annual GHG emissions over next two decades.</li> </ul> </li> </ul>
Climate and Development: An Agenda for Action  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> World Bank</li> <li>• Compiles and harmonizes results from the World Bank Group's 'Country Climate and Development Reports' (CCDRs).           <ul style="list-style-type: none"> <li>◦ CCDRs: New core diagnostic reports that integrate climate change and development considerations.</li> </ul> </li> <li>• Covers 24 countries that account for 34% of the world's GHG emissions.</li> </ul>
Nationally Determined Contributions (NDC) Synthesis Report, 2022  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> UNFCCC</li> <li>• Second such report.</li> <li>• An annual summary of climate commitments made by countries and their impact on GHG emissions.</li> <li>• <b>Analysed NDCs of 193 Parties to the Paris Agreement</b>, including 24 updated or new NDCs submitted after COP 26 (Glasgow).</li> <li>• <b>Key Highlights:</b> <ul style="list-style-type: none"> <li>◦ Cumulative CO<sub>2</sub> emissions in 2020-2030 to likely use up 86% of the remaining carbon budget.</li> <li>◦ Combined climate pledges could put the world on track for about 2.5°C of temperature rise by 2100, from a possible range of 2.1°C to 2.9°C.</li> </ul> </li> </ul>
Investing in carbon neutrality: Utopia or the new green wave?	<ul style="list-style-type: none"> <li>• <b>Released by:</b> UN Food and Agriculture Organization (FAO) and European Bank for Reconstruction and Development (EBRD)</li> <li>• Carbon neutrality/ Net zero CO<sub>2</sub> emissions: Anthropogenic CO<sub>2</sub> emissions balanced globally by anthropogenic CO<sub>2</sub> removals over a specified period.</li> </ul>
State of Climate Action Report 2022  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> Climate Action Tracker (an independent analytic group comprising Climate Analytics and New Climate Institute), the United Nations High-Level Climate Change Champions, World Resources Institute and others.</li> <li>• <b>Provides a comprehensive assessment of the global gap in climate action</b> across the world's highest-emitting systems.</li> </ul>

<b>Climate Transparency Report (CTR)</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Climate Transparency             <ul style="list-style-type: none"> <li>It is a global partnership with a shared mission to stimulate a “race to the top” in climate action in G20 countries through enhanced transparency.</li> </ul> </li> <li><b>Key highlights:</b> <ul style="list-style-type: none"> <li>G20 members responsible for around 3/4th of global emissions.</li> <li><b>Six G20 members</b> including <b>India did not sign the global methane pledge.</b></li> </ul> </li> </ul>
<b>Global Carbon Budget 2022 report</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Global Carbon Project (GCP)             <ul style="list-style-type: none"> <li><b>Established in 2001</b>, GCP is shared partnership between International Geosphere-Biosphere Programme, International Human Dimensions Programme on Global Environmental Change, World Climate Research Programme and DIVERSITAS (partnership of inter-governmental and NGOs integrating biodiversity science).</li> </ul> </li> <li><b>Aim:</b> To develop complete picture of global carbon cycle.</li> <li><b>Key highlights of the Report</b> <ul style="list-style-type: none"> <li><b>Global CO<sub>2</sub> concentrations</b> set new record.</li> <li>Atmospheric CO<sub>2</sub> concentrations are now <b>51% above</b> pre-industrial levels.</li> <li>Projected CO<sub>2</sub> emissions decrease in China and European Union, but <b>increase in US, India (6%), and rest of world.</b></li> </ul> </li> </ul>
<b>Climate Change Performance Index 2023 (CCPI)</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Germanwatch, NewClimate Institute and Climate Action Network.</li> <li><b>Evaluates 59 countries and European Union including India.</b></li> <li><b>Looks at four categories:</b> GHG emissions, renewable energy, energy use, and climate policy.             <ul style="list-style-type: none"> <li>Also tracks implementation of Paris Agreement by various countries.</li> </ul> </li> <li><b>Key Findings</b> <ul style="list-style-type: none"> <li><b>First 3 places left empty</b> as no country performed well enough in all index categories.</li> <li><b>Denmark ranked fourth.</b></li> <li><b>India ranked 8<sup>th</sup> (rose two spots).</b></li> </ul> </li> </ul>
<b>Carbon Pricing Leadership Report 2021-22</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Secretariat of Carbon Pricing Leadership Coalition (CPLC)             <ul style="list-style-type: none"> <li>CPLC is a <b>voluntary initiative that brings together leaders from government, business, civil society and academia</b> to enhance global understanding of carbon pricing as a tool for accelerating and financing effective climate action.</li> </ul> </li> <li>Prepared to review <b>global developments in carbon pricing, implications for carbon market growth</b> and broader limitations to carbon pricing potential.</li> <li><b>Key Finding:</b> Less than 4% of global emissions are currently covered by a carbon price within the range needed by 2030 to meet the Paris Agreement temperature goals.</li> </ul>
<b>The World Heritage Glaciers Report</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Jointly released by UNESCO and IUCN (International Union for Conservation of Nature and Natural Resources).</li> <li><b>Key findings:</b> <ul style="list-style-type: none"> <li>1/3rd of Glaciers among the World Heritage sites will disappear by 2050.</li> <li>Glaciers identified in 50 sites on the UNESCO World Heritage List.</li> </ul> </li> </ul> <div style="text-align: center;"> <p><b>GLACIERIZED AREA OF INDIA</b></p>  <p>The map shows the "GLACIERIZED AREA OF INDIA" across several countries. Key areas labeled include the Siachen Glacier in J&amp;K, Ladakh, and PAKISTAN; Chhota Shigri Glacier, Gangotri-Chaukhamba Area, Karmet Area, and Nanda Devi Area in the northern Indian states; Kanchenjunga Area in NEPAL; Arunachal Pradesh in BHUTAN; and Assam in BANGLADESH. The map also shows parts of CHINA, INDIA, and NEPAL. States like J&amp;K, HP, CHH, BIHAR, WB, and ASSAM are also indicated.</p> </div>

Finance for climate action: Scaling up investment for climate and development Report	<ul style="list-style-type: none"><li>• <b>Released by:</b> Independent High-Level Expert Group on Climate Finance (CF).<ul style="list-style-type: none"><li>○ Group was launched in 2021 by <b>COP26 and COP27 presidencies</b> and <b>UN Climate Change High-Level Champions</b>.</li></ul></li><li>• <b>Status of CF</b><ul style="list-style-type: none"><li>○ 90% of total CF is targeting <b>mitigation activities</b>.</li><li>○ <b>Most CFs were raised as debt</b>, of which only 16% was low-cost.</li><li>○ Most financing remains in its country of origin.</li><li>○ Emerging markets and developing economies, except China, will need \$2 trillion per year by 2030.</li></ul></li></ul>
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**31 MAR, 9 AM | 17 MAR, 1 PM | 21 FEB, 9 AM | 24 JAN, 1 PM**

**AHMEDABAD: 16<sup>th</sup> Feb, 8:30 AM | CHANDIGARH: 19<sup>th</sup> Jan, 5 PM | PUNE: 21<sup>st</sup> Jan, 8 AM**

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## 2. POLLUTION

### 2.1. AIR POLLUTION

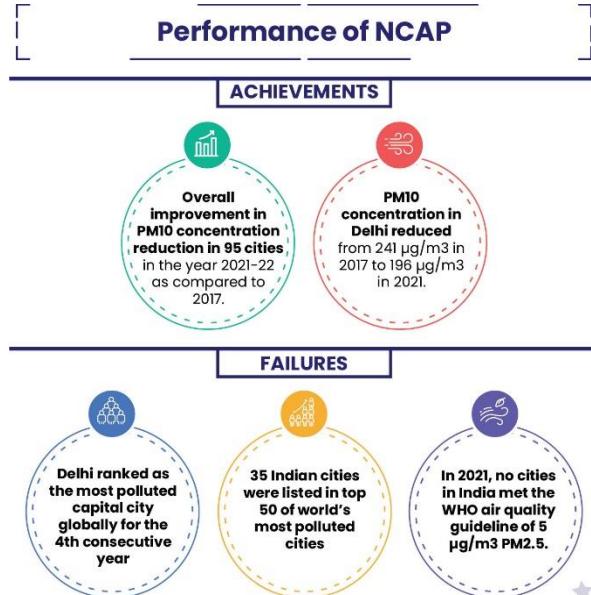
#### 2.1.1. NEW TARGETS FOR NATIONAL CLEAN AIR PROGRAMME (NCAP)

##### Why in news?

The Centre has set a **new target of a 40% reduction in particulate matter concentration** in cities covered under the **National Clean Air Programme (NCAP) by 2026**, updating the earlier goal of 20 to 30% reduction by 2024.

##### About NCAP

- Launched in 2019 for reducing comprehensive mitigation actions for prevention, control and abatement of air pollution.
- Initially envisaged to achieve **targets of 20 to 30 % reduction in Particulate Matter (PM10 and PM2.5) concentration by 2024** across the country taking 2017 as the base year.
- Key features:**
  - Preparation of City-specific action plans** which include measures for strengthening the air quality monitoring network, reducing vehicular and industrial emissions, increasing public awareness, etc.
  - Implemented in 132 cities-**
    - ✓ **123 Non-Attainment cities (NACs)** identified under NCAP based on non-conforming to National Ambient Air Quality Standards (NAAQS) consecutively for five years.
    - ✓ **8 million Plus Cities (MPCs)** identified by 15th Finance Commission (XV-FC), for receiving performance-based grant for air quality improvement.
  - PRANA (Portal for Regulation of Air-pollution in Non-Attainment cities)** portal monitors the implementation of NCAP.



##### Related News:

###### Swachh Vayu Sarvekshan

- Ministry of Environment, Forest and Climate Change will launch **Swachh Vayu Sarvekshan** under NCAP.
- 131 cities to be ranked in the country for implementing City Action Plans prepared NCAP for **reducing air pollution upto 40% by 2025-26**.
  - Cities categorized into 3 groups based on population (population > 10 lakh, population between 3 to 10 lakh and population < 3 lakh).
- For the survekshan cities are required to-**
  - do the annual self-assessment as per the framework provided on **PRANA online portal**.
  - report implementation of activities and measures taken in respect of solid waste management, road dust management, management of construction and demolition waste, control of vehicular emissions and industrial pollution.
- Based on the **self-assessment and third party assessment**, 3 best performing cities in each group will be given cash award.

#### 2.1.2. NORMS FOR THERMAL POWER PLANTS (TPPS)

##### Why in news?

Ministry of Environment, Forest and Climate Change (MoEF&CC) gave two-year extension to thermal power plants (TPPs) on SO<sub>2</sub> norms.

##### About TPP Norms

- In 2015, MoEF&CC notified environmental norms for particulate matter (PM), sulphur dioxides (SO<sub>2</sub>), nitrogen oxides and mercury and water use for coal based TPPs.



##### DO YOU KNOW?

Coal TPPs contribute to over half SO<sub>2</sub> concentration, 30% oxides of nitrogen, 20% PM in the ambient air..

- Initially deadline for implementation- 2017 was extended to 2022.
- Deadline for SO<sub>2</sub> further extended for all three categories of TPPs.
  - However, deadline remains same for meeting PM and NO<sub>x</sub> standards.
- Compliance with norms requires retrofitting existing TPPs with auxiliaries to control emissions such as Flue Gas Desulphurisation (FGD), Selective Catalytic Reduction etc.
  - FGD: A set of technologies used to remove SO<sub>2</sub> from sources of emissions, e.g., exhaust flue gases of fossil-fuel power plants.

SO <sub>2</sub> Norms for Thermal Power Plants (TPPs)			
Category	Criteria	Deadline for parameters other than SO <sub>2</sub> emissions	Deadline for SO <sub>2</sub> emissions
A	Within 10 km radius of the National Capital Region (NCR) or cities having million-plus population.	End of 2022	End of 2024
B	Within 10 km radius of critically polluted areas or non-attainment cities (not meeting National Ambient Air Quality Standards).	End of 2023	End of 2025
C	Remaining plants	End of 2024	End of 2026

### 2.1.3. COMMISSION FOR AIR QUALITY MANAGEMENT (CAQM)

#### Why in news?

Commission for Air Quality Management (CAQM) bans use of coal in Delhi and nearby cities from January 2023

#### More on the news

- The CAQM issued directions to ban the use of coal in industrial, domestic and other miscellaneous applications to bring down GHG emission.
  - Use of low-sulphur coal in thermal power plants has been exempted from the ban.
- Date of implementation of ban on use of coal-
  - October 1, 2022 in areas having PNG (piped natural gas) infrastructure and supply.
  - January 1, 2023 in areas where PNG supply is still not available.

#### About Commission for Air Quality Management (CAQM)

- A statutory body established under the **Commission for Air Quality Management in National Capital Region and Adjoining Areas Act, 2021**.
- First established in 2020 through an Ordinance.
- Headed by Chairperson with at least 15 years' experience in the field of environment and pollution or 25 years of administrative experience.
- Appeal of CAQM orders, directions etc.: National Green Tribunal.
- Functions of CAQM
  - Coordinate actions on monitoring of air quality.
  - Planning and executing plans to prevent and control air pollution in NCR.
  - Conduct research and development through networking with technical institutions.

#### Related news:

##### Graded Response Action Plan (GRAP)

- CAQM issued orders for enforcing measures under 'stage-1' of GRAP in National Capital Region (NCR) after air quality deteriorated to be in 'poor' category in Delhi.
- GRAP: An action plan to address air pollution in Delhi-NCR, based on 4 different stages of adverse air quality. (refer table)
  - It was revised recently by CAQM under provisions of CAQM in NCR and Adjoining Areas Act, 2021.

##### Bio-decomposer

- Delhi government sprayed bio-decomposers on fields to curb stubble burning.

##### Graded Response Action Plan (GRAP)

Air Quality (AQ)	Prescribed Measures
Stage I - 'Poor' (201-300)	<ul style="list-style-type: none"> <li>● Prohibition on construction and demolition activities at plots equal to or more than 500 sqm. Spreading public awareness for reporting air pollution incidents etc.</li> </ul>
Stage II - 'Very poor' (301- 400)	<ul style="list-style-type: none"> <li>● Ensuring uninterrupted power supply to discourage use of generator sets. Ban on use of diesel generator sets except for emergent and essential services including railway etc.</li> </ul>
Stage III - 'Severe' (401-450)	<ul style="list-style-type: none"> <li>● Closure of brick kilns and hot mix plants not operating on fuels approved by CAQM.</li> </ul>
Stage IV - 'Severe+'	<ul style="list-style-type: none"> <li>● Four-wheeler diesel light motor vehicles will not be allowed. Closure of all industries in NCR not running on fuels approved by CAQM.</li> </ul>

- Bio-decomposer capsule:**
  - Developed by Indian Agricultural Research Institute.
  - Accelerates decomposition process of stubble by turning it into manure over a period of 15-20 days.
  - Composed of a group of beneficial micro-organisms.

## 2.1.4. WHO'S AIR QUALITY DATABASE

### Why in news?

WHO has released 2022 update of its air quality database.

### About the 2022 update

- Almost the entire global population (99%) breathes air that exceeds WHO air quality limits.
- Introduces for the first time, ground measurements of annual mean concentrations of nitrogen dioxide ( $\text{NO}_2$ ), a common urban pollutant and precursor of particulate matter and ozone.
- Includes measurements of particulate matter with diameters equal or smaller than 10  $\mu\text{m}$  ( $\text{PM}_{10}$ ) or 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ).

### WHO's 2021 Air Quality Guidelines

Pollutant	Averaging Time	2021 AQGs
$\text{PM}_{2.5}$ , $\mu\text{g}/\text{m}^3$	Annual	5
	24-hour <sup>a</sup>	15
$\text{PM}_{10}$ , $\mu\text{g}/\text{m}^3$	Annual	15
	24-hour <sup>a</sup>	45
$\text{O}_3$ , $\mu\text{g}/\text{m}^3$	Peak season <sup>b</sup>	60
	8-hour <sup>a</sup>	100
$\text{NO}_2$ , $\mu\text{g}/\text{m}^3$	Annual	10
	24-hour <sup>a</sup>	25
$\text{SO}_2$ , $\mu\text{g}/\text{m}^3$	24-hour <sup>a</sup>	40
$\text{CO}$ , $\text{mg}/\text{m}^3$	24-hour <sup>a</sup>	4

\*

### About the WHO Air quality guidelines

- Recommended levels and interim targets for common air pollutants: PM, O<sub>3</sub>, NO<sub>2</sub>, and SO<sub>2</sub>.
- First released in 1987 and Latest global version published in 2021.

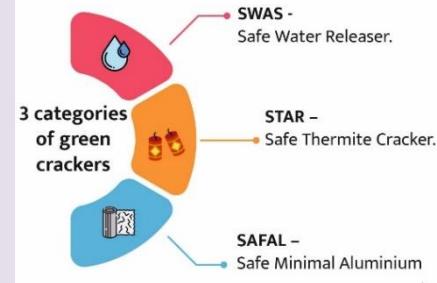
### Related news: National Air Quality Resource Framework of India (NARFI)

- NARFI is an information mechanism to help decision-makers in government, municipalities, start-ups and in private sectors to address air pollution issues in different climatic zones of India.
- Developed by:** National Institute of Advanced Studies (NIAS), Bengaluru with support from Office of Principal Scientific Adviser.
- Will provide an all-inclusive guide to collecting air quality data, studying its impact and implementing science-based solutions.
- Will have 5 modules including Emission Inventory, Air Shed, and Mitigation; Impacts on Human Health and Agriculture etc.

## 2.1.5. OTHER INITIATIVES TO TACKLE AIR POLLUTION

<b>Bharat stage (BS)-VI norms</b>	<ul style="list-style-type: none"> <li>In a bid to curb rising air pollution, BS-III petrol vehicles and BS-IV diesel vehicles are banned in Delhi-NCR.</li> <li><b>BS norms:</b> Regulate output of air pollutants from internal combustion engine equipment, including motor vehicles. <ul style="list-style-type: none"> <li>Based on the European emission standards</li> <li>First BS norms (BS-I) introduced in 2000.</li> <li>From April 1, 2020, BS-VI norms became mandatory.</li> </ul> </li> <li><b>BS-VI compliance:</b> <ul style="list-style-type: none"> <li>For petrol vehicles: Required to be 25 % cleaner by reducing NOx (Nitrogen Oxide) numbers from 80mg/km to 60mg/km.</li> <li>For diesel cars: Reduces three pollutants HC (Hydrocarbons), NOx, PM (Particulate Matter) and NOx level by 70%.</li> </ul> </li> <li>Timelines and standards to be followed by automakers set by Central Pollution Control Board.</li> </ul>
<b>Trem Stage-IV Emission Norms</b>	<ul style="list-style-type: none"> <li>Centre may again defer the date for implementing Trem Stage-IV emission norms for farm equipment.</li> <li><b>TREM IV emission norms:</b> Applicable to tractors with engines bigger than 50 HP (horsepower) from April 2022, <ul style="list-style-type: none"> <li>Less than 50 HP will continue to be governed by TREM III A norms.</li> </ul> </li> <li>At present, TREM III A emission norms are applicable for tractors across various HP categories and were implemented in April 2010/2011.</li> <li><b>Bharat Stage (CEV/Trem) V standards,</b> starting from April 1, 2024, cover a wider range of engines, including those smaller than 8 kW and those larger than 560 kW.</li> </ul>

<b>Pelletisation and Torrefaction</b>	<ul style="list-style-type: none"> <li>MoEFCC released Central Pollution Control Board (CPCB) guidelines for grant of one-time financial support for promoting establishment of paddy straw based pelletisation and torrefaction plants.</li> <li><b>Pelletisation:</b> Involves shredding, drying, grinding and pellet making.</li> <li><b>Torrefaction:</b> Thermal degradation of organic biomass.</li> <li><b>Major difference between pelletisation and Torrefaction:</b> Presence of a torrefaction reactor.</li> <li><b>Use of Paddy straw made into pellets or torrefied:</b> Can be mixed along with coal in TPPS to save coal and reduce carbon emissions.</li> </ul>
<b>Green Crackers</b>	<ul style="list-style-type: none"> <li>Green crackers cause 30 % less air pollution as compared to traditional ones.</li> <li><b>Benefits:</b> Reduce emissions substantially, absorb dust and don't contain hazardous elements like barium nitrate.</li> <li><b>Produced by:</b> Licensed manufacturers approved by Council of Scientific &amp; Industrial Research (CSIR).</li> <li><b>Petroleum and Explosives Safety Organisation (PESO) under Ministry of Commerce and Industry tasked with certifying</b> that crackers are made without arsenic, mercury, and barium, and are not loud beyond a certain threshold.</li> </ul>
<b>Breathelife Campaign</b>	<ul style="list-style-type: none"> <li>A global campaign launched in 2016 that mobilizes cities and individuals to take action to bring air pollution to safe levels by 2030 to protect our health &amp; climate.</li> <li><b>Led by:</b> WHO, UN Environment Programme (UNEP) and Climate &amp; Clean Air Coalition.</li> <li><b>Several member cities from India:</b> Bengaluru, Bhubaneshwar, Dehradun etc.</li> <li><b>Strategies used by Breathelife:</b> Connect cities (to share best practices), increasing monitoring, accelerating solutions by building demands and empowering individuals.</li> </ul>



## 2.2. WATER POLLUTION AND CONSERVATION

### 2.2.1. UNITED NATIONS (UN) WATER SUMMIT ON GROUNDWATER (GW) 2022

**Why in news?**

United Nations (UN) Water Summit on Groundwater (GW) 2022 concluded in Paris.

**About the Summit**

- Organized by:** UN-Water, UNESCO and International Groundwater Resources Assessment Centre (IGRAC)
- Aim:** To bring attention to groundwater at highest international level.
- Will mark the completion of “**Groundwater: Making the invisible visible**” campaign run by UN-Water throughout 2022.
- Uses UN World Water Development Report 2022 as a baseline and SDG 6 Global Acceleration Framework (GAF)** to define actions towards more responsible and sustainable use and protection of this vital natural resource.
  - In 2020, **five pillars of SDG 6 GAF** released namely data and information, capacity development, innovation, finance and governance.
- GW:** Water stored in rocks and soil, 99% of liquid freshwater on Earth.

#### Related information

- UN-Water:** A UN inter-agency coordination mechanism for all freshwater and sanitation related matters.
- IGRAC:** A UNESCO Centre that works under World Meteorological Organisation (WMO), and financially supported by Netherlands.
  - Specializes in regional- and transboundary-level assessment and monitoring of GW resources.
  - One of IGRAC's flagship products is **Global Groundwater Information System (GGIS)**.

#### Related news: Dynamic Ground Water (GW) Resource Assessment

##### 2022 Report

- Released by:** Ministry of Jal Shakti
- Carried out at periodical intervals jointly by **Central Ground Water Board and States/UTs**.
- Key highlights**
  - India is largest user of GW with a 1/4th of total global withdrawal.
  - Total annual GW recharge has increased and rainfall contributes to nearly 61 % in this.

#### KNOW THE TERM

- Overexploited:** Ground water extraction exceeding the annually replenishable ground water recharge.
- Critical:** ground water extraction is between 90-100 % of annual extractable resources available.
- Safe:** Ground water extraction is less than 70%.

- Stage of GW extraction (percentage of utilisation of groundwater against recharge) saw a decline reaching at 60%.
  - ✓ 87% of the GW was extracted for irrigation.
  - ✓ GW extraction is very high (100%) in Haryana, Punjab, Rajasthan, Dadra & Nagar Haveli and Daman & Diu.
- Categories: 67% GW units are safe and there was a decline in the number of over-exploited units.
- 14 % assessment units are 'Overexploited' and 4% are 'Critical'.

## 2.2.2. WATER CONVENTION

### Why in news?

2022 marks the 30th anniversary of the United Nations Economic Commission for Europe (UNECE)'s Water Convention.

**About Water Convention (Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1992)**

- An international legal instrument and intergovernmental platform.
- Adopted in Helsinki in 1992 and entered into force in 1996.
  - Initially negotiated as a regional instrument, opened globally for accession to all UN Member States in 2016.
- Aim: To ensure the sustainable use of transboundary water resources.
  - Requires Parties to use transboundary waters in a **reasonable and equitable way** and ensure their **sustainable management**.
  - Parties bordering the same transboundary waters must cooperate by entering into **specific agreements and establishing joint bodies**.
- A powerful tool to achieve the objectives of SDG 6 (clean water and sanitation) and its target 6.5- all States to implement **integrated water resources management** at all levels by 2030, including through **transboundary cooperation**.

### Related news: World Water Forum

- In 2022, Water Convention organized the first ever transboundary pavilion at the ninth World Water Forum in Dakar, Senegal.
- World's largest event on water, organized every three years since 1997 by the World Water Council (a think tank), in partnership with a host country.
- Provides a unique platform where the international water community and key decision makers can collaborate on global water challenges.

**UNECE****United Nations Economic Commission for Europe (UNECE)****Genesis:** Set up in 1947 by United Nations Economic and Social Council (ECOSOC).**Objective:** To promote pan-European economic integration.**Membership:** 56 member States in Europe, North America and Asia.

◆ However, all interested UN member States may participate in the work of UNECE.

**Other key information:** One of five regional commissions of the United Nations, the others are:

- ◆ Economic Commission for Africa (ECA)
- ◆ Economic and Social Commission for Asia and the Pacific (ESCAP)
- ◆ Economic Commission for Latin America and the Caribbean (ECLAC)
- ◆ Economic and Social Commission for Western Asia (ESCWA)



## 2.2.3. UNCONVENTIONAL WATER RESOURCES

### Why in news?

Book titled 'Unconventional Water Resources' was compiled by experts at United Nations University's Institute for Water, Environment and Health (UNU-INWEH), UNU Institute for Integrated Management of Material Fluxes and of Resources and UN Food and Agriculture Organisation.

**About Non-conventional/ Unconventional water resources (UWRs)**

- Commonly include waters of inferior or marginal quality like- saline water, brackish water, agricultural drainage water, treated or untreated wastewater effluents etc.
  - Use of this water requires adoption of more complex management practices and stringent monitoring procedures.

**6 categories of UWRs**

- Harvesting water from air and ground by Cloud Seeding or Rain Enhancement, Fog Harvesting.
- Fog harvesting and micro-catchment rainwater harvesting marked as low-cost and low-impact methods.
- Desalination- Removing salts or other minerals from wastewater effluent, to obtain fresh water for human consumption.
- Tapping fresh and brackish groundwater offshore and onshore
- Reusing used water i.e. municipal waste-water and agricultural drainage water.
- Moving water physically to water-scarce areas in ships' ballast holds, or towing icebergs.
- Micro-scale capture of rainwater that would otherwise evaporate.

- The book identified 6 broad categories of UWRs.

#### Related news: Grey Water

- 100% Saturation of Grey Water Management** has been achieved in Pappankuzhi Village, Tamil Nadu.
- Grey water:** Wastewater from baths, showers, hand basins, washing machines, dishwashers and kitchen sinks, excludes streams from toilets.
- Significance of grey water recycling:**
  - Prevent potential harm to the environment and reduce the demand for freshwater.
  - Reliable water resource unlike rainwater harvesting.
  - Good fertilizer source due to high nitrogen and phosphorus content.

## 2.2.4. HEAVY METAL CONTAMINATION

### Why in news?

75% of river monitoring stations reported heavy metal pollution as per Centre for Science and Environment (CSE).

### More on the news

- In one-fourth of monitoring stations, across 117 rivers and tributaries, **high levels of two or more toxic metals** were reported.
- Seven states and Union Territories under threat-** Assam, Arunachal Pradesh, Sikkim, Bihar, Himachal Pradesh, Jammu and Kashmir, and Ladakh.

### Other common water contaminants and their impact on human health

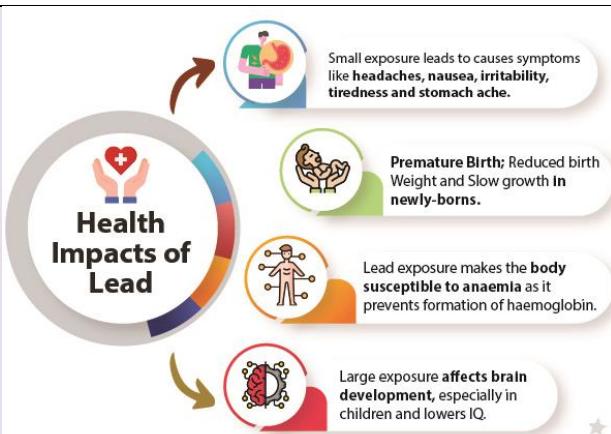
	<b>Arsenic</b> Black-Foot Disease, painful and disfiguring skin conditions melanosis, keratosis, and hyperkeratosis, liver and kidney disease, and fatalities from heart and lung disease and multiple cancers.
	<b>Fluoride</b> Skeletal fluorosis, dental fluorosis, etc.
	<b>Manganese</b> Impairs the intellectual development etc.
	<b>Uranium</b> Chemical damage to the kidneys, increase in bone cancer risk etc
	<b>Nitrate</b> Blue baby syndrome (methemoglobinemia), increased risks of colorectal cancer, thyroid disease, and neural tube defects etc.

### About Heavy Metals

- Naturally occurring elements.**
- High atomic weight and density at least 5 times greater than that of water.**
- E.g.: lead, iron, nickel, cadmium, arsenic, chromium and copper.**
- Effects of heavy metals exposure**
  - Health:** Slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's, Parkinson's disease etc.
  - Environment:** Affect biodegradability of organic pollutants, making them less degradable.
  - Plants:** Influences soil fertility, disturbs photosynthesis etc.
- In 2021, IIT Mandi has developed **fibrous membrane filter using a biopolymer-based material** to separate out heavy metals from water samples.

#### Related news: Lead Poisoning

- A report about lead poisoning was prepared **jointly by government think tank Niti Ayog and Council of Scientific & Industrial Research.**
- Findings:**
  - India bears world's highest health, economic burden due to lead poisoning.
  - Bihar, Uttar Pradesh, Madhya Pradesh, Jharkhand, Chhattisgarh and Andhra Pradesh had the **highest average blood lead levels.**
- Sources of lead:**
  - Naturally found in the Earth's crust.
  - Mining, smelting and refining industries and their waste.**
  - Household Products** such as Cosmetic Products, Ayurveda medicines etc.
  - Present in **printed circuit boards and batteries** due to unscientific recycling
  - Potteries** (e.g. utensils and glazed ceramic wares), **water bodies** etc.



## 2.2.5. PER AND POLYFLUOROALKYL SUBSTANCES (PFAS)

### Why in news?

New research suggests that rainwater around the world is contaminated by PFAS.

### About PFAS

- Chemicals with **partially or completely fluorinated carbon chains** of varied lengths.
- **Referred as “forever chemicals”** as do not degrade easily in the environment due to strong carbon-fluorine bonds.
- PFAS like perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) listed under **Stockholm Convention on Persistent Organic Pollutants** (their production and use are restricted or eliminated in the Parties.)
- **Concerns associated with use of PFAS:**
  - **Found in the blood of people and animals.**
  - **High exposure associated with health risks** like decreased fertility, developmental effects in children, interference with body hormones, increased cholesterol levels, liver damage, kidney and testicular cancer etc.
  - **Difficult to capture and destroy.**
- **Measures to reduce PFAS contamination:** Safe disposal of PFAS using methods like filtration through activated carbon tanks, incineration etc.; phasing out PFASs listed under the Stockholm Convention and replace them with safer alternatives; Avoid PFAS-based non-stick pans and kitchen utensils; etc.

### Common uses of PFAS



Non-stick cook and bake-ware



Fire-fighting foams



Water- and oil- proof apparel



Stain resistant upholstery carpet, etc.



Biocides, household agents such as cleaning agents and impregnation sprays.



Food packing



### 2.2.5.1. OTHER WATER POLLUTANTS IN NEWS

Pollutants	Details
Nonylphenol (NP)	<ul style="list-style-type: none"> <li>• A study <b>revealed the presence of high levels of toxic chemical NP in drinking water</b> across India.</li> <li>• <b>Nonylphenol is commonly used in the production of Nonylphenol Ethoxylates (NPEs).</b> <ul style="list-style-type: none"> <li>○ NPEs used as <b>surfactants</b> and in day-to-day <b>consumer products</b> such as detergents, wetting agents and dispersants.</li> </ul> </li> <li>• <b>Impacts in Human: Endocrine disruptor</b> associated with adverse effects like <b>birth defects, skin and eye irritation</b> etc.</li> <li>• United Nations Environment Programme (UNEP) has <b>designated NP as a chemical of global concern.</b> <ul style="list-style-type: none"> <li>○ <b>No standards exclusively for NP in drinking and surface waters in India.</b></li> </ul> </li> </ul>
Endosulfan	<ul style="list-style-type: none"> <li>• Supreme Court (SC) directed Kerala to pay ₹5 lakh compensation each victim of toxic Endosulfan pesticide.</li> <li>• <b>Endosulfan: An organochlorine biocide used for controlling pests</b> and mites by generating neurotoxic effects. <ul style="list-style-type: none"> <li>○ <b>Sprayed on cotton, cashew, fruits, tea, paddy, and tobacco</b> etc.</li> <li>○ <b>Banned in 2011 by SC and under Stockholm Convention on Persistent Organic Pollutants.</b></li> <li>○ Complete ban w.e.f of December 2020 was also put on <b>Alachlor, Dichlovos, Trichlorfon, Phosphamidon, methyl parathion, phorate and triazophos.</b></li> </ul> </li> </ul>
Chlorpyrifos, fipronil, atrazine and paraquat	<ul style="list-style-type: none"> <li>• According to a report by the Pesticide Action Network (PAN) a non-profit body, <b>chlorpyrifos, fipronil, atrazine and paraquat</b> are being used in excess in various states than what has been recommended by the <b>Central Insecticides Board and Registration Committee</b>, India's pesticides regulator. <ul style="list-style-type: none"> <li>○ <b>Chlorpyrifos</b> is used to control <b>foliage and soil-borne insect pests.</b></li> <li>○ <b>Fipronil</b> used to control ants, beetles, cockroaches, fleas, etc.</li> <li>○ <b>Atrazine</b> used to <b>selectively control annual grasses and broadleaf weeds before they emerge.</b></li> <li>○ <b>Paraquat</b> is a <b>herbicide</b> used primarily to control weed and grass control.</li> </ul> </li> </ul>
Microplastic	<ul style="list-style-type: none"> <li>• Indian Institute of Science (IISc) study cautions Microplastics in Cauvery river may be harming fish.</li> <li>• For the purpose of the study of microplastics in water bodies, samples were collected from three different locations with varying water flow as <b>water speed affects the concentration of pollutants.</b></li> </ul>

	<ul style="list-style-type: none"> <li><b>Microplastics: Less than 5mm in size</b> <ul style="list-style-type: none"> <li>Include microfibres (most abundant), fragments, pellets, flakes, sheets or foams.</li> <li>Enter water bodies through <b>atmospheric deposition, run-off from contaminated land or through municipal wastewater.</b></li> </ul> </li> </ul> <p><b>Key findings of the study</b></p> <ul style="list-style-type: none"> <li>Using Raman spectroscopy, <b>microplastics and toxic chemicals containing the cyclohexyl functional group</b> were detected which were found responsible for the ailments in the fish.</li> <li>Chemicals containing the <b>cyclohexyl group, are commonly used in agriculture and the pharmaceutical industry.</b></li> </ul>
Nanoplastics	<ul style="list-style-type: none"> <li>Researchers have developed a <b>new, metallic fingerprint-based method to detect and measure amount of nanoplastics</b> in organisms.</li> <li>Researchers <b>exposed lettuce plants to nanoplastics</b> from commonly found plastic waste in environment — polystyrene (PS) and polyvinyl chloride (PVC) nanoplastics.</li> <li><b>Nanoplastics: Smaller than 1,000 nanometre</b> (1 nm is equal to one billionth of a metre).</li> <li>Can lead to <b>cell damage and inflammation</b> in humans; <b>growth impairments, larval deformities and other toxic effects</b> in marine organisms.</li> </ul>

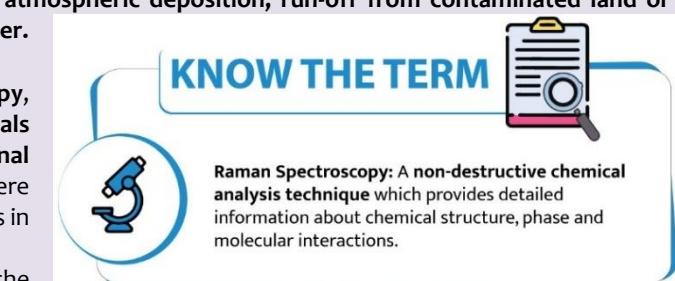
## 2.2.6. ARTH GANGA

### Why in news?

Recently, **several new initiatives were launched under Arth Ganga** concept during the event of 'Yamuna Par Azadi ka Amrit Mahotsav' organized by National Mission for Clean Ganga (NMCG).

### About Arth Ganga

- A concept espoused by the Prime Minister during **National Ganga Council meeting in Kanpur in 2019**.
- Focuses on **creating economic livelihood opportunities to sustain the activities under Namami Gange Programme**, the flagship program of the Government to clean Ganga and its tributaries.
- Aim:** To contribute about **3% to the GDP** from Ganga Basin.
  - Expected to generate economic benefit of more than Rs 1000 crores over the next 5 years.



### New initiatives launched under Arth Ganga



**Related news****District Ganga Committees (DGCs)**

- Minister for Jal Shakti launched **Digital Dashboard for DGCs Performance Monitoring System**.
- DGCs:** Constituted in districts on Ganga River basin to ensure **people's participation** in management and pollution abatement in Ganga and its tributaries.
- DGCs are **mandated to-**
  - Ensure proper **utilization of assets created under Namami Gange**,
  - Monitor drains/sewage** falling in Ganga and its tributaries,
  - Create strong connect of people** with Ganga rejuvenation.
  - District Collector is the Chairperson** of DGC.

**Stockholm World Water Week 2022**

- The **World Water Week** is an annual event organized by **Stockholm International Water Institute (SIWI)** to address the global water issues and related concerns of international development.
- SIWI: A not-for-profit institute with a wide range of expertise in water governance** – from sanitation and water resources management to water diplomacy.

### 2.2.7. OTHER INITIATIVES FOR WATER CONSERVATION

Bharat Tap	<ul style="list-style-type: none"><li><b>The Ministry of Housing and Urban Affairs (MoHUA)</b> has launched Bharat Tap initiative.</li><li>Conducted under <b>aegis of Atal Mission for Rejuvenation and Transformation 2.0 (AMRUT)</b> and <b>Swachh Bharat Mission 2.0 (SBM)</b>.</li><li><b>Aim:</b> To provide low-flow, sanitary-ware at scale, and thereby <b>reduce water consumption at source</b> considerably.<ul style="list-style-type: none"><li>Estimated to <b>save minimum 40% water</b>, in turn result into <b>energy saving</b>.</li></ul></li></ul>
Nirmal Jal Prayas	<ul style="list-style-type: none"><li>MoHUA launched 'Nirmal Jal Prayas', initiative of National Real Estate Development Council (<b>NAREDCO</b>) Mahi.<ul style="list-style-type: none"><li><b>Aim:</b> To map ground water and <b>save 500 crore litres of water per annum</b>.</li><li>Through the initiative, <b>advocacy, awareness and amplification towards saving water will be disseminated</b> and highlighted.</li></ul></li><li><b>NAREDCO:</b> An <b>autonomous self-regulatory body</b>, established in 1998, under aegis of MoHUA.<ul style="list-style-type: none"><li>It strives to be the collective force influencing and shaping real estate industry.</li><li>NAREDCO had established <b>Mahi - NAREDCO Women's Wing for empowering women entrepreneurs and encouraging participation of women</b> in real estate sector and allied fields.</li></ul></li></ul>
National Water Awards (NWA)	<ul style="list-style-type: none"><li><b>Ministry of Jal Shakti</b> has launched 4th NWA on Rashtriya Puraskar portal.</li><li>NWAs: Introduced to <b>recognize and encourage exemplary work and efforts</b> made by States, Districts, individuals, etc. in accomplishing government's vision 'Jal Samridh Bharat'.<ul style="list-style-type: none"><li><b>Aim:</b> To sensitize the public about importance of water and motivates them to adopt best water usage practices.</li><li>Award winners in different categories will be presented with a <b>citation, trophy, and cash prize</b>.</li></ul></li></ul>
JALDOOT App	<ul style="list-style-type: none"><li><b>Developed by:</b> Ministry of Rural Development.</li><li><b>Aim:</b> To identify the ground water level in selected villages.</li><li><b>Gram Rojgar Sahayak (GRS)</b> will measure the water level of selected wells twice a year (pre-monsoon and post-monsoon).</li><li>Data collected could be utilised as part of the Gram Panchayat Development Plan (GPD) and Mahatma Gandhi NREGA planning exercises.</li></ul>
Swachh Sujal Pradesh	<ul style="list-style-type: none"><li><b>Andaman and Nicobar (A&amp;N) Islands</b> have become <b>India's first Swachh Sujal Pradesh</b>.</li><li><b>Swachh Sujal Pradesh certification:</b> Provided by Ministry of Jal Shakti, 3 important components:<ul style="list-style-type: none"><li><b>Safe and secure drinking water supply and management</b>.</li><li><b>ODF (open defecation free) Plus:</b> ODF Sustainability and Solid and Liquid Waste Management (SLWM), and</li><li><b>Cross-cutting interventions</b> like convergence, IEC (Information, Education Communication), action planning, etc.</li></ul></li><li><b>All villages on A&amp;N Islands</b> have received <b>Har Ghar Jal certification</b>.</li></ul>
Pey Jal Survekshan (PJS)	<ul style="list-style-type: none"><li>Ministry of Housing and Urban Affairs conducted <b>ground survey of PJS under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0</b>.</li><li><b>PJS:</b> Serves as a <b>monitoring tool and an accelerator for AMRUT Mission</b>.<ul style="list-style-type: none"><li><b>Aim:</b> To instill healthy competition motivation among cities and Urban Local Bodies.</li></ul></li></ul>

	<ul style="list-style-type: none"> <li>○ Key focus areas: Water utility services, used water utility services, water bodies, Non-Revenue Water (NRW) estimation, best practices and innovation .</li> <li>○ Based on Self-assessment of service level, Direct Observation and Citizen's Feedback.</li> <li>○ Third-party agency- IPSOS (a private firm) will conduct Survekshan.</li> </ul>
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## 2.3. LAND DEGRADATION

### 2.3.1. COP15 OF UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

#### Why in News?

Fifteenth session of Conference of the Parties (COP15) of United Nations Convention to Combat Desertification (UNCCD), held in Abidjan, Côte d'Ivoire, concluded recently.

#### About COP of UNCCD

- Meets biennially since 2001.
- COP15 theme: 'Land. Life. Legacy: From scarcity to prosperity'.
- COP15 will bring together leaders from governments, private sector, civil society and other key stakeholders from around the world to drive progress in future sustainable management of land.
  - India had hosted COP-14 of UNCCD in 2019 and made commitment to restore 26 million hectares of degraded land by 2030.
  - COP-14 theme- 'Restore land, Sustain future'.

United Nations  
Convention to Combat  
Desertification

### United Nations Convention to Combat Desertification (UNCCD)

Bon, Germany

**Genesis:** Established in 1994, is the sole legally binding international agreement linking environment and development to sustainable land management.

**Objective:** Focuses on coordinated actions to put the world on a path to land degradation and carbon neutrality.

**Membership:** 197 Parties, including 196 country Parties and the European Union.

A Party

**Other key information:**

- ◆ One of the 3 Rio conventions.
- ◆ MoEFCC is nodal Ministry that oversees the implementation of Convention in country.
- ◆ Major initiatives launched under the UNCCD
  - Land Degradation Neutrality (LDN) Target Setting Programme: UNCCD is supporting interested countries (including India) with their national LDN target setting process.
  - LDN Fund: Officially launched at UNCCD COP 13 to leverage public money to raise private capital for sustainable land projects.
  - Land for Life Programme seeks to address the challenges of land degradation, desertification, and mitigation of drought.

#### Key outcomes of COP15

<b>New commitments</b>	<ul style="list-style-type: none"> <li>• Accelerate restoration of one billion hectares of degraded land by 2030 by improving data gathering and monitoring.</li> <li>• Establish an Intergovernmental Working Group on Drought for 2022-2024 to support a shift from reactive to proactive drought management.</li> <li>• Address sand and dust storms and other escalating disaster risks by designing and implementing plans and policies.</li> <li>• Ensure greater synergies among the three Rio Conventions: Convention on Biological Diversity, UNCCD, and UNFCCC.</li> </ul>
<b>New Declaration Issued</b>	<ul style="list-style-type: none"> <li>• <b>Abidjan Call:</b> Issued by the Heads of State and Government to boost long-term environmental sustainability.</li> <li>• <b>Abidjan Declaration on achieving gender equality</b> for successful land restoration.</li> <li>• <b>COP15 "Land, Life and Legacy" Declaration</b>, which responds to findings of UNCCD's flagship report Global Land Outlook 2.</li> </ul>
<b>Other Initiatives</b>	<ul style="list-style-type: none"> <li>• <b>Drought in Numbers, 2022 report:</b> Identified that in 2022, more than 2.3 billion people face water stress.</li> <li>• <b>Business for Land initiative:</b> for bringing visibility to the commitments made by participating companies towards land degradation neutrality, both in supply chains and CSR activities.</li> <li>• <b>Sahel Sourcing Challenge:</b> To enable communities growing Great Green Wall (GGW) to use technology to monitor progress, create jobs and commercialize their produce. <ul style="list-style-type: none"> <li>○ GGW: An African-led movement, to grow an 8,000 km belt of trees across the entire width of Africa.</li> </ul> </li> <li>• <b>Droughtland:</b> a new UNCCD public awareness campaign.</li> </ul>

## 2.4. LIGHT POLLUTION

### Why in news?

**2022 International Dark Sky Week** was recently conducted.

### About International Dark Sky Week

- An **annual event** hosted by **International Dark-Sky Association (IDA)**.
- **Aim:** To raise awareness about the **negative impact of light pollution** and celebrate the night sky.

### About Light Pollution or Photo Pollution

- Presence of **excessive, misdirected, or obtrusive artificial (usually outdoor) light**.
- **Components of light pollution-**
  - **Glare** – excessive brightness that causes visual discomfort.
  - **Skyglow** – brightening of the night sky over inhabited areas.
  - **Light trespass** – light falling where it is not intended or needed.
  - **Clutter** – bright, confusing and excessive groupings of light sources.
- **Ways to tackle light pollution-**
  - Promoting the use of **LED technology and green energy** for displays and illuminations.
  - Avoid illuminated advertisements (ads) that obscure or diminish the effectiveness of traffic signals.

### HOW DOES LIGHT POLLUTION IMPACT BIRDS AND PEOPLE?

Light Pollution impacts an enormous diversity of birds that are active both nocturnally and diurnally.

	<b>LIGHT-INDUCED COLLISION</b> Contributes to the Death of millions of birds from collisions with buildings and other built infrastructure.	<b>DISORIENTATION DURING FLIGHT</b> Attracts and disorients birds flying at night, causing them to circle illuminated areas, depleting their energy reserves and putting them at risk of exhaustion, predation and lethal collision
	<b>DISRUPTION OF BIOLOGICAL RHYTHMS</b> Alter birds behaviors, including migration, foraging, and vocal communication, disrupting daily and annual biological cycles of birds.	<b>DISRUPTION OF ECOSYSTEMS</b> Impacts not only birds, but also other animals and plants.
	<b>HARMS HUMAN HEALTH</b> Impacts circadian rhythms and the production of melatonin, which are regulated by light and dark. Can contribute to sleep disorders, diabetes, and other problems.	
	<b>Other Impacts</b> Interferes with astronomical research Increases energy consumption	

## 2.5. WASTE MANAGEMENT

### 2.5.1. BAN ON SINGLE USE PLASTIC

#### Why in news?

Several single use plastic (SUP) items identified by the Ministry of Environment, Forest and Climate Change (MoEFCC) were be banned across India from 1<sup>st</sup> July 2022.

#### About the SUP Ban

- **SUP items** which have low utility and high littering potential **identified under the Plastic Waste Management (PWM) Amendment Rules, 2021**.
  - Their manufacture, import, stocking, distribution, sale and use is prohibited.
  - **Ban not applicable to compostable plastic products.**
- **Penalties for violation:** Under the **Environment Protection Act 1986** –imprisonment up to 5 years, or a penalty up to Rs 1 lakh, or both.

#### SUP ITEMS BANNED UNDER PWM AMENDMENT RULES, 2016

	<b>PLASTIC STICKS</b> Earbuds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks.
	<b>PACKING/WRAPPING FILMS</b> Wrapping or packing films around sweet boxes, invitation cards, and cigarette packets.
	<b>CUTLERY ITEMS</b> Plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays
	<b>OTHER ITEMS</b> Plastic or PVC banners less than 100 microns, stirrers, polystyrene (Thermocol) for decoration.

#### Important provisions of PWM Amendment Rules, 2021

- Aimed to curb pollution caused by littered and unmanaged plastic and phase out SUP items by 2022.
- **Single use plastic (SUP)** defined as a **plastic item intended to be used once for the same purpose** before being disposed of or recycled.
- **Thickness of plastic carry bags increased** from 50 microns to 75 microns with effect from **30th September 2021** and to 120 microns with effect from the **31st December, 2022**.
- **Complete ban on use of sachets** using plastic material for storing, packing or selling **gutkha, tobacco and pan masala**.

- Extended Producer Responsibility (EPR) Guidelines given legal force:** Plastic packaging waste not covered under identified SUP items shall be collected and managed in an environmentally sustainable way through **EPR of the producer, importer and brand owner (PIBO)** as per PWM Rules, 2016.

#### Steps taken by the Government to ensure enforcement of the ban

Mascot	<ul style="list-style-type: none"> <li><b>PRAKRITI mascot</b> to spread greater awareness among masses and bring behavioural change.</li> </ul>
E-governance portals & apps	<ul style="list-style-type: none"> <li><b>National Dashboard on Elimination of Single Use Plastic and Plastic Waste Management</b> set up by MoEFCC to bring all stakeholders at one place and track the progress.</li> <li><b>Central Pollution Control Board (CPCB) launched-</b> <ul style="list-style-type: none"> <li><b>Extended Producer Responsibility (EPR) Portal for Plastic Packaging</b> for compliance to EPR Obligations by Producers, Importers and Brand-owners.</li> <li><b>Mobile App for SUP Grievance Redressal</b> to empower citizens to check sale/usage/manufacturing of SUP in their area.</li> <li><b>Monitoring module for SUP</b> for local bodies, State Pollution Control Boards (SPCBs)/Pollution Control Committees (PCCs) and CPCB, to inventorize details of SUP production/ sale &amp; usage in commercial establishments at district level, and on-ground enforcement of ban on SUP.</li> </ul> </li> </ul>
Directions issued at national, state and local level	<ul style="list-style-type: none"> <li><b>All leading petrochemical industries to not supply plastic raw materials</b> to the industries engaged in banned SUP production.</li> <li><b>SPCB/PCCs to modify/revoke consent to operate</b> issued under Air/Water Act to industries engaged in banned SUP production.</li> <li><b>Customs Authority to stop the import</b> of banned SUP items.</li> <li><b>Local authorities to issue fresh commercial licenses with the condition that SUP items will not be sold</b> on their premises.</li> </ul>

#### Related news:

**Maharashtra, Tamil Nadu, Gujarat among top Indian Plastic waste producers**

- Findings are based on Central Pollution Control Board (CPCB) data.
- Other key Findings**
  - India ranks 5th in generation of plastic waste** with an annual discharge of 3.5 million tonne in 2020.
  - Almost 83% of this comes from just 10 states/ UTs.**
  - On a per capita basis, India's plastic waste generation has almost doubled** over FY2016-20; however, remains lower than most of the developed economies.

**Puneet Sagar Abhiyan (PSA)**

- UNEP has signed MoU with National Cadet Corps to **tackle issue of plastic pollution through PSA and Tide Turners Plastic Challenge programme**.
- Aim:** To increase awareness amongst local population about importance of keeping the beaches and river fronts clean.

**Global Plastics Outlook: Policy Scenarios to 2060**

- The 'Global Plastics Outlook: Policy Scenarios to 2060' report was recently released by Organisation for Economic Co-operation and Development (OECD).
- Projections of the report for the year 2060:**
  - Use of plastics and plastic waste will almost triple globally**, driven by economic and population growth.
  - Largest increases expected in emerging economies** in Sub-Saharan Africa and Asia.
  - Following impacts from plastic lifecycle are projected to more than double- **GHG emissions, Ozone formation, acidification, and human toxicity**.

## 2.5.2. E-WASTE (MANAGEMENT) RULES 2022

#### Why in the news?

The Ministry of Environment, Forest and Climate Change (MoEF&CC) has notified E-waste (management) Rules 2022, in the exercise of the powers conferred by the Environment (Protection) Act, 1986.

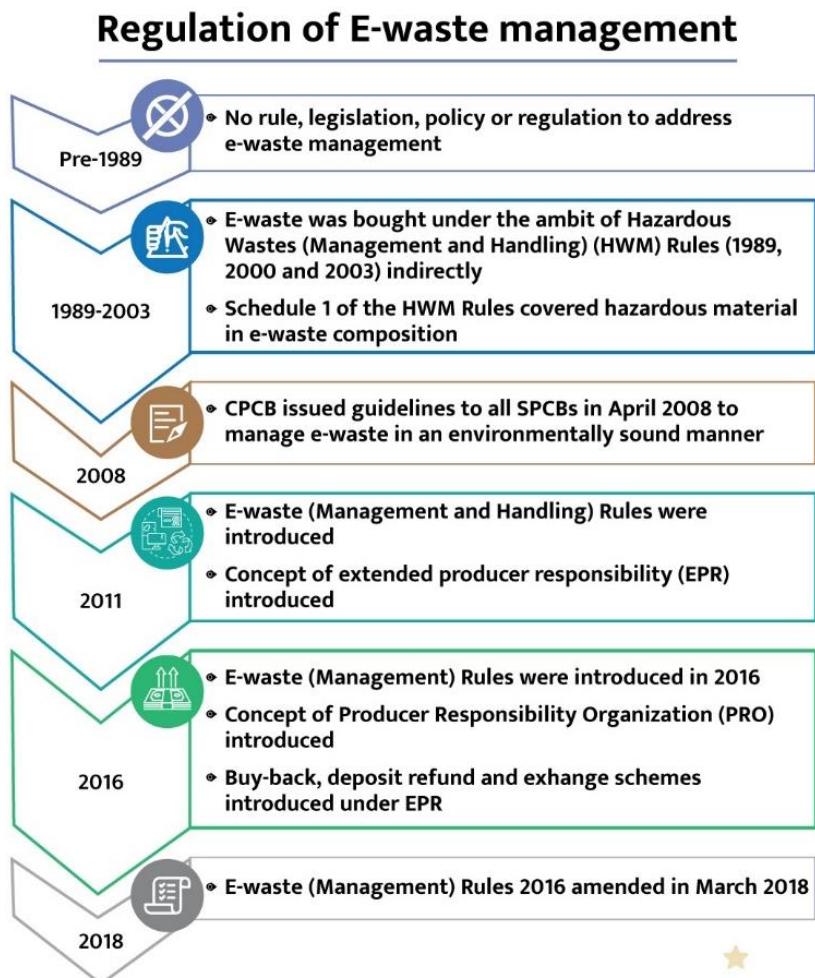
#### Key Provisions mentioned in E-waste (management) Rules 2022

- 'E-waste' Definition:** Electrical and electronic equipment, whole or in part discarded as waste, and rejects from manufacturing, refurbishment and repair processes.

#### Entities not covered in E-waste (management) Rules 2022

Entity	Covered in
Waste batteries	Battery Waste Management Rules, 2022
Packaging plastics	Plastic Waste Management Rules, 2016
Micro enterprises	MSME Development Act, 2006
Radioactive waste	Atomic Energy Act, 1962

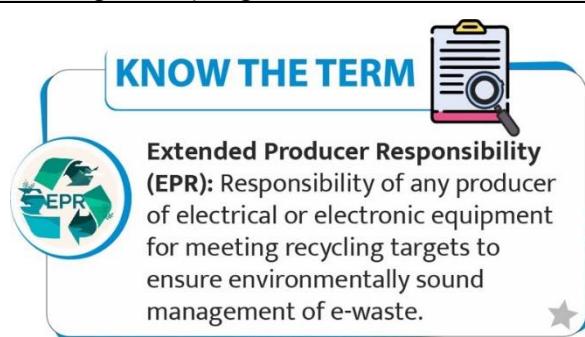
- Coverage:** Every manufacturer, producer, refurbisher, dismantler, and recycler involved processing of e-waste with **certain exceptions** (refer infographic).
- Compulsory Registration** of manufacturer, producer, refurbisher, or recycler of the e-products with **Central Pollution Control Board (CPCB)**.
- Introduction of Extended Producer Responsibility (EPR) Certificates** to incentivize registered electronic waste recyclers by introducing (not part of 2016 Rules).
- CPCB to conduct random sampling of electrical and electronic equipment placed on the market** to monitor and verify the compliance of reduction of hazardous substances provisions.
- Imposition and collection of environmental compensation** on the producer in case of non-fulfilment of obligations as per CPCB guidelines.
- Responsibilities:**



<b>Manufacturers</b>	<ul style="list-style-type: none"> <li>Make the end product recyclable.</li> <li>Component made by different manufacturers should be compatible with each other.</li> </ul>
<b>Producers</b>	<ul style="list-style-type: none"> <li>Obtaining and implementing extended producer responsibility targets may be made stable for 2 years and starting from <b>60% for the year 2023-2024 and 2024-25; 70% for the year 2025-26 and 2026-27 and 80% for the year 2027-28 and 2028-29 onwards.</b></li> <li>These rules will be applicable from 1st April, 2023.</li> <li><b>Creating awareness.</b></li> </ul>
<b>Recycler</b>	<ul style="list-style-type: none"> <li>Ensuring that the recycling processes and facilities are in accordance with the regulatory standards.</li> <li>Maintain a record of e-waste collected.</li> </ul>
<b>State government</b>	<ul style="list-style-type: none"> <li>Earmark space for e-waste dismantling and recycling in the existing and upcoming industrial parks, estates, and industrial clusters.</li> <li><b>Undertaking industrial skill development</b> and establishing measures for protecting the health and safety of workers engaged in the dismantling and recycling facilities for e-waste.</li> </ul>

#### Status of E-waste generation in India

- 3rd largest Electronic waste producer** in the world after China and United States.
  - Produces about 4 mMT (million Metric Tonnes) of e-waste. This is expected to increase 40-fold by 2050.
- Computer devices accounts for nearly 70% of annual e-waste** production, followed by telecom sector, medical equipment and electric equipment.
- Only 1.5% of electronic waste generated is recycled** through institutional processes.
  - Uttar Pradesh, Uttarakhand, Tamil Nadu, and Haryana are among the States that have a bigger capacity to dismantle and recycle e-waste.



## 2.6. INTERNATIONAL CONVENTIONS AND TREATIES

### 2.6.1. STOCKHOLM CONVENTION

#### Why in news?

18th Meeting of the Persistent Organic Pollutants Review Committee to the Stockholm Convention (POPRC-18) was held recently.

#### Outcomes of the meeting

- Committee concluded its review of **four of the five chemicals under consideration.**
  - The 5 chemicals: Dechlorane Plus (flame retardant), UV-328 (stabiliser), medium chain chlorinated paraffins (flame retardant), Long-Chain Perfluorocarboxylic Acids, and chlorpyrifos (Pesticide).

#### KNOW THE TERM



**Persistent Organic Pollutants (POPs):** Chemical substances that persist in environment for a long period, bio-accumulate in living organisms, adversely affect human health/ environment and have the property of long-range environmental transport.



## Stockholm Convention



**Genesis:** A global legally binding treaty, adopted and opened for signature at a Conference of Plenipotentiaries in 2001 in Stockholm, Sweden (entered into force in 2004).



**Objective:** To protect human health and environment from POPs.



**Membership:** 186 parties (185 states and the European Union).



◆ India ratified in 2006.

◆ Notable non-ratifying states- the United States, Israel, and Malaysia.



#### Other key information:

- Ministry of Environment notified the 'Regulation of POP Rules' in 2018, under the Environment (Protection) Act, 1986.
- The chemicals targeted are listed in the annexes of the convention text.



#### Annexes of Stockholm Convention

Categorization of chemicals	Measures to be taken by parties with respect to listed chemicals
Annex A (Elimination)	<ul style="list-style-type: none"><li>Eliminate the production and use.</li><li>Specific exemptions available only to Parties registered for them.</li></ul>
Annex B (Restriction)	<ul style="list-style-type: none"><li>Restrict the production and use in light of any applicable acceptable purposes and/or specific exemptions.</li></ul>
Annex C (Unintentional production)	<ul style="list-style-type: none"><li>Reduce the unintentional releases with the goal of continuing minimization and, where feasible, ultimate elimination.</li></ul>



### 2.6.2. ROTTERDAM CONVENTION

#### Why in news?

International trade of 2 hazardous pesticides was recommended for 'prior informed consent' (PIC).

### More on the news

- Recommendations were made by the **Chemical Review Committee (CRC)** for 2 hazardous pesticides:
  - **Iprodione:** A fungicide used on vines, fruits, trees and vegetables, classified as carcinogenic and toxic for reproduction.
  - **Terbufos:** A soil insecticide used commonly on sorghum, maize, beet and potatoes, found to pose risk to aquatic organisms due to its toxicity.
- In India, the use of these chemicals was permitted by the **2015 Anupam Verma committee report.**
- India is among the largest exporters of Terbufos.

### KNOW THE TERM



**Prior informed consent (PIC):** A mechanism under Rotterdam Convention for formally obtaining and disseminating the decisions of importing parties on their willingness to receive future shipments of hazardous chemicals listed in Annex III of the Convention and for ensuring compliance with these decisions by exporting Parties.



## Rotterdam Convention



**Genesis:** An international legally binding treaty, adopted by the Conference of the Plenipotentiaries in Rotterdam in 1998 (entered into force in 2004).



**Objective:** To facilitate informed decision-making by countries with regard to trade in hazardous chemicals.



**Membership:** 72 signatories, 165 Parties (including India)



#### Other key information:

- ◆ Covers pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons by Parties.
- ◆ Creates legally binding obligations for the implementation of the PIC procedure.
- ◆ Information Exchange is facilitated among Parties for a very broad range of potentially hazardous chemicals.
- ◆ A subsidiary body **Chemical Review Committee (CRC)** was established to review chemicals and pesticide formulations according to criteria set out by Convention.

## 2.7. REPORTS AND INDICES

Reports	Details
<b>State of Global Water Resources (SGWR) 2021 report</b> 	<ul style="list-style-type: none"><li>• Released by: World Meteorological Organisation (WMO)</li><li>• Report assesses the effects of climate, environmental and societal change on Earth's water resources including the conditions of streamflow, terrestrial water storage (TWS) and selected cryosphere parameters.</li></ul> <p><b>Key observations</b></p> <ul style="list-style-type: none"><li>• With increased melting of glaciers, annual glacier run-off increases at first, until a turning point, often called "peak water", is reached, upon which run-off declines.</li></ul>

### KNOW THE TERM



#### Streamflow

It refers to the volume of water flowing through a river channel at any given time.



#### Terrestrial Water Storage

It is the sum of continental water stored in canopies, snow and ice, rivers, lakes and reservoirs, wetlands, soil and groundwater.



#### Cryosphere

It is the frozen water part of the Earth system such as solid precipitation, snow, sea ice, icebergs, glaciers etc.

	<ul style="list-style-type: none"> <li>74% of all natural disasters between 2001 and 2018 were <b>water related</b>.</li> <li><b>3.6 billion people face inadequate access to water</b> at least a <b>month per year</b>. It is expected to reach <b>5 billion by 2050</b>.</li> </ul>
World Water Development Report 2022 	<ul style="list-style-type: none"> <li><b>Released by:</b> UNESCO</li> <li>Officially launched by the UNESCO Director-General at the 9th World Water Forum in Dakar, Senegal.           <ul style="list-style-type: none"> <li>Encapsulated global concern over the sharp rise in freshwater withdrawal from streams, lakes, aquifers, and human-made reservoirs leading to water scarcity being experienced in different parts of the world.</li> </ul> </li> </ul>
Global Land Outlook 2: Land Restoration For Recovery And Resilience 	<ul style="list-style-type: none"> <li><b>Released by:</b> United Nations Convention to Combat Desertification (UNCCD).</li> <li><b>Key observations</b> <ul style="list-style-type: none"> <li>Humans have transformed more than 70 % of the earth's land area from its natural state causing environmental degradation.</li> <li><b>Modern agriculture</b> is major factor for degradation land.</li> <li>Up to <b>40%</b> of the planet's land is degraded, directly affecting half of humanity and affect half of global GDP.</li> </ul> </li> </ul>

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### 3. BIODIVERSITY

#### 3.1. INTERNATIONAL TREATIES AND CONVENTIONS

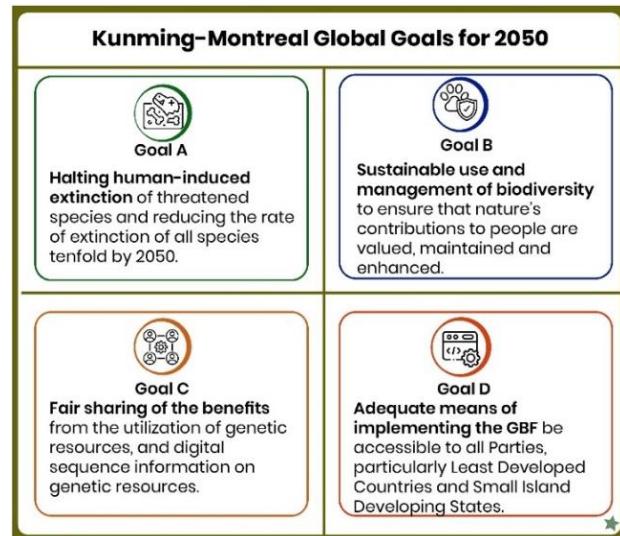
##### 3.1.1. COP15 TO THE UNITED NATIONS CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

###### Why in news?

The 15th Conference of Parties (COP15) of the Convention on Biological Diversity recently concluded in Montreal, Canada.

###### About COP15

- Chaired by China and hosted by Canada.
- Held in two phases:
  - Phase one took place virtually in Kunming, China, in October 2021 and
  - Phase two was recently held in Montreal, Canada.
- Objective: To adopt a global biodiversity framework (GBF), which will replace the Aichi Biodiversity Targets that expired in 2020.
  - GBF and its underlying documents are not legally binding.



###### Major outcomes of COP15

- Adoption of Kunming-Montreal Global Biodiversity Framework (GBF) to address biodiversity loss, restore ecosystems and protect indigenous rights, with-
  - 4 long-term goals for 2050 related to the 2050 Vision for Biodiversity (refer infographic) and
  - 23 action-oriented global targets for urgent action over the decade to 2030.
- Global Environment Facility requested to establish a Special Trust Fund in 2023, and until 2030, to support the implementation of the GBF.
  - Fund would have its own “equitable governing body” dedicated to achieving the goals of the GBF and must be prepared to receive “financing from all sources”, including official development assistance.
- Set clear indicators to measure progress to form an agreed synchronized and cyclical system based on National biodiversity strategies and action plans (NBSAPs), National reports, Global review of collective progress, Voluntary peer reviews etc.
  - Revised or updated NBSAPs in alignment with the Kunming-Montreal global biodiversity framework and its goals and targets to be communicated in a standardized format by COP-16 in Turkey in 2024.

**Convention on Biological Diversity**

### United Nations Convention on Biological Diversity (CBD)

Montreal, Canada

<b>Genesis:</b> An international legally binding multilateral treaty, opened for signature in 1992 at the Rio "Earth Summit".	<b>Objective:</b> <ul style="list-style-type: none"> <li>❖ Conservation of biological diversity.</li> <li>❖ Sustainable use of the components of biological diversity.</li> <li>❖ Fair and equitable sharing of the benefits arising out of the utilization of genetic resources.</li> </ul>
<b>Signatories:</b> 196 parties.	<b>A Party</b>
<b>Other key information:</b> <ul style="list-style-type: none"> <li>❖ Conference of the Parties (COP) is the governing body of the Convention which meets every two years, or as needed.</li> <li>❖ At COP10, governments agreed to the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets.</li> <li>❖ Has 3 Supplementary agreements: Cartagena Protocol on Biosafety; Nagoya Protocol on Access and Benefit-sharing; Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety.</li> <li>❖ United Nations General Assembly declared the period 2011-2020 to be the “United Nations Decade on Biodiversity”.</li> </ul>	

###### About Digital Sequencing Information

- Data derived from or linked to genetic resources.
- Placeholder term for genetic information, bioinformation, sequence information, natural information, genetic sequence data, nucleotide sequence data or genetic resources.
- Help in developing vaccines, regulating invasive species, ecosystem research, identifying plant pests, repair gene defects, identifying organisms etc.

- Parties should submit national reports containing agreed headline indicators in 2026 and 2029.
- **Multilateral mechanism for benefit-sharing from the use of digital sequence information on genetic resources:** This may include innovative revenue generation measures and a global fund within GBF.
- **Adoption of the Gender Plan of Action** to support and promote the gender-responsive implementation of the GBF and its associated mechanisms.



**India and CBD**

- Became a party in **1994**.
- Enacted the **Biological Diversity Act in 2002** to give effect to the convention.
- Part of the **High Ambition Coalition (HAC) for Nature and People**, supporting the **30 X 30 Target** by seeking to integrate other effective area-based conservation measures (OECMs) into the wider landscapes and seascapes.
  - HAC for Nature and People:** An intergovernmental group co-chaired by Costa Rica and France and by the United Kingdom as Ocean co-chair, championing a global deal for nature and people with the central goal of **protecting at least 30% of the world's land and ocean by 2030**.
  - The **30X30 Target** was **first floated in 2019** and presently more than 100 countries are part of it.

### 3.1.1.1. WORLD RESTORATION FLAGSHIPS

**Why in news?**

The UN Decade on Ecosystem Restoration declared first 10 World Restoration Flagships at the side-lines of COP15 of CBD.

**About World Restoration Flagships**

- For honouring the best examples of large-scale and long-term ecosystem restoration in any country or region, embodying the **10 Restoration Principles of the UN Decade**.
- Initiatives eligible to receive United Nations-backed promotion, advice or funding.
- Progress of all Flagships to be transparently monitored through the **Framework for Ecosystem Restoration Monitoring**, the UN Decade's platform for keeping track of global restoration efforts.
- Flagship Initiatives Selection Criteria**
  - Clearly identifiable geographically.
  - Part of nominated area already under successful, measurable, and well-documented restoration.
  - Well-defined ecological, cultural, and socio-economic objectives and goals.
- First 10 Flagships stretch across 23 countries and all ecosystems.**
  - Together aim to **restore more than 60 million hectares and create more than 13 million jobs**.

**List of 10 inaugural World Restoration Flagships**
**About the UN Decade on Ecosystem Restoration**

- 2021 to 2030** has been declared by the United Nations General Assembly as the UN Decade on Ecosystem Restoration.
- Led by: **UN Environment Programme** and the **Food and Agriculture Organization** of the UN, together with the support of partners.
- Aim:** To prevent, halt, and reverse the loss and degradation of ecosystems worldwide and **revive billions of hectares**, covering terrestrial as well as aquatic ecosystems.

### TEN PRINCIPLES THAT UNDERPIN ECOSYSTEM RESTORATION



Flagship initiative	Countries	Details
Trinational Atlantic Forest Pact	Argentina, Brazil, Paraguay	<ul style="list-style-type: none"> <li><b>Aim:</b> To mend South America's iconic Atlantic Forest and restoring 15 million ha of degraded forest by 2050.</li> <li><b>Coordinated by:</b> The Pact for the Restoration of the Atlantic Forest and the Trinational Network for the restoration of the Atlantic Forest.</li> </ul>
Abu Dhabi Marine Restoration	United Arab Emirates	<ul style="list-style-type: none"> <li><b>Aim:</b> To restore coral, mangrove and seagrass in Abu Dhabi, creating a refuge for the dugong, a fast-disappearing aquatic mammal.</li> <li><b>Coordinated by:</b> The Environment Agency – Abu Dhabi.</li> </ul>
Great Green Wall for Restoration and Peace	Burkina Faso, Djibouti, Eritrea, Ethiopia, Mali, Mauritania, Niger, Senegal, Sudan, Chad	<ul style="list-style-type: none"> <li><b>Aim:</b> To restore savanna, grasslands and farmlands across an 8,000km belt of Africa known as the <b>Sahel</b>.</li> <li><b>Coordinated by:</b> Pan-African Great Green Wall Agency, Initiative of the Great Green Wall for the Sahara and the Sahel Burkina Faso, UNEP Finance Initiative etc..</li> </ul>

Namami Gange	India	<ul style="list-style-type: none"> <li><b>Aim:</b> To rejuvenate India's sacred Ganges River and surrounding basin and restore people's connection to the river, while reducing pollution and reversing deforestation.</li> <li><b>Coordinated by:</b> National Mission for Clean Ganga under the Government of India, and supported by the World Bank, the Japan International Cooperation Agency and the German Development Agency.</li> </ul>
Multi-country Mountain Flagship	Democratic Republic of the Congo, Kyrgyzstan, Rwanda, Serbia, Uganda	<ul style="list-style-type: none"> <li><b>Aim:</b> To protect mountain landscapes in Kyrgyzstan, Rwanda, Serbia and Uganda and to safeguard a range of imperiled species, including mountain gorillas and snow leopards.</li> <li><b>Coordinated by:</b> The United Nations Environment Programme, The Carpathian Convention, and The Mountain Partnership.</li> </ul>
Small Island Developing States	Vanuatu, Comoros, Saint Lucia	<ul style="list-style-type: none"> <li><b>Aim:</b> To restore sensitive ecosystems in Vanuatu, St. Lucia and Comoros and help the island nations safeguard wildlife, brace for climate change and strengthen their economies.</li> <li><b>Coordinated by:</b> Governments of Comoros, Saint Lucia, and Vanuatu, The Small Island Developing States Coalition for Nature, The United Nations Department of Economic and Social Affairs, FAO and UNEP.</li> </ul>
Atlyn Dala Conservation Initiative	Kazakhstan	<ul style="list-style-type: none"> <li><b>Aim:</b> To conserve and restore Kazakhstan's steppe, semi-desert and desert ecosystems across the historical range of the Saiga antelope.</li> <li><b>Coordinated by:</b> Association for the Conservation of Biodiversity of Kazakhstan, Frankfurt Zoological Society etc.</li> </ul>
Central American Dry Corridor	Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama	<ul style="list-style-type: none"> <li><b>Aim:</b> To restore 300,000 ha of drought-stricken Central American farmland and forests.</li> <li><b>Coordinated by:</b> Central American Commission on Environment and Development, Green Climate Fund, IUCN etc.</li> </ul>
Building with Nature in Indonesia	Indonesia	<ul style="list-style-type: none"> <li><b>Aim:</b> To naturally regenerate mangroves and protect Indonesia's coast against flooding.</li> <li><b>Coordinated by:</b> Indonesian Ministry of Marine Affairs, Wetlands International etc.</li> </ul>
Shan-Shui Initiative in China	China	<ul style="list-style-type: none"> <li><b>Aim:</b> To restore 10 million hectares of ecosystems across China, including forests, grasslands and waterways.</li> <li><b>Coordinated by:</b> Ministry of Natural Resources and Ministry of Finance, People's Republic of China.</li> </ul>

### 3.1.1.2. RESTORATION BAROMETER REPORT 2022

#### Why in news?

At the Convention on Biological Diversity's Conference of the Parties (CBD COP15), the International Union for Conservation of Nature (IUCN) launched its first Restoration Barometer Report.

#### About the Restoration Barometer report

- Restoration Barometer was launched in 2016** as the **Bonn Challenge Barometer**.
- Tracks restoration progress across terrestrial ecosystems** including coastal and inland waters where use or management rights can be identified (i.e., not high seas).
- Has 8 indicators** that build a comprehensive picture of a country's restoration progress and **progress towards global goals**.
- Currently, **22 countries are using the Barometer to report the progress of their restoration targets** and more than 50 have endorsed it.
- Findings of 2022 report:**
  - Financial investments of \$26 billion across 18 countries.**
  - 14 million hectares of degraded landscapes.**
  - Data from Ecuador, India, Pakistan, and Uzbekistan is being finalized and will be published later.

#### Global goals tracked by Restoration Barometer



### 3.1.1.3. UPDATED RED LIST OF THREATENED SPECIES

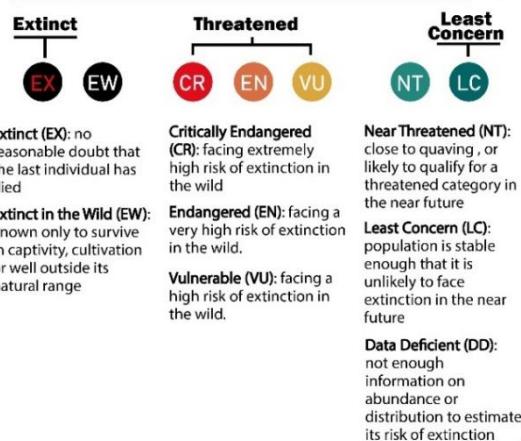
#### Why in News?

The International Union for Conservation of Nature's (IUCN) has unveiled its **updated Red List of Threatened Species** during the **COP15 biodiversity conference in Canada**.

#### Key Updates

- The IUCN Red List now includes 150,388 species, of which 42,108 are threatened with extinction.
- Over 1,550 of the 17,903 marine animals and plants assessed are at risk of extinction.**
- Climate change impacts at least 41% of threatened marine species.

#### THE RED LIST CATEGORIES



#### Affected Marine Species

<b>Dugong</b> 	<ul style="list-style-type: none"> <li><b>Dugong populations in East Africa and New Caledonia</b> have entered the IUCN Red List as Critically Endangered and Endangered respectively.           <ul style="list-style-type: none"> <li>The species remains Vulnerable globally.</li> </ul> </li> <li><b>Threats:</b> Unintentional capture in fishing gear in East Africa and poaching in New Caledonia, and boat injuries and destruction of seagrass habitats in both locations.</li> <li><b>Protection status in India:</b> <ul style="list-style-type: none"> <li></li> <li></li> <li></li> <li>In list of 22 species covered under Species Recovery Programme? </li> </ul> </li> <li><b>Characteristics:</b> <ul style="list-style-type: none"> <li>Also known as Sea Cows.</li> <li>Only herbivorous marine mammals and feed on seagrass.</li> <li>Only member of the Order Sirenia found in India.</li> <li>Live in groups and come to the surface to breathe with a distinct dolphin-like tail.</li> <li>Have mammary glands.</li> </ul> </li> <li><b>Habitat and distribution:</b> Shallow coastal waters of the Indian and western Pacific Oceans.           <ul style="list-style-type: none"> <li>In India, found in Gulf of Mannar, Palk Bay, Gulf of Kutch and Andaman and Nicobar Islands.</li> </ul> </li> <li><b>Conservation Measures in India:</b> <ul style="list-style-type: none"> <li>State animal of the Andaman and Nicobar Islands.</li> <li>Tamil Nadu government announced India's first conservation reserve for Dugongs in Palk Bay.</li> </ul> </li> </ul>
<b>Pillar coral (Dendrogyra cylindrus)</b> 	<ul style="list-style-type: none"> <li>Pillar coral found throughout the Caribbean from the Yucatan Peninsula and Florida to Trinidad and Tobago, has moved from Vulnerable to Critically Endangered, after its population shrunk by over 80% across most of its range since 1990.</li> <li><b>Threats:</b> Stony Coral Tissue Loss Disease and bleaching caused by increased sea surface temperatures and excess antibiotics, fertilisers and sewage.</li> </ul>
<b>Abalone</b> 	<ul style="list-style-type: none"> <li>44% of all abalone shellfish species enter the IUCN Red List as threatened with extinction.           <ul style="list-style-type: none"> <li>Poaching threatens Endangered perlemoen abalone of South Africa.</li> <li>Marine heatwaves have exacerbated abalone diseases worldwide, affecting the Critically Endangered black abalone in California and Mexico, and the Vulnerable green ormer (<i>H. tuberculata</i>), found from the English Channel to Northwest Africa and the Mediterranean.</li> </ul> </li> </ul>

- India specific findings:** 239 new species analysed in India have entered the list, of which, 29 are threatened.

## Details of some of New Threatened species in India

Species	Description	IUCN STATUS
<b>White-cheeked Dancing Frog</b> ( <i>Micrixalus candidus</i> ) 	<ul style="list-style-type: none"> <li>Only known from a small range with an extent of occurrence of 167 square kilometers (km²) in the <b>Western Ghats of Karnataka</b>, a <b>biodiversity hotspot</b>.</li> <li><b>Threats:</b> Loss of their habitat, pollution, changes in temperature, diseases, pests, invasive species.</li> </ul>	
<b>Andaman Smoothhound shark</b> ( <i>Mustelus andamanensis</i> ) 	<ul style="list-style-type: none"> <li>Shark is found in the <b>Andaman Sea in the Eastern Indian Ocean</b> off the coast of Myanmar, Thailand, and the Andaman and Nicobar Islands.</li> <li><b>Threats:</b> Subject to fishing pressure including trawl, longline, and gillnet.</li> </ul>	
<b>Yellow Himalayan Fritillary</b> ( <i>Fritillaria cirrhosa</i> ) 	<ul style="list-style-type: none"> <li><b>Mostly found in the Himalayas</b>, it occurs in Bhutan, China, India, Myanmar, Nepal and Pakistan.</li> <li>Species is threatened due to <b>unorganised harvest, over-extraction, unsustainable and premature harvesting of bulbs</b>, coupled with illegal hidden markets.</li> <li><b>Medicinal uses:</b> This is supposedly antiasthmatic, antirheumatic, febrifuge, galactagogue, haemostatic, ophthalmic and oxytocic.</li> </ul>	

### 3.1.2. INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE (ITPGRFA)

#### Why in News?

**India hosted the Ninth Session of the Governing Body (GB9) of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).**

#### Major decisions taken at GB9

- Historical first:** Federation of Seed Industry of India (FSII) contributed Rs 20 lakhs to the Benefit-Sharing Fund (BSF).
- India appointed as Co-Chair** of the Working Group on Enhancement of Multilateral System of Access and Benefit-sharing (MLS).
- Consensus on implementation of Farmers Rights** reached.
  - GB9 considered the options for encouraging, guiding and promoting the realization of Farmers' Rights.
- Contracting Parties acknowledged** the intervention made by India, and supported by many African nations, regarding effect due to institutional reform within the CGAIR system (a global research partnership for a food-secure future) on funding of gene-banks globally.
- Decisions deferred for later:** Issues like the multilateral system (MLS) of access and benefit sharing (ABS) and digital sequence information (DSI).

#### Governing Body of ITPGRFA

- Highest organ of ITPGRFA.
- Composed of representatives of all Contracting Parties.
- Function:** To promote the full implementation of the Treaty.

#### KNOW THE TERM



##### MULTILATERAL SYSTEM OF ACCESS AND BENEFIT-SHARING (MLS)

- MLS is a global system that enables countries to exchange much-needed plant genetic material with one another.
- Benefit-sharing part includes financial and non-financial support for PGRFA conservation activities around the world.

#### KNOW THE TERM



##### BENEFIT-SHARING FUND (BSF)

- It supports agricultural projects for farmers, public institutions and others in developing countries to conserve and use PGRFA to improve food crop production, fight plant pests and adapt to the effects of climate change.
- BSF supports projects involving smallholder farmers and local communities.

## About Plant Genetic Resources for Food and Agriculture (PGRFA)

- Any plant materials, such as seeds, fruits, cuttings, pollen, and other organs and tissues from which plants can be grown.
- Include traditional crop varieties and their wild relatives, modern cultivars, breeding lines etc. which provide food, feed for domestic animals, fibre, clothing, shelter, medicine and energy.
  - Can be used to develop new varieties or improve the quality and productivity of crops.
- National Bureau of Plant Genetic Resources (NBPGR), established in 1976, is the nodal organisation in India for planning, conducting, promoting, coordinating and lending all activities concerning plant.
- Threats to PGRFA conservation and utilization: Population growth and urbanization; pollution; climate change; invasive alien species; genetic vulnerability and erosion; etc.



## International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)

**Genesis:** A legally binding agreement that was adopted by 31st session of Food and Agriculture Organization (FAO) in 2001 and entered into force in 2004.



### Objective:

- ◆ Recognizing the enormous contribution of farmers to the diversity of crops that feed the world.
- ◆ Establishing a global system to provide farmers, plant breeders and scientists with access to plant genetic materials.
- ◆ Ensuring that recipients share benefits they derive from the use of these genetic materials with the countries where they have been originated.



**Membership:** 150 Contracting Parties including one member organization



A Party



### Other key information:

- ◆ Also known as seed treaty.
- ◆ Provided international legal framework needed for establishment of Svalbard Global Seed Vault in Norway.
- ◆ Funding for the treaty comes from its Contracting Parties and from Food and Agriculture Organization.



### Technique for protecting plant varieties

Technique	Benefits of the technique	Issues with the technique
Field gene bank	<ul style="list-style-type: none"> <li>• Simple and traditional preservation strategy</li> <li>• Direct evaluation and characterisation</li> <li>• Seasonal accessibility and availability</li> <li>• Natural selection pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Accumulation of mutations and endophytic organisms</li> <li>• Exposure of adverse weather conditions</li> <li>• Exposure to pathogens and insects</li> <li>• Plant ageing; Handling errors</li> </ul>
In vitro gene bank	<ul style="list-style-type: none"> <li>• Virus elimination</li> <li>• Immediate accessibility</li> <li>• Immediate availability</li> <li>• High multiplication rate</li> <li>• Low space requirements</li> <li>• Precise environment modulation</li> <li>• Medium term storage, &lt; 2 years</li> </ul>	<ul style="list-style-type: none"> <li>• Plant ageing</li> <li>• Handling errors</li> <li>• Soma clonal variations</li> <li>• Specific protocol development</li> <li>• Infestation of insects (mites, thrips, other arthropods)</li> <li>• Contamination with fungi, bacteria &amp; endophytic organism</li> </ul>
Cryo bank	<ul style="list-style-type: none"> <li>• Minimum space requirements</li> <li>• Low long-term costs</li> <li>• High genetic stability</li> <li>• Long-term storage, &gt;100 years</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted availability</li> <li>• Restricted accessibility</li> <li>• Access to liquid nitrogen</li> <li>• Specific protocol development</li> <li>• High initial workload to cryopreserve clonal plants</li> </ul>

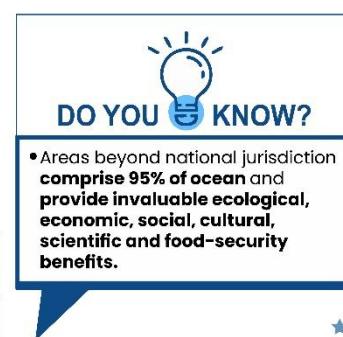
### 3.1.3. BIODIVERSITY BEYOND NATIONAL JURISDICTION (BBNJ)

#### Why in news?

UN meet begins over treaty to govern use of high seas.

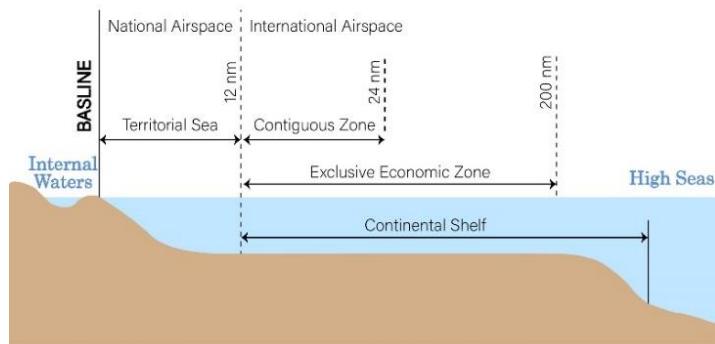
#### About Biodiversity Beyond National Jurisdiction (BBNJ) Treaty (Treaty of High Seas)

- An international agreement on conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.
- Another instrument under the framework of 1982 United Convention on the Law of the Sea (UNCLOS).



- UNCLOS (India also a state party) lays down a **comprehensive regime of law and order in world's oceans and seas** establishing rules governing all uses of oceans and their resources.
- **Other instruments under UNCLOS:** 1994 agreement on implementation of Part XI of UNCLOS and 1995 UN Fish Stocks Agreement.

#### U. N. CONVENTION ON THE LAW OF THE SEA: DEFINED WATERS



#### MARITIME BOUNDARY DEFINITIONS

**Territorial Sea.** Sovereign territory of the state. Foreign civilian and military vessels have right to innocent passage.

**Exclusive Economic Zone (EEZ).** Sovereign rights for exploring and exploiting resources, preserving marine environment, establishing artificial islands and structures.

**Contiguous Zone.** State may exercise control necessary to prevent infringement of its customs, fiscal, immigration, or sanitary laws.

**High Seas.** All parts of the sea that are not included in the EEZ, the territorial sea, or in the internal waters of a state. No exclusive rights.

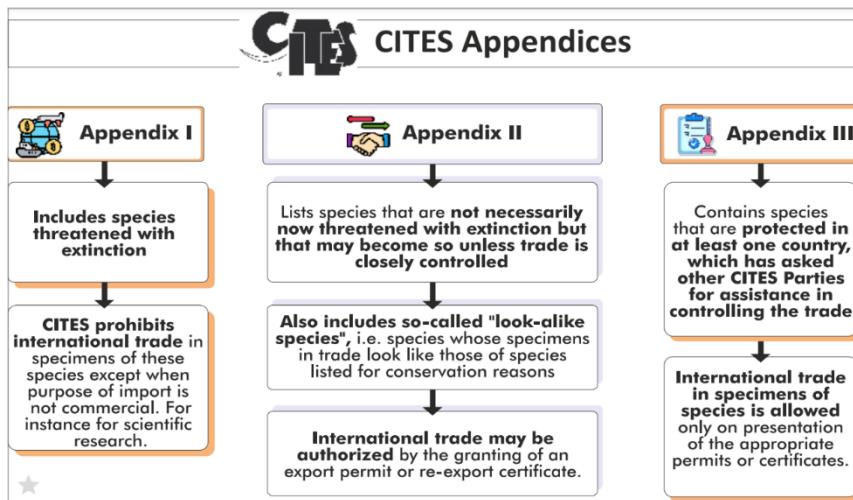
### 3.1.4. CITES (CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA)

#### Why in news?

The 19th Meeting of Conference of the Parties (CoP 19) to **CITES**, also known as the **World Wildlife Conference**, was held in Panama.

#### Outcomes of the conference

- Multiple species of **sharks and rays, trees, amphibian, turtle and tortoise**, and several songbirds brought under CITES' protection.
- Accepted a proposal to include **sea cucumbers** in Appendix II of Convention.
- On India's initiative a proposal to clarify the quantity of **Shisham (Dalbergia sissoo)** items such as furniture was considered.
- Resolution documents on tortoises and fresh water turtles specifically mentioned commendable result achieved by India's **Operation Turtshield** (by Wildlife Crime Control Bureau).
- Proposal to allow a regular form of controlled trade in ivory** was defeated.
  - Abandoning its **decades-old stance** of strongly opposing **ivory trade**, India for the first time abstained from voting.
  - International ivory trade was banned in 1989 when all African elephant populations were put in CITES Appendix I.
  - Later, populations of several countries including Namibia, Botswana etc. were transferred to Appendix II.



#### About Shisham

- A deciduous tree ascending up to 25-30 m.
- Native to Indian subcontinent and southern Iran and occurs throughout sub-Himalayan tract from Ravi to Assam.
- Included in Appendix II of convention.
- Indian rosewood or the shisham tree is used to make durable dark-reddish tables, beds, bookshelves or chairs.
- State tree of Punjab.

**India and CITES**

- **Extensive use of Appendix III:** Since its ratification of CITES in 1976, India has **listed 39 taxa in Appendix III**.
  - Through the listings, important international trade data was gathered that supported **decision for application to a different CITES Appendix** (with stricter trade controls).
- **Monitoring the Illegal Killing of Elephants (MIKE) programme:** An international collaboration that measures the levels, trends and causes of elephant mortality.
  - **India has 10 sites participating** in MIKE programme.
- **Acts regulating International trade in all wildlife species of India (including the species covered under CITES):** Wild Life (Protection) Act of 1972, Export–Import Policy (EXIM Policy) under the Foreign Trade (Development and Regulation) Act of 1992 and Customs Act of 1962.
- **Management Authority for CITES (CITES-MA) in India: Director of Wildlife Preservation, Government of India.**
- **Government of India appointed five Scientific Authorities to assist the CITES MA** on scientific aspects of CITES-
  - **Zoological Survey of India (ZSI), Kolkata.**
  - **Botanical Survey of India (BSI), Kolkata.**
  - **Central Marine Fisheries Research Institute (CMFRI), Cochin.**
  - **Wildlife Institute of India (WII), Dehradun.**
  - **Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore.**

**CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora)**

**Genesis:** An international agreement between governments which was drafted as a result of a resolution adopted in 1963 at a meeting of members of IUCN (The World Conservation Union).  
◆ Text of the Convention finally agreed in 1973 and entered in force in 1975 .

**Objective:** To ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.

**Secretariat:** Administered by UNEP, located at Geneva, Switzerland.

 **A Party**

**Membership:** 184 parties

**Other key information:**  
◆ Legally binding on the Parties, but does not take the place of national laws.  
◆ Each Party has to adopt its own domestic legislation to its implementation at the national level.  
◆ All 184 Parties have right to attend, to put forward proposals to consider, and to vote on all decisions.  
◆ The species covered by CITES are listed in **3 Appendices**, according to the degree of protection they need.

## 3.2. WILDLIFE AND CONSERVATION

### 3.2.1. THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2022

#### Why in News?

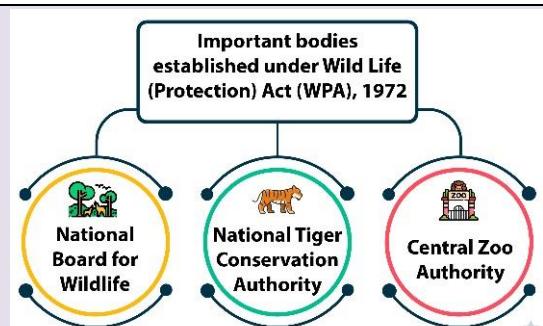
Recently, the Wildlife (Protection) Amendment Act, 2022 was enacted **to amend the WLPA, 1972 to incorporate more species** protected under the law.

#### About the Wild Life (Protection) Amendment Act (WLPA), 2022

2022 act seeks to **conserve and protect wildlife through better management of protected areas and implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)**.

#### About Wild Life (Protection) Act (WPA), 1972

- Provides for the **protection of wild animals, birds and plants** with a view to ensuring the ecological and environmental security of the country.
- Empowers the State to declare protected areas, under 4 categories- **National Parks, Wildlife Sanctuaries, Community Reserves and Conservation Reserves**.
- **Created 6 schedules** for specially protected plants (1), specially protected animals (4) and vermin species (1), which gave varying degrees of protection to classes of flora and fauna.



#### Key Amendments

<b>New Chapter VB for implementation of CITES</b>	<ul style="list-style-type: none"><li>• <b>Designation of authorities by the Central government-</b><ul style="list-style-type: none"><li>◦ <b>Management Authority (MA)-</b> responsible for issuance of permits and certificates for trade of scheduled specimens in accordance with the Convention.</li><li>◦ <b>Scientific Authority-</b> to advise MA on aspects related to impact on the survival of the specimens being traded.</li></ul></li><li>• <b>Identification mark</b> to be used by the MA for a specimen, as per CITES.<ul style="list-style-type: none"><li>◦ Modification or removal of the identification mark prohibited.</li></ul></li></ul>
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	<ul style="list-style-type: none"> <li><b>Registration certificate to be obtained by person possessing live specimens of scheduled animals from the MA.</b></li> <li><b>Breeders of species in Appendix I of Schedule IV required to make an application for licence to the Chief Wild Life Warden within 90 days of the commencement of the amendment.</b></li> <li><b>Conditions for export, import, re-export and introduction from sea of scheduled specimens have been specified.</b></li> </ul>
Rationalisation of schedules	<p><b>Number of schedules from 6 to 4 by:</b></p> <ul style="list-style-type: none"> <li>Reducing the number of schedules for specially protected animals from 4 to 2.</li> <li><b>Inserting a new schedule for specimens listed in the Appendices under CITES (scheduled specimens).</b></li> <li><b>Removing the schedule for vermin species.</b> <ul style="list-style-type: none"> <li>Wild animals will be declared as Vermin by Central Government by the way of notification for any area and for a specified period.</li> </ul> </li> </ul>
Control of sanctuaries	<ul style="list-style-type: none"> <li><b>Chief Wildlife Warden will manage and protect sanctuaries in accordance with the management plans prepared as per guidelines of the central government.</b></li> <li><b>In case of sanctuaries falling under Scheduled Areas or areas where Forest Rights Act 2006 is applicable, the management plan for such sanctuary prepared after due consultation with the Gram Sabha concerned.</b></li> </ul>
Increase in Penalties	<ul style="list-style-type: none"> <li>For <b>General violation</b> increases to 1 lakh from Rs25,000.</li> <li>For <b>specially protected animals</b> increases to 25,000 from Rs10,000.</li> </ul>
Exemptions for 'live elephant' (section 43)	<ul style="list-style-type: none"> <li><b>Transfer or transport of live elephants allowed for a religious or any other purpose</b> by person having ownership certificates in accordance with conditions prescribed by the Central Government.</li> </ul>
New section 42A for Surrender of captive animals	<ul style="list-style-type: none"> <li><b>Any person having a certificate of ownership for captive animals or animal products, can voluntarily surrender them to the Chief Wild Life Warden.</b></li> <li><b>No compensation to be paid to the person for surrendering</b> such items and the items will become the property of the State Government.</li> </ul>
Relaxation of certain restrictions	<ul style="list-style-type: none"> <li><b>Permits may be granted for Film-making</b> (without causing any adverse impact to the habitat or wildlife) to enter or reside in a sanctuary.</li> <li><b>Certain activities</b> such as, grazing or movement of livestock, bona fide use of drinking and household water by local communities etc. allowed without a permit in a sanctuary.</li> </ul>
Other Provisions	<ul style="list-style-type: none"> <li><b>Central government empowered to regulate or prohibit the import, trade, possession or proliferation of invasive alien species.</b></li> <li><b>No renewal of any arms licences to be granted to any person residing within 10 kilometres</b> of a sanctuary except under the intimation to the Chief Wild Life Warden or the authorised officer.</li> <li><b>State Board for Wild Life permitted to constitute a Standing Committee.</b></li> </ul>

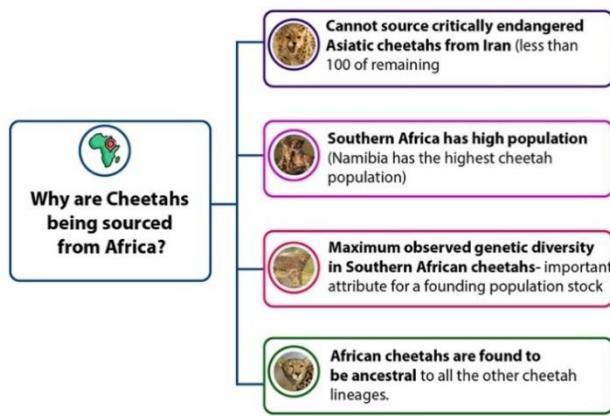
### 3.2.2. CHEETAH REINTRODUCTION

#### Why in news?

Eight wild African Cheetahs (5 female and 3 male) from Namibia, were recently introduced in Kuno National Park (KNP), Madhya Pradesh under Project Cheetah.

#### About Project Cheetah

- World's first inter-continental large wild carnivore translocation project.**
- Part of the centrally Sponsored Scheme- '**Project Tiger**' of India.
- Funding:** Funds from **Project Tiger and Compensatory Afforestation Fund Management & Planning Authority (CAMPA)**.



- **Aim:** To introduce African cheetah in India.
  - Cheetah declared **extinct from India in 1952** becoming **only large wild mammalian species that went extinct since independence (1947).**
  - **Reasons for extinction:** large scale capture of animals from the wild for coursing, bounty and sport hunting, extensive habitat conversion and decline in prey base.
- **Nodal Agency:** National Tiger Conservation Authority (NTCA) authorized for funding, supervision and hand holding of the project.
  - **Wildlife Institute of India (WII)**, national and international carnivore/cheetah experts/agencies for technical and knowledge support.
- **Future plan:** To introduce at least 50 cheetahs into various national parks over the next five years.
  - 12 more Cheetah are due to arrive from South Africa at KNP.
- **Significance of Cheetah Relocation:** Establish viable cheetah metapopulation in India, resource mobilization, contributing to global conservation efforts, enhance local community livelihoods, contribute to climate change mitigation goals etc.

### DO YOU KNOW?

The very name of the animal "Cheetah" originates from **Sanskrit** meaning "**the spotted one**" cave paintings dating back to the Neolithic age depict the cheetah in Gujarat and Madhya Pradesh.

#### About African Cheetah

- Both a **flagship species** (selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause) and an **umbrella species** (its conservation ensures conservation of other species of wild animals and forests).
- **Characteristics:**
  - **World's fastest land mammal**, capable of running at **80 to 128 km/h**.
  - **Diurnal** i.e., they hunt during the day.
  - Unlike other big cats (lions, tigers, etc.) **don't roar**.
  - **Gestation period- 93 days**.
  - **Live in three main social groups:** females and their cubs, male coalitions, and solitary males.
    - ✓ **Females lead a nomadic life** searching for prey in large home ranges, males are more sedentary and instead establish much smaller territories.
  - **Average female home ranges have been estimated to be about 750 sq km.**
  - Among large carnivores, **conflicts with human interests are lowest for cheetahs**, as they are not a threat to humans and usually do not attack large livestock.

	African Cheetah	Asiatic Cheetah
Pictorial Representation		
IUCN Status	Vulnerable	Critically Endangered
CITES Status	Appendix I	Appendix I
Distribution	Africa (Northwest Africa, East Africa, and Southern Africa)	Only few left in Iran
Physical Characteristics	Bigger in size as compared to Asiatic Cheetah, slightly bigger build and sturdy legs and neck.	Slightly smaller and slender than the African Cheetah. Their neck is much smaller and slender. Also, their legs are slender.
Food Intake	Diverse diet due to bigger habitat	Limited source especially medium sized prey like Chinkara, Gazelle etc.

#### Related news: Measures taken for ensuring success of the programme

- **Soft-release:** Cheetahs placed in a quarantine period for a month, in an electronically-fenced area of 500 hectares, before being released into the wild.
- All cheetahs **vaccinated and fitted with Satellite radio collars** for monitoring them at all times.
- **Action Plan for Introduction of Cheetah** prepared based on the modern scientific approach recommended by the latest **International Union for Conservation of Nature (IUCN) guidelines**.
- **Public awareness campaigns for the local communities:**
  - **Cheetah mitras**, dedicated team of volunteers, trained by the forest department trained to create awareness among the villagers about protecting cheetahs.
  - Local mascot named **Chintu Cheetah to sensitise locals**.
- **Cheetah Task Force:** Constituted by MoEF&CC for a period of 2 years to monitor Cheetah introduction in Kuno National Park, Madhya Pradesh, and other suitable designated areas. Its functions will include-
  - **Reviewing, progressing and monitoring the health status of Cheetah**, upkeep of the quarantine & soft release enclosures, adherence to the defined protocols by forest & veterinary officials, etc.
  - **Suggesting and advising** on development of tourism infrastructure in the fringe areas of KNP.
  - **Regularly interacting with Cheetah mitras** and local communities for their awareness raising etc.

#### About Kuno National Park (KNP)

- **Geographical location and other Important features of KNP:**
  - **Location:** Lies in North-West of Madhya Pradesh close to state border with Rajasthan in Vindhyan Hills of Central India.
  - On its south-eastern side of the boundary, it forms a contiguous forest landscape with patchy connectivity to **Panna Tiger reserve (TR)** through the **Shivpuri forest area**.
  - **Ranthambore NP and Kailadevi WLS** (both part of the Ranthambore TR) are connected with it through good forest patches towards the north-western boundary from across the river Chambal.
  - Only wildlife site in the country with a complete incentivized voluntary relocation of villages from inside the park.
- **River:** Perennial Kuno river
- **Forest Type:** Northern tropical dry deciduous forest
- **Flora and Fauna:**
  - Trees like **Kardhai, Salai, Khair** etc.
  - **Herbivores** include- sambar, nilgai, wild pig (*Sus scrofa*), chinkara, chousingha, blackbuck etc.
  - **Carnivores** include leopard, sloth bear, striped hyaena, gray wolf, golden jackal, Indian fox etc.

## Kuno National Park (KNP)



### 3.2.3. PROJECT TIGER

#### Why in news?

Project Tiger will complete 50 years in the year 2023.

#### About Project tiger

- A **Centrally Sponsored Scheme** of the Ministry of Environment, Forests and Climate Change, launched in 1973.
  - Initially launched in **9 Tiger reserves (TRs)** in different states of India.
- Provides central assistance to tiger range States for **in-situ conservation** of tigers in designated tiger reserves.
- **Implementing Agency:** Statutory body **National Tiger Conservation Authority (NTCA)**, established through Wild Life (Protection) Amendment Act, 2006.
  - Overarching supervisory/coordination role and approves the **Tiger Conservation Plan** prepared by the State Governments.
- **Funding pattern:** Centre provides financial assistance to States of **60% and 50%** for expenditure on all non-recurring items and expenditure on recurring items respectively.
  - Northeastern and Himalayan States are provided 90% central assistance in both cases.

#### Activities undertaken under project Tiger

- Establishment and development of new TRs: 52 tiger reserves covering over 75,000 sq. km.
  - Recently declared TRs: Ranipur TR (53rd TR) and Ramgarh Vishdhari TR (52<sup>nd</sup> TR).
  - Other Protected areas accorded approval for declaration as TR: Sunabeda Wildlife Sanctuary (Odisha), Male Mahadeshwara Hills Wildlife Sanctuary (Karnataka), and Guru Ghasidas National Park & Tamor Pingla Wildlife Sanctuary Tiger Reserve (Chhattisgarh).



#### Related news: Integrated Tiger Habitat Conservation Programme (ITHCP)

- German Development Cooperation and ITHCP have contributed total of **€47.5 million** for tiger conservation in Asian countries.
  - Initiated in 2014, ITHCP or 'Tiger Programme' is grant-making initiative which contributes to Global Tiger Recovery Programme (GTRP), global effort to double tiger numbers in wild by 2022.
- GTRP consists of **12 large-scale projects in Tiger Conservation Landscapes** across Bangladesh, Bhutan, India, Indonesia, Nepal and Myanmar.

- **Core buffer strategy for TRs:** Core areas are kept free of all human activities, a **co-existence agenda** adopted in buffer and fringe areas with landscape approach.
  - NTCA recently banned new construction in tiger reserves' core areas.
- **NTCA conducting 5<sup>th</sup> cycle of assessment using application M-STRIPES** (Monitoring System for Tigers Intensive-Protection & Ecological Status): Uses GPS to geotag photo-evidence.
- **Independent monitoring and the evaluation of tiger reserve** by developing **Management Effectiveness Evaluation (MEE) Framework** as per international standards.
- **Special Tiger Protection Force (STPF)** deployed in several TRs for focused anti-poaching operations.
- **Technological advancements:** E-Bird project uses Unmanned Aerial Vehicles (UAV) for Surveillance and Monitoring.

### DO YOU KNOW?

While Tigers are generally solitary animals but **Mother tigers stay with their cubs for about two years** and teach them to hunt.

## TIGER PROTECTION STATUS



### Wildlife Protection Act



Schedule I Schedule IV

### About Indian Tiger or Royal Bengal Tiger (*Panthera Tigris*)

- **Tiger species native to India.**
- **A flagship species of India**, declared as the **National Animal of India**.
- **Habitat:** Largest population is in India, smaller groups in **Bangladesh, Nepal, Bhutan, China and Myanmar**.
  - India home to more than **70% of global tiger population**.
  - Nearly 35% of tigers in India are found outside tiger reserves.
- **Distribution of Tiger population in India:** Habitats ranging from the high mountains, mangrove swamps, tall grasslands, to dry and moist deciduous forests, as well as evergreen and shola forest systems.
  - **Madhya Pradesh has the maximum number of tigers** followed by Karnataka and Uttarakhand.
- **Significance of tiger conservation:** Both an **Umbrella species** and a **Keystone species** (has a disproportionately large effect on its natural environment relative to its abundance).
- **Characteristics:**
  - **Solitary and territorial animal**, and the territory of an adult male may encompass territories of two to seven females.
  - **Stripes are individually as unique as human fingerprints**.

Recently declared Tiger reserves	
Tiger reserve	Details
Ramgarh Vishdhari Tiger Reserve	<ul style="list-style-type: none"> <li>• Rajasthan Government has <b>notified the Ramgarh Vishdhari Wildlife Sanctuary as a tiger reserve</b>.           <ul style="list-style-type: none"> <li>○ It is the <b>4<sup>th</sup></b> Tiger Reserve of Rajasthan after Ranthambore, Sariska and Mukundra; and <b>52<sup>nd</sup></b> tiger reserve of India.</li> </ul> </li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ <b>Location:</b> Bundi district and in part in Bhilwara and Kota districts.</li> <li>○ Serves as a tiger corridor between <b>Ranthambore Tiger Reserve</b> and <b>Mukundra Hills Tiger Reserve</b>.</li> <li>○ The topography varies from gentle slopes to steep rocky cliffs from flat-of hills of <b>Vindhya</b> to the conical hillocks and sharp ridges of the <b>Aravallis</b>.</li> </ul> </li> <li>• <b>River:</b> Mez, a tributary of Chambal river.</li> <li>• <b>Forest Type:</b> Dry Deciduous Forest</li> <li>• <b>Fauna and Flora:</b> Golden jackal, Indian wolf, leopard, striped hyena, chinkara, antelope, Chital, Sambar, Nilgai etc.</li> </ul>
Ranipur Tiger Reserve (RTR)	<ul style="list-style-type: none"> <li>• UP cabinet approved the notification of state's 4<sup>th</sup> (Dudhwa, Pilibhit and Amangarh are remaining 3) and India's 53<sup>rd</sup> tiger reserve in <b>Ranipur Wildlife Sanctuary</b> in Chitrakoot district.</li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ <b>Location:</b> Chitrakoot district of Uttar Pradesh.</li> </ul> </li> <li>• <b>Forest Type:</b> Tropical dry deciduous forests.</li> <li>• <b>Fauna and Flora:</b> Tiger, leopard, bear, spotted deer, sambhar, chinkara, reptiles and other mammals.</li> </ul>

### 3.2.4. GREAT INDIAN BUSTARDS

#### Why in news?

Supreme Court (SC) seeks update on power cables at Great Indian Bustard's (GIB) habitat.

#### More on the news

- In April, 2021, SC had ordered the power companies in Rajasthan and Gujarat to make the high-tension power lines underground so that GIB do not get caught in the web.
  - A three-member high-level committee (HLC) formed to look into the feasibility of the work.
  - Now SC has directed the HLC to submit a status report in three weeks.
- However, Centre and Rajasthan government objected to SC order stating the order was not feasible as area falling in GIB habitat is crucial for development of renewable energy sector.

#### About Great Indian Bustard

- Characteristics:**
  - Called 'Son Chiriya' in Madhya Pradesh, 'Godawan' in Rajasthan and 'Maldhok' in Maharashtra.
  - Looks like an ostrich.
  - Despite weighing heavy, can easily fly.
  - Bustard Species Found in India:** Great Indian Bustard, the Lesser Florican and the Bengal Florican.
- Habitat:**
  - Arid and semi-arid grasslands, open country with thorn scrub, tall grass interspersed with cultivation. Avoids irrigated areas.
  - Endemic to Indian Sub-continent, **Rajasthan has the highest population.**
  - Important Sites:** Desert National Park Sanctuary (Rajasthan), Naliya (Gujarat), Warora (Maharashtra) and Bellary (Karnataka)
- Threats to GIB:** Hunting, habitat erosion, 'greening' projects that transform arid grasslands to wooded areas, predators preying on the eggs etc
- Steps taken for GIB Conservation:**
  - One of the **Species for Recovery Programme** under Integrated Development of Wildlife Habitats of the Ministry of Environment and Forests
  - Included under **National Wildlife Action Plan (2002-2016).**

#### GREAT INDIAN BUSTARD PROTECTION STATUS



In list of 22 species covered under Species Recovery Programme?



### 3.2.5. INDIA'S 33RD ELEPHANT RESERVE

#### Why in news?

Ministry of Environment, Forest and Climate Change gave its nod to **Terai Elephant Reserve (TER)**, spread over 3,000 square kilometre in Dudhwa-Pilibhit region in Uttar Pradesh.

#### More on the news

- The area also includes: Dudhwa Tiger Reserve, Pilibhit Tiger Reserve and comprise forest areas of the Kishanpur Wildlife Sanctuary, Katarniaghata Wildlife Sanctuary
- TER will conserve four wild species - tiger, Asian elephant, swamp deer and one-horned rhinoceros in the entire landscape.

#### About Elephant reserves

- Declared as an administrative category by government to **demarcate large landscapes that hold elephants and their movements.**
- Notified under centrally sponsored scheme **Project Elephant.**

#### ELEPHANT PROTECTION STATUS



- Two recently notified ERs: Lemru in Chhattisgarh and Agasthymalai in Tamil Nadu.
- 33 elephant reserves together cover a total area of nearly 80,000 sq km.
- Tamil Nadu and Assam have the highest number of ERs (5 each) followed by Kerala (4) and Odisha (3).
  - Mysore ER in Karnataka is the largest ER.

#### About Indian elephant (*Elephas maximus*)

- Characteristics:
  - Highly intelligent animals characterised by strong family bonds, sophisticated forms of communication and complex behaviour, including tool use and the ability to feel grief and compassion.
  - Form herds of related females led by the oldest female, the 'matriarch'.
  - Have longest gestation period of all mammals (18 to 22 months).
  - Adult male Asian elephants are less social than females. They enter musth -- a mate-searching strategy for old (above 30 years of age) males, annually.
- Habitat: Found in the central and southern Western Ghats, North East India, eastern India and northern India and in some parts of southern peninsular India.
  - As per the last count in 2017, India has 29,964 elephants.
  - Karnataka has the highest number of elephants, followed by Assam and Kerala.
- Threats: Man-elephant conflict, habitat loss and fragmentations, poaching and the loss of genetic viability resulting from small population size and isolation.
- Conservation measures
  - India launched 'Project Elephant' in 1992. Under the project, the government provides technical and financial help to states to save elephants.
  - Development of Elephant Reserves.
  - Monitoring the Illegal Killing of Elephants (MIKE), an international effort for conservation of elephants in Asia and Africa.

### 3.2.6. INVASIVE SPECIES

#### Why in news?

Kaziranga National Park & Tiger Reserve faces new threat from invasive plant species.

#### More on the news

- Kaziranga's field director submitted a list of 18 invasive plants that are silently taking over the landscape at cost of indigenous grasses, shrubs and trees.
  - Herbivores usually avoid the invasive plants, which regenerate at an alarming speed and threaten to edge out the indigenous flora.
- Several identified invasive species: Bombax ceiba, Crateva magna, Trevia nudiflora, Lagerstroemia speciose, Lagerstromia parviflora, Litsea salicifolia, Securinega irosa, Rosa involucrata, pomoea camea, Derms cuneilolia, Calamus tenuis, and Leea macrophylla etc.
  - Some identified species have herbal properties (E.g., Leea macrophylla, Cestrum diurnum etc) but their toxicity outweighs their utility.

#### About Kaziranga National Park (KNP)

- Geographical location and other Important features:
  - Locations: Edge of the Eastern Himalayan biodiversity hotspots – Golaghat and Nagaon district.
  - Brahmaputra lies on the North and Karbi Anglong hills on the South of Kaziranga.
  - A UNESCO's World Heritage Site and a Tiger Reserve.
  - Houses largest-population of the one-horned rhinoceros in the world.
- Rivers: Brahmaputra, Diphlu, Mora Diphlu and Mora Dhansiri.
- Forests: Tropical moist broadleaf forests.
- Fauna and Flora:
  - Great Indian Rhinoceros, Tiger, Leopard, Elephant etc.
  - Kumbhi, Indian gooseberry, cotton tree, elephant Apple etc.

#### Kaziranga National Park (KNP)



- Permission has been sought under Wildlife (Protection) Act, 1972 to go in for experimental culling, cutting, slashing, uprooting, and girdling of invasive species.

#### About invasive species

- An organism that causes ecological or economic harm in a new environment where it is not native.
  - For E.g.: In India, **Parthenium** (came from wheat imported from U.S. in 1950s) and **Lantana** (brought by British as ornamental plants from South America) **threatens more than 40% of India's tiger reserves**.

#### 3.2.6.1. OTHER INVASIVE SPECIES IN NEWS

Invasive species	Details
Vilayati Kikar	<ul style="list-style-type: none"><li>• Delhi is implementing ecological restoration of its central ridge which involves replacing invasive vilayati kikar (<i>Prosopis juliflora</i>) with indigenous species.</li><li>• A native of South and Central America, introduced in India (by Britishers) to meet the fuel and wood requirement of the rural poor and to restore degraded lands.</li><li>• Has weedlike properties- grow in arid conditions, relative native species killing any competition and water-table depletion.</li></ul>
American bullfrog and brown tree snake	<ul style="list-style-type: none"><li>• As per a recent study, these species cost world an estimated \$16 billion between 1986 and 2020, by causing problems ranging from crop damage to power outages.</li></ul>
Senna spectabilis	<ul style="list-style-type: none"><li>• An invasive species, <i>Senna spectabilis</i> has taken over between 800 and 1,200 hectares of the buffer zones of the Mudumalai Tiger Reserve (MTR)</li><li>• Another major weed <i>Lantana camara</i>, also poses a threat to biodiversity in the tiger reserve.</li><li>• About <i>Senna spectabilis</i>:<ul style="list-style-type: none"><li>○ An exotic tree bright yellow flowers.</li><li>○ Introduced as an ornamental species and for use as firewood from South and Central America.</li><li>○ Negative effect on local biodiversity, crowding out native species and limiting food availability for wildlife.</li></ul></li></ul>
Red-eared slider turtle	<ul style="list-style-type: none"><li>• Invasive south red-eared slider turtle poses threat to Indian biodiversity.</li><li>• Mature fast, grow larger, and produce more offspring, thus, threat to native freshwater turtle.</li><li>• Can out-compete native turtles for food, nestling, and basking sites.</li><li>• Can transfer diseases and parasites to native reptile species.</li><li>• Habitat: Native to south-eastern USA and Mexico.</li><li>• Scientific name: <i>Trachemys scripta elegans</i>.</li><li>• IUCN Red List status: Least concern.</li></ul>

#### 3.2.7. ECO-SENSITIVE ZONES (ESZ)

##### Why in news?

The Supreme Court has directed that every protected forest, national park and wildlife sanctuary in the country should **mandatorily have a minimum 1 km ESZ**, from their demarcated boundaries.

##### More about the judgment

- The directions were passed in reference to applications filed under the **TN Godavarman Thirumalpad versus Union of India** case.
- **Applicability:** All such states/UTs where the minimum ESZ is not prescribed.
- **Other highlights of the judgment:**
  - **Extended boundary shall prevail** if the existing ESZ goes beyond 1 km buffer zone or if any statutory instrument prescribes a higher limit.
  - **No new permanent structure** will be allowed within the ESZ.
  - **Mining within national wildlife sanctuary or national park is not permitted.**
  - **Activity already being undertaken**, within the 1km or extended ESZ, **but lying outside the ambit of prohibited activities may continue with permission.**
  - The **Principal Chief Conservator of Forests** of each State/UT directed to make a list of subsisting structures at the ESZs and submit a report to the court within 3 months.
  - Requirements could be **diluted if there is “overwhelming public interest”**.

- In respect of PAs for which the proposal of a State/UT has not been given, **the 10 kilometres buffer zone as ESZ shall be implemented**, according to MoEFCC guidelines, till a final decision is arrived.

#### About Eco-sensitive zones (ESZs)

- Ecologically important and fragile areas around protected areas** designated under the Environment

Protection Act (EPA), 1986, to be protected from industrial pollution and unregulated development.

- Notified by:** The Central Government in exercise of the powers conferred by section 3 of the EPA, 1986.

- Aim of ESZs**

- Create some kind of "**Shock Absorber**" for the Protected Areas (PAs).
  - Act as a transition zone** from areas requiring higher protection to those requiring lesser protection.
  - Regulate human activities, rather than prohibit, around PAs.**
- Extent of ESZs as per 2011 guidelines:** Generally, width of **up to 10 kms around a PA**.
  - Also includes **Sensitive corridors, connectivity and ecologically important patches**, crucial for landscape linkages, even **beyond 10 kms width**.
  - Distribution** of an area of ESZ and the **extent of regulation** may **not be in uniform** all around and are kept PA specific.

#### CATEGORIES OF ACTIVITIES UNDERTAKEN WITHIN AN ESZ



#### PROCEDURE OF DECLARATION OF ESZ



#### Related news: Supreme Court quashes plea against Gadgil, Kasturirangan reports

- Plea was filled in the court for not implementing the recommendations of the **Gadgil Committee and Kasturirangan Committee Report on Western Ghats**.
  - According to petitioners, it would lead to the **violation of the 'Right to Life'** of the citizens hailing from the **Western Ghats, especially Kerala**.
- Western Ghats Conservation Background**
  - Gadgil panel (2011) recommended **tagging 64% of the Western Ghats region** as an Ecologically Sensitive Area (ESA) with varying degrees.
  - However, after widespread opposition, **Kasturirangan committee** (2013) was appointed that proposed **37 per cent of the total area** of Western Ghats, to be declared as ESA.
    - The Kasturirangan report removed the system of gradation recommended by the Gadgil commission.
    - Instead, it continued the **existing system of 'red', 'orange' and 'green'** categorisation of activities **according to their polluting effects**.
    - It recommended a **blanket ban on mining, quarrying, setting up of red category industries and thermal power projects**.
  - To solve the conflict in two reports Kerala Government proposed to implement the **Oommen V Oommen Report** that recommended that plantations and inhabited areas in the Western Ghats be kept out of the ESA.

### 3.2.8. BIODIVERSITY HERITAGE SITES (BHSS)

#### Why in news?

Tamil Nadu issued a notification declaring **Arittapatti and Meenakshipuram villages** in Madurai district the first biodiversity heritage site in State.

#### About Biodiversity Heritage Sites (BHSs)

- Well defined areas that are unique, ecologically fragile ecosystems, spread over terrestrial, coastal and inland and marine waters having rich biodiversity.
- Notified by: State Governments, in consultation with 'local bodies'.
  - Identified and notified as per the provisions of the **Section 37 of the Biological Diversity Act 2002**.
  - State Government in consultation with Central Government may frame rules for the management and conservation of BHS.
- Creation of BHSs may not put any restriction on prevailing practices and usages of local communities, other than those voluntarily decided by them.
  - State Governments are also empowered to frame schemes for compensating or rehabilitating any person or section of people economically affected by such notification.
- State Biodiversity Boards (SBB) may invite suggestion for declaration of BHSs through relevant community institutions (Gram sabhas, panchayats, urban wards, forest protection committees, tribal councils).
- Presently 35 BHS are in India including Majuli, Unakoti, Silachari Caves, Amarkantak etc.
  - First Biodiversity Heritage Site of India - Nallur Tamarind Grove in Bengaluru, Karnataka (2007).

#### About Arittapatti Biodiversity Heritage site

- Houses Anaikondan tank, built during the reign of Pandiyan kings in the 16th century.
- Has megalithic structures, rock-cut temples, Tamil Brahmi inscriptions, Jain beds etc.
- Arittapatti village houses several species of birds including three important raptors: Laggar Falcon, the Shaheen Falcon and Bonelli's Eagle.
- Other Fauna: Indian Pangolin, Slender Loris and pythons.

#### BHSs COMPRISSES ANY ONE OR MORE OF THE FOLLOWING COMPONENTS:



Richness of wild as well as domesticated species or intra-specific categories.



High endemism, presence of rare and threatened species, keystone species.



Species of evolutionary significance, wild ancestors of domestic/cultivated species or their varieties.



Past pre-eminence of biological components represented by fossil beds and having significant cultural, ethical or aesthetic values.



Important for maintenance of cultural diversity, with or without a long history of human association with them.

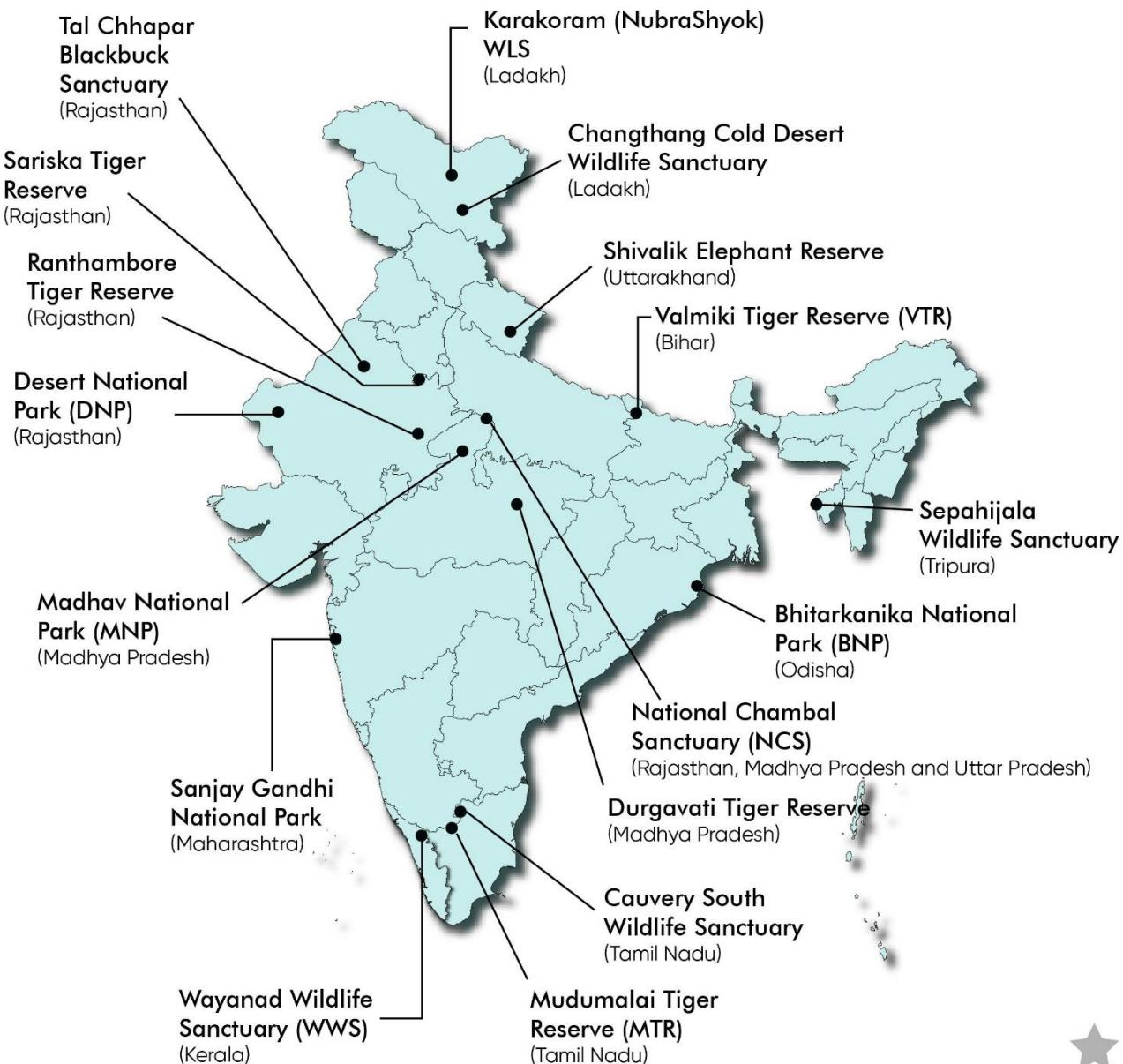
#### Other types of Protected Areas in India

Protected Area	Details
National Park	<ul style="list-style-type: none"> <li>• Notified under: Wildlife (Protection) Act of 1972.</li> <li>• Notified by: Both Central and State Government.</li> <li>• More protected vis-a-vis protection in wildlife sanctuaries.</li> <li>• No human activity is permitted inside the national park except for the ones permitted by the Chief Wildlife Warden of the state under the conditions given in WPA 1972.</li> <li>• More than 100 national parks in covering 1.23% of the geographical area of the country.           <ul style="list-style-type: none"> <li>○ Highest number of national parks in Madhya Pradesh.</li> </ul> </li> </ul>
Wildlife Sanctuary	<ul style="list-style-type: none"> <li>• Notified under: Wildlife (Protection) Act (WPA) of 1972.</li> <li>• Notified by: State Government to constitute as a sanctuary.</li> <li>• Criteria: If any area (other than area comprised with any reserve forest or the territorial waters) is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance.</li> <li>• Some restricted human activities are allowed inside the Sanctuary area.</li> <li>• More than 550 wildlife sanctuaries in India covering 3.64 % of the geographical area.           <ul style="list-style-type: none"> <li>○ Highest number of WS in Andaman &amp; Nicobar Islands.</li> </ul> </li> </ul>
Community Reserve or	<ul style="list-style-type: none"> <li>• Notified under: Wildlife (Protection) Act, 1972 (introduced in the Wildlife (Protection) Amendment Act of 2002).</li> </ul>

<b>Conservation Reserves</b>	<ul style="list-style-type: none"> <li><b>Notified by:</b> State Government after consulting with the central government and the local communities.</li> <li><b>Criteria:</b> An inhabited area which typically act as buffer zone to or connectors and migration corridors between established national parks, wildlife sanctuaries and reserved and protected forests of India. Parts of the land in this area are privately owned.           <ul style="list-style-type: none"> <li>Such areas are designated as <b>conservation areas if they are uninhabited and completely owned by the Government of India</b> but used for subsistence by communities.</li> </ul> </li> <li>More than 200 community reserves in India and 97 Conservation reserves.</li> </ul>
<b>Tiger Reserve</b>	<ul style="list-style-type: none"> <li><b>Notified under:</b> Wildlife (Protection) Act, 1972.</li> <li><b>Governed by:</b> Project Tiger, administrated by the National Tiger Conservation Authority (NTCA).</li> <li><b>Criteria:</b> A National Park or Wildlife Sanctuary considered significant for protecting tigers.</li> <li>Consists of a '<b>Core</b>' or '<b>Critical Tiger Habitat</b>', managed as an inviolate area and a '<b>Buffer</b>' or <b>Peripheral area</b> is immediately abutting a Core area, which may be accorded a lesser degree of habitat protection.</li> <li>Currently 53 tiger reserves in the country.</li> </ul>
<b>Critical Tiger Habitat</b>	<ul style="list-style-type: none"> <li><b>Notified under:</b> Wild Life Protection Act, 1972.</li> <li><b>Notified by:</b> State govt.</li> <li>Also known as core areas of tiger reserves.</li> <li>Demarcated areas of National Parks/Sanctuaries, <b>to be kept as inviolate for the purposes of tiger conservation</b>, without affecting the rights of forest dwellers.</li> <li><b>Largest area under CTH in India:</b> Nagarjunsagar-Srisailam Tiger Reserve.</li> </ul>
<b>Marine Protected Areas</b>	<ul style="list-style-type: none"> <li>A space in the ocean where human activities are more strictly regulated than the surrounding waters - similar to parks on land.</li> <li><b>Given special protections</b> for natural or historic marine resources by local, state, territorial, native, regional, or national authorities.</li> </ul>
<b>Biosphere Reserve</b>	<ul style="list-style-type: none"> <li><b>An international designation by UNESCO</b> comprising terrestrial, marine and coastal ecosystems.</li> <li>Divided into <b>core, buffer and transition</b> zone in decreasing order of protection.</li> <li><b>18 biosphere reserves in India, of which 13 are part of the World Network of Biosphere Reserves</b>, based on the UNESCO Man and the Biosphere (MAB) Programme</li> </ul>
<b>Bird Sanctuary</b>	<ul style="list-style-type: none"> <li>Nature facilities that ensure conservation of various species of birds and their natural habitats.</li> <li>More than 70 Bird Sanctuaries in India.</li> </ul>
<b>Important Bird Areas (IBAs)</b>	<ul style="list-style-type: none"> <li><b>Declared under:</b> IBA programme of Birdlife International.           <ul style="list-style-type: none"> <li><b>Aim:</b> To identify, monitor and protect a global network of IBAs for conservation of the world's birds and associated biodiversity.</li> </ul> </li> <li>Serve as conservation areas for protection of birds at the global, regional or sub-regional level.</li> <li><b>Criteria according to Birdlife International:</b> <ul style="list-style-type: none"> <li>hold significant numbers of one or more globally threatened bird species,</li> <li>be one of a set of sites that together hold a suite of restricted-range species or biome-restricted species and</li> <li>have exceptionally large numbers of migratory or congregatory birds.</li> </ul> </li> <li>The Bombay Natural History Society and Birdlife International identified 554 IBAs in India.</li> </ul>
<b>Natural World Heritage Sites</b>	<ul style="list-style-type: none"> <li>Place that is listed by the United Nations Educational, Scientific and Cultural Organization as of special cultural or physical significance.</li> <li><b>7 Natural World Heritage Sites in India-</b> Great Himalayan National Park Conservation Area, Kaziranga National Park, Keoladeo National Park, Manas Wildlife Sanctuary, Nanda Devi and Valley of Flowers National Parks, Sundarbans National Park and Western Ghats.</li> </ul>

### 3.2.9. PROTECTED AREAS IN NEWS

## Protected Areas in News



### Bihar

#### Valmiki Tiger Reserve (VTR)

- The forest department of Bihar has established an elephant rescue centre in VTR.
- Geographical location and other Important features:**
  - Location:** Extreme north-eastern end along the international border with Nepal in western Champaran district.
  - Contiguous with** Nepal's Chitwan National Park to the north, sharing a forested boundary with Sohagibarwa Wildlife Sanctuary in Uttar Pradesh.
  - Only protected area where Gauris found in the Shivaliks and Gangetic plains landscape.
  - Among the 14 tiger reserves in India which received accreditation of Global Conservation Assured Tiger Standards (CA|TS).
- Rivers:** Gandak River on the West boundary
- Forest Type:** Unique combination of the terai-bhabar vegetation.



	<ul style="list-style-type: none"> <li><b>Fauna and Flora:</b> Champa Trees, Tiger, Sloth bear, Leopard, Wild dog, Bison, Wild boar, barking deer, spotted deer, hog deer, sambar and blue bull.</li> </ul>
 Kerala	
Wayanad Wildlife Sanctuary (WWS)	<ul style="list-style-type: none"> <li><b>Money spider, ant-mimicking spider</b> have been reported for the first time from Muthanga range of WWS.</li> <li><b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li><b>Location:</b> Southern trenches of famous Western Ghats.</li> <li>Contiguous to protected areas of <b>Nagarhole and Bandipur National Parks of Karnataka on north-east</b> and <b>Mudumalai National Park of Tamil Nadu on south east</b>.</li> <li>Covers the Wayanad Plateau situated at the confluence of <b>three biologically distinct and diverse regions</b>- the main Western Ghat Mountains, the Nilgiri Hills and the Deccan Plateau.</li> <li>Component of the <b>Nilgiri Biosphere Reserve</b>.</li> <li><b>Tribal communities in the area:</b> Kuruma, Paniya, Kattunaicka, Urali, Kurichiar and Adiyar.</li> <li><b>Sanctuary is divided into two parts-</b> Muthanga towards the east and Tholpetty on the north side.</li> </ul> </li> <li><b>Rivers:</b> Kabini river (tributary of Cauvery River).</li> <li><b>Forest Type:</b> South Indian Moist Deciduous forests, West coast semi-evergreen forests and plantations of teak, eucalyptus and Grewelia.</li> <li><b>Fauna and Flora:</b> Elephant, Gaur, Tiger, Panther, Sambar, Red headed vultures and White rumped vultures, Spotted deer, four-horned antelope , Wild boar, Sloth bear, Nilgiri langur etc.</li> </ul>
 Ladakh	
Changthang Cold Desert Wildlife Sanctuary	<ul style="list-style-type: none"> <li>Department of Science &amp; Technology has announced setting up of <b>India's first dark sky reserve at Hanle in Ladakh</b> as a part of Changthang Wildlife Sanctuary.</li> <li><b>Geographical location and other Important features :</b> <ul style="list-style-type: none"> <li><b>Location:</b> Ladakhi Changthang Plateau in the <b>east of Leh District</b>.</li> <li>Situated between <b>Ladakh and Tibet (China) border</b>.</li> <li>Has <b>Korzok village</b>, considered to be the <b>world's highest village</b>.</li> <li>Home to <b>highest altitude water lakes</b>, namely, <b>Tso Moriri</b> (a Ramsar Wetland site), <b>PangongTso</b> and <b>TsoKar</b>.</li> </ul> </li> <li><b>Rivers:</b> Indus River</li> <li><b>Fauna and Flora:</b> Snow leopard, Tibetan wolf, wild yak, bharal, brown bear, Kiang or Tibetan wild ass, Dark-necked crane.</li> </ul>
Karakoram (NubraShyok) WLS	<ul style="list-style-type: none"> <li>Ladakh has identified <b>proper mapping and boundary identification of Changthang and Karakoram sanctuaries</b> along India-China border as a priority concern. <ul style="list-style-type: none"> <li><b>Wildlife Institute of India (WII) has been asked to map</b> and identify areas of 'high conservation value' to help 'rationalise' boundaries - allowing for addition or deletion of land.</li> </ul> </li> <li><b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li><b>Location:</b> Easternmost reaches of <b>Karakoram Range in Leh District</b>.</li> <li>Bounded on North and South by China and Pakistan, the Karakoram ranges lines the north.</li> <li>Situated just to the <b>north of Hemis National Park</b>, east of <b>Deosai National Park</b> and to the <b>northwest of the Changthang WLS</b>.</li> <li><b>Community of Diskit</b> is located in the heart of the Sanctuary.</li> <li>Kargil is situated to the west of Karakoram Wildlife Sanctuary within the Suru River Valley.</li> </ul> </li> <li><b>Rivers:</b> Shyok River (tributary of the Indus)</li> <li><b>Flora and Fauna:</b> Tibetan antelope (chiru) Tibetan gazelle, Himalayan ibex, Shapo, bharal, wild yak, Snow leopard etc.</li> </ul>
 Madhya Pradesh	
National Chambal	<ul style="list-style-type: none"> <li>To end illegal sand mining, Madhya Pradesh plans to make it legal in parts of NCS. <ul style="list-style-type: none"> <li>Sand mining has been banned in NCS since 2006.</li> </ul> </li> <li><b>Geographical location and other Important features:</b></li> </ul>

Sanctuary (NCS)	<ul style="list-style-type: none"> <li>○ <b>Location:</b> Area spanning across <b>three states of Madhya Pradesh, Rajasthan and Uttar Pradesh.</b></li> <li>○ <b>A Riverine sanctuary.</b></li> <li>○ Main area for <b>species reintroduction programme of crocodilian species Gavialis gangeticus (Gharial).</b></li> <li>○ Listed as an <b>Important Bird Area (IBA).</b></li> <li>● <b>Rivers:</b> Chambal River (tributary of Yamuna River) and its <b>tributary Parvati.</b></li> <li>● <b>Forest Type:</b> Part of <b>Khathiar dry deciduous forests ecoregion.</b></li> <li>● <b>Flora and Fauna:</b> Gharials, gangetic dolphins, mugger crocodiles and several rare turtle species.</li> </ul>
Durgavati Tiger Reserve	<ul style="list-style-type: none"> <li>● <b>Madhya Pradesh (MP) Wildlife Board approved a new reserve for tigers of Panna Tiger Reserve (PTR).</b> <ul style="list-style-type: none"> <li>○ <b>One-fourth of PTR will get submerged due to linking of Ken-Betwa rivers.</b></li> <li>○ In wake of river linking project, NTCA had asked UP and MP governments to notify new tiger reserves.</li> </ul> </li> <li>● <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ Location: Spread across Narisinghpur, Damoh and Sagar districts of MP.</li> <li>○ A green corridor linking PTR with Durgavati to be developed for the natural movement of the tiger to the new reserve.</li> </ul> </li> <li>● <b>Forests:</b> Tropical mixed dry deciduous forest and some teak forests.</li> <li>● <b>Flora and Fauna:</b> leopard, wolf, jackal, sloth bear, Barking deer, Four Horned Antelope etc.</li> </ul>
Madhav National Park (MNP)	<ul style="list-style-type: none"> <li>● <b>Tigers are being reintroduced</b> in the MNP more than six decades after they were last seen there in 1960s.           <ul style="list-style-type: none"> <li>○ Tigers from Panna, Bandhavgarh and Satpura National Parks will be reintroduced.</li> </ul> </li> <li>● <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ Location: Madhya Pradesh in Shivpuri District, part of upper Vindhyan hills.</li> <li>○ Two lakes- <b>Sakhya Sagar &amp; Madhav Sagar and Madikhera</b> dam situated here.</li> </ul> </li> <li>● <b>Forest Type:</b> Northern Tropical dry deciduous mixed forest as well as dry thorn forest.</li> <li>● <b>Flora and Fauna:</b> Tigers, hyena, sloth bear, and crocodile, Nilgai, Chinkara and Chowsingha, Chital, Sambar, migratory birds including geese, pochard, pintail, teal, mallard, and gadwall, Kardhai tree etc.</li> </ul>

## Maharashtra

Sanjay Gandhi National Park	<ul style="list-style-type: none"> <li>● A pair of <b>Asiatic lions</b> have been brought to the Sanjay Gandhi National Park from Gujarat.</li> <li>● <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ <b>Location:</b> Borivali East, Mumbai</li> <li>○ Previously known as '<b>Borivali National Park</b>'.</li> <li>○ Site of archaeological importance because of <b>presence of Kanheri caves</b> which represent a rare fragment of <b>Buddhist history</b>.</li> <li>○ Forms approximately <b>20% of Mumbai's geographical area</b>.</li> <li>○ 2 man-made lakes inside the park premises, <b>Tulsi Lake</b> and <b>Vihar Lake</b>.</li> <li>○ <b>Tribes in the area:</b> Warlis and Mahadeo Kolis.</li> </ul> </li> <li>● <b>River:</b> Dahisar River.</li> <li>● <b>Forest Type:</b> Southern <b>mixed-deciduous</b> forest</li> <li>● <b>Fauna and Flora:</b> Leopard, monkey, spotted deer, Indian hare, wild cat etc. and Flora are dominated by the Tectona, Albizzia, Terminalia, Butea, bamboo etc.</li> </ul>
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## Odisha

Bhitarkanika National Park (BNP)	<ul style="list-style-type: none"> <li>● Number of <b>newborn saltwater crocodiles</b> in BNP reached a record <b>3,700</b> this year during the nesting period.</li> <li>● <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>○ <b>Location:</b> Kendrapara, Odisha.</li> <li>○ At the <b>south end of the national park</b> is the <b>Gahirmatha Beach</b> which is the lone mass nesting spot in Indian Ocean region.</li> <li>○ Has India's <b>Largest Herony</b>.</li> </ul> </li> <li>● <b>Rivers:</b> Lies in the estuarial region of <b>Brahmani, Baitarani, Dhamra and Patasala River</b>.</li> <li>● <b>Forest Type:</b> Second-largest mangrove forest in India (after the Sundarbans).</li> <li>● <b>Fauna and Flora:</b> Saltwater crocodiles, hyenas, wild boar, Open Billed Stork, Grey Heron,, White Ibis etc.</li> </ul>
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 <b>Rajasthan</b>	
<b>Desert National Park (DNP)</b>	<ul style="list-style-type: none"> <li>• A green agriculture project funded by the FAO's Global Environment Facility (GEF) will help with the conservation of critical biodiversity in DNP.</li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>◦ <b>Location:</b> Jaisalmer and Barmer districts of Rajasthan.</li> <li>◦ Only place where Rajasthan State Bird (<b>Great Indian Bustard</b>), State animal (<b>Chinkara</b>) and State tree (<b>Khejri</b>) and State flower (<b>Rohida</b>) are found naturally.</li> <li>◦ Khejri tree revered and protected by the local communities specially the '<b>Bishnois</b>'.</li> <li>◦ <b>Landform</b> consists of sand dunes, craggy rocks and compact Salt Lake bottoms.</li> <li>◦ <b>Climate:</b> extreme hot, arid region of very low rainfall zone.</li> </ul> </li> <li>• <b>Forest Type:</b> Thorn Forest</li> <li>• <b>Fauna and Flora:</b> Great Indian Bustard, Blackbuck, Chinkara, wolf India Fox, desert fox, etc.</li> </ul>
<b>Ranthambore Tiger Reserve</b>	<ul style="list-style-type: none"> <li>• A Tiger was recently shifted from Ranthambore Tiger Reserve (RTR) to Sariska Tiger Reserve (STR).</li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>◦ <b>Location:</b> Junction of Aravali valley and Vindhya near Sawai Madhopur district in Eastern Rajasthan.</li> <li>◦ Also, a National Park.</li> <li>◦ Ranthambore Fort, a UNESCO World Heritage Site, situated inside the Park.</li> <li>◦ Lakes: <b>Padam Talao, Malik Talao, Raj Bagh Talao.</b></li> </ul> </li> <li>• <b>Rivers:</b> Enclosed by <b>Chambal River and Banas River</b> from the two sides.</li> <li>• <b>Forest Type:</b> Dry deciduous forest and open grassy meadow.</li> <li>• <b>Fauna and Flora:</b> Tigers, Leopards, Striped Hyenas, Sambar deer, Chital, Nilgai, etc.</li> </ul>
<b>Sariska Tiger Reserve</b>	<ul style="list-style-type: none"> <li>• A Tiger was recently shifted from Ranthambore Tiger Reserve (RTR) to Sariska Tiger Reserve (STR).</li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>◦ <b>Location:</b> Alwar district of Rajasthan.</li> <li>◦ Part of the <b>Aravalli Range</b>.</li> <li>◦ Harbors Neelkanth temple; Pandupol Hanuman Temple; Kankwadi fort.</li> </ul> </li> <li>• <b>Forest Type:</b> Mountains, grasslands, dry deciduous forests.</li> <li>• <b>Fauna and Flora:</b> Indian leopard, jungle cat, caracal, striped hyena, golden jackal, etc. and bird species, such as sand grouse, harbor quails, crested serpent eagles, etc.</li> </ul>
<b>Tal Chhapar Blackbuck Sanctuary</b>	<ul style="list-style-type: none"> <li>• To protect the sanctuary, Rajasthan High Court ordered a "<b>complete prohibition</b>" on any action to reduce wildlife sanctuary's area.           <ul style="list-style-type: none"> <li>◦ Court directed to complete the formalities for declaration of eco-sensitive zone surrounding Tal Chhapar at the earliest.</li> </ul> </li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>◦ <b>Location:</b> Thar Desert, Rajasthan and part of famous Shekhawati region.</li> <li>◦ Tal is Rajasthani word means <b>plane land</b>.</li> <li>◦ <b>Only sanctuary in India with a good number of blackbucks</b> in an almost tree-less, saline and flat-land.</li> <li>◦ "<b>Mothiya</b>" or pearl-a special type of grass is found here.</li> </ul> </li> <li>• <b>Forest Type:</b> Grassland</li> <li>• <b>Fauna and Flora:</b> Desert fox, desert cat and Migratory birds are harriers, eastern imperial eagle, short-toed eagle, little green bee-eaters etc.</li> </ul>

 <b>Tamil Nadu</b>	
<b>Cauvery South Wildlife Sanctuary</b>	<ul style="list-style-type: none"> <li>• <b>Tamil Nadu government has notified</b> the sanctuary as <b>state's 17th wildlife sanctuary</b>, under <b>Wild Life (Protection) Act, 1972</b>.</li> <li>• <b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li>◦ <b>Location:</b> Krishnagiri and Dharmapuri Districts</li> <li>◦ <b>Connects Cauvery North Wildlife Sanctuary</b> of Tamil Nadu with Cauvery Wildlife Sanctuary in neighboring Karnataka.</li> <li>◦ Maintains further continuity to the <b>Nilgiri Biosphere</b> through <b>Malai Mahadeshwara Wildlife Sanctuary, Billigiri Rangaswamy Temple (BRT) Tiger Reserve</b> in Karnataka and <b>Sathyamangalam Tiger Reserve</b> and Erode District.</li> <li>◦ Important elephant habitat comprising of <b>2 elephant corridors: Nandimangalam-Ulibanda Corridor and Kovaipallam-Anebiddahalla Corridor</b>.</li> </ul> </li> <li>• <b>River:</b> Cauvery River</li> </ul>

	<ul style="list-style-type: none"> <li><b>Fauna and Flora:</b> Grizzled giant squirrel, four-horned antelope, and Lesser Fish Eagle, Leith's soft shelled turtles, smooth coated otters, marsh crocodile, etc</li> </ul>
Mudumalai Tiger Reserve (MTR)	<ul style="list-style-type: none"> <li>Newly captured and reintroduced wild elephant PM2 (Pandalur Makhna) in MTR is adapting to new habitat. <ul style="list-style-type: none"> <li>Theppakadu Elephant camp in MTR is oldest elephant camp in Asia, established before independence.</li> </ul> </li> <li><b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li><b>Location:</b> Nilgiris District of Tamil Nadu at <b>tri-junction of 3 states-</b> Karnataka, Kerala and Tamil Nadu.</li> <li>Shares boundary with Wayanad Wildlife Sanctuary (Kerala) on West, Bandipur Tiger Reserve (Karnataka) on North.</li> <li>Part of the <b>Nilgiris Biosphere Reserve.</b></li> <li>Among the 14 tiger reserves in India which <b>received accreditation of Global Conservation Assured Tiger Standards (CA TS).</b></li> </ul> </li> <li><b>River:</b> Moyar.</li> <li><b>Forest Type:</b> Tropical evergreen forest, moist deciduous forest, moist teak forest, dry teak forest, secondary grasslands and swamps.</li> <li><b>Fauna and Flora:</b> Elephants, Gaur, Tiger, Panther, Spotted Deer, Barking Deer, Wild Boar, Porcupine etc., birds like-minivets, hornbill, fairy Blue Birds, etc.</li> </ul>



## Uttarakhand

Shivalik Elephant Reserve	<ul style="list-style-type: none"> <li>Uttarakhand govt announced <b>repeal of the decision to denotify the Shivalik Elephant Reserve to expand the airport in Dehradun.</b></li> <li><b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li><b>Location:</b> Much of this reserve falls <b>inside protected areas:</b> Rajaji National Park, Corbett Tiger Reserve, Nandaur Wildlife Sanctuary, and Sonanadi Wildlife Sanctuary.</li> <li>Home to almost all of Uttarakhand's wild elephants.</li> <li><b>Protects key patches and corridors</b> that allow elephants to move from their habitats near the Yamuna river in the west to those on the Sharda River in the east.</li> <li>A Monitoring the Illegal Killing of Elephants (MIKE) site in India.</li> </ul> </li> </ul>
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MONITORING THE  
ILLEGAL KILLING  
OF ELEPHANTS

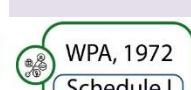


## Tripura

Sepahijala Wildlife Sanctuary	<ul style="list-style-type: none"> <li>Two baby leopards join Sepahijala Zoo after 12 years.</li> <li><b>Geographical location and other Important features:</b> <ul style="list-style-type: none"> <li><b>Location:</b> Bishalgarh, Tripura.</li> <li>A woodland with an artificial lake and natural botanical and zoological gardens.</li> <li>A kind of Zoo plus Garden and Sanctuary.</li> </ul> </li> <li><b>Fauna and Flora:</b> Clouded leopard, spectacle langur, capped langur, pig-tailed macaque, slow loris, Barking deer, Wild boar and Flora-Artocarpus chaplasi, Albizzia procera etc.</li> </ul>
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### 3.2.10. SPECIES IN NEWS

<b>Terrestrial Species</b> <b>Asiatic Lion</b> 	<ul style="list-style-type: none"> <li>Recently parliament was informed that <b>Project Lion document "Lion @ 47: Vision for Amrit kal"</b> has been prepared to secure &amp; restore lions' habitats.</li> <li><b>About Project Lion:</b> <ul style="list-style-type: none"> <li>Envisages <b>landscape ecology based conservation</b> of the Asiatic Lion in Gujarat by integrating <b>conservation and eco-development.</b></li> <li>Being implemented in <b>Gir landscape in Gujarat</b>, last home of Asiatic lion.</li> </ul> </li> </ul>
	<b>Protection Status:</b> <div style="display: flex; align-items: center;"> <span>Appendix I</span> </div> <div style="display: flex; align-items: center; margin-left: 20px;"> <span>Schedule I</span> <span>Schedule IV</span> </div> <div style="display: flex; align-items: center; margin-left: 20px;"> <span>In list of 22 species covered under Species Recovery Programme?</span> </div>
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li><b>Second-largest cats in the world</b>, after tigers.</li> <li><b>Social cats</b> which live in groups called <b>prides</b>.</li> </ul>

	<ul style="list-style-type: none"> <li><b>Male lions</b> have a <b>distinctive thick mane</b> of hair around their heads that females lack.</li> <li>Asiatic lions and African lions are subspecies of the same species.</li> </ul> <table border="1"> <thead> <tr> <th colspan="3"><b>Difference between Asiatic and African Lions</b></th></tr> <tr> <th>Criteria</th><th>Asiatic</th><th>African</th></tr> </thead> <tbody> <tr> <td><b>Size</b></td><td>Larger</td><td>Smaller</td></tr> <tr> <td><b>Mane</b></td><td>Relatively dense, Lighter mane</td><td>Relatively short, Darker, sparse mane</td></tr> <tr> <td><b>Skin Fold</b></td><td>Absent</td><td>Longitudinal fold of skin that runs along the belly</td></tr> <tr> <td><b>Pride Size</b></td><td>Larger</td><td>Smaller</td></tr> </tbody> </table> <ul style="list-style-type: none"> <li><b>Threat:</b> Vulnerable to disease, <b>genetic inbreeding</b>, disaster, potential poaching and accidental lion deaths due to human causes.</li> </ul> <p><b>Habitat:</b> Population limited to only five protected areas in Gujarat – <b>Gir National Park, Gir Sanctuary, Pania Sanctuary, Mitiyala Sanctuary and Girnar Sanctuary</b>.</p> <p><b>Conservation Measures:</b> Asiatic Lion Conservation Project, funded from the Centrally Sponsored Scheme- Development of Wildlife Habitat (CSS-DWH).</p>	<b>Difference between Asiatic and African Lions</b>			Criteria	Asiatic	African	<b>Size</b>	Larger	Smaller	<b>Mane</b>	Relatively dense, Lighter mane	Relatively short, Darker, sparse mane	<b>Skin Fold</b>	Absent	Longitudinal fold of skin that runs along the belly	<b>Pride Size</b>	Larger	Smaller
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<b>Pride Size</b>	Larger	Smaller																	
<b>Snow Leopard</b>	 <ul style="list-style-type: none"> <li>Snow leopard conservationist (Charudutt Mishra) won <b>Whitley Gold Award</b> for efforts to involve local communities.</li> </ul> <p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span>  <b>VU</b> </span> <span>  Appendix I         </span> <span>  Wildlife Protection Act            Schedule I      Schedule IV         </span> <span>           In list of 22 species covered under Species Recovery Programme?         </span> <span>  </span> </div> <p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Termed as <b>Ghost of Mountain</b> due to their camouflage.</li> <li>Patterned with black <b>spots called rosettes</b> unique to every snow leopard.</li> <li>A <b>flagship species</b> of high-altitude Himalayas in India.</li> <li><b>Threats:</b> Loss of natural prey species, human animal conflict and illegal trade of its fur and bones.</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li><b>Mountainous landscape of Central and Southern Asia</b> with <b>12 snow leopard range countries</b> being- Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyz Republic, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.       <ul style="list-style-type: none"> <li><b>China has world's largest snow leopard population.</b></li> </ul> </li> <li>In India, found in a large part of the <b>western Himalayas</b>, including the Union Territories of Jammu and Kashmir and Ladakh, Himachal Pradesh, Uttarakhand and Sikkim and Arunachal Pradesh in the <b>eastern Himalayas</b>.</li> </ul> <p><b>Conservation Measures:</b></p> <ul style="list-style-type: none"> <li>Declared as <b>State animal of Himachal Pradesh and Ladakh</b>.</li> <li><b>India has ratified the Global Snow Leopard and Ecosystem Protection Program (GSLEP)</b>.</li> <li><b>Snow Leopard Population Assessment in India (SPA)</b>.</li> <li><b>Project Snow Leopard (2009)</b>, a centrally supported program for conservation.</li> <li><b>SECURE Himalaya project (2017)</b> by Government of India and UNDP with support of Global Environment Facility.</li> </ul>																		
<b>Nilgiri Tahr</b>	 <ul style="list-style-type: none"> <li>Tamil Nadu is set to implement <b>Project Nilgiri Tahr</b>, aimed at developing a better understanding of its population for the 2022-27 periods.</li> </ul> <p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span>  <b>EN</b> </span> <span>  WPA, 1972            Schedule I         </span> <span>           In list of 22 species covered under Species Recovery Programme?         </span> <span>  </span> </div>																		

	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Only mountain ungulate (animal with hooves) in southern India amongst the 12 species present in India.</li> <li>Locally known as 'Varaiaadu'.</li> <li>Diurnal, but are most active grazing in the early morning and late afternoon.</li> <li>Only Tahr is adapted to a cold and wet tropical environment.</li> <li>State animal of Tamil Nadu.</li> <li><b>Threats:</b> Habitat loss due to rampant deforestation, competition with domestic livestock, hydroelectric projects, and monoculture plantations, occasional hunting for its meat and skin.</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>Endemic to the Western ghats with current distribution between Nilgiris in the north and Kanyakumari hills in the south of the region.</li> <li>Ervikulam National Park in Anamalai hills, Kerala, is home to the largest population of the Nilgiri tahr.</li> <li>Mukurthi national park created to protect the keystone species.</li> </ul>				
Red pandas	 <ul style="list-style-type: none"> <li>Padmaja Naidu Himalayan Zoological Park (West Bengal) has started a programme to release 20 red pandas in about five years to the forests.</li> </ul> <p><b>Protection Status:</b></p> <table border="1"> <tr> <td>IUCN STATUS <b>EN</b></td> <td>CITES Appendix I</td> <td>Wildlife Protection Act Schedule I Schedule IV</td> <td>In list of 22 species covered under Species Recovery Programme?</td> </tr> </table>	IUCN STATUS <b>EN</b>	CITES Appendix I	Wildlife Protection Act Schedule I Schedule IV	In list of 22 species covered under Species Recovery Programme?
IUCN STATUS <b>EN</b>	CITES Appendix I	Wildlife Protection Act Schedule I Schedule IV	In list of 22 species covered under Species Recovery Programme?		
Greater One-Horned Rhino	 <ul style="list-style-type: none"> <li>The reintroduction of Greater One-Horned Rhino in Manas National Park of Assam has indicated higher life expectancy of them. <ul style="list-style-type: none"> <li>Manas National Park is a UNESCO World Heritage Site and a tiger reserve in Western Assam.</li> </ul> </li> </ul> <p><b>Protection Status:</b></p> <table border="1"> <tr> <td>IUCN STATUS <b>VU</b></td> <td>CITES Appendix I</td> <td>Wildlife Protection Act Schedule I Schedule IV</td> <td>In list of 22 species covered under Species Recovery Programme?</td> </tr> </table> <p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Asia's largest Rhino species and 4th largest land animal.</li> <li>Excellent swimmer and can run at a speed of 55 km/hr for short periods.</li> <li>Solitary animal, though several may occupy the same patch of grassland or water source.</li> <li>Has incredible sense of hearing and smell, but eyesight is relatively poor.</li> <li>Gestation period is about 16 months.</li> <li><b>Threats:</b> Hunted for their horn (an ingredient in traditional Asian medicines), destruction of their preferred habitat</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>Alluvial Terai-Duar savanna grasslands and riverine forest.</li> <li>Found commonly in Nepal, Bhutan, Pakistan and India.</li> <li>India home to over 85% of the population.</li> </ul>	IUCN STATUS <b>VU</b>	CITES Appendix I	Wildlife Protection Act Schedule I Schedule IV	In list of 22 species covered under Species Recovery Programme?
IUCN STATUS <b>VU</b>	CITES Appendix I	Wildlife Protection Act Schedule I Schedule IV	In list of 22 species covered under Species Recovery Programme?		

	<ul style="list-style-type: none"> <li>Mainly found in the <b>seven Protected Areas</b> viz. - Kaziranga NP, Pobitora WLS, Orang NP, Manas NP in Assam, Jaldapara NP and Gorumara NP in West Bengal and Dudhwa NP in Uttar Pradesh.</li> <li><b>Assam has 71% of the world's population (2652 as per 2018 census)</b> with Kaziranga National Park harbouring the highest number.</li> </ul> <p><b>Conservation Measures:</b> Indian Rhino Vision 2020 (to expand rhino's range), Special Rhino Protection Force, National Rhino Conservation Strategy launched in 2019 to conserve the greater one-horned rhinoceros, etc.</p>
<b>Sangai (Manipur Brow-antlered deer)</b>	<ul style="list-style-type: none"> <li>PM addressed <b>Manipur Sangai Festival</b> via video message.</li> <li><b>Sangai Festival</b> is named after, <b>Sangai</b>, brow-antlered deer found <b>only in Manipur</b>.</li> </ul> <p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span>  EN   Appendix I         </span> <span>  Wildlife Protection Act            Schedule I Schedule IV         </span> <span>  In list of 22 species covered under Species Recovery Programme?         </span> </div> <p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>A medium-sized deer, with uniquely distinctive antlers.</li> <li>Called the <b>Dancing Deer</b> as it walks on the hind surface of its pasterns with mincing hops over floating foliage known as Phumdi.</li> <li><b>Threats:</b> Steadily degenerating habitat of phumdi as a result of pollution, continuous inundation and flooding, invasion of non-native plants like Paragrass etc., threats of diseases from the livestock, inbreeding depression and poaching.</li> </ul> <p><b>Habitat:</b> Loktak Lake inside Keibul Lamjao National Park (<b>Manipur</b>), over floating biomass, called phumdi.</p> <p><b>Conservation measures:</b></p> <ul style="list-style-type: none"> <li>State animal of Manipur.</li> <li>Loktak Lake designated as a wetland of International Importance <b>under Ramsar Convention</b>.</li> </ul>
<b>Fishing cat</b>	<ul style="list-style-type: none"> <li><b>Chilika lake, Asia's largest brackish water lagoon</b>, is home to around 176 fishing cats, according to a recent study conducted by the Chilika Development Authority in collaboration with The Fishing Cat Project.           <ul style="list-style-type: none"> <li>The first population estimation carried out <b>outside the protected area network</b>.</li> </ul> </li> </ul> <p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span>  VU   Appendix II         </span> <span>  Wildlife Protection Act            Schedule I Schedule IV         </span> </div> <p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Nocturnal animal and an <b>adept swimmer</b> and twice the size of a house cat.</li> <li>Remarkable feature: <b>Layered structure of their fur</b>, a crucial adaptation to life in the water.</li> <li><b>Threats:</b> Destruction of wetlands, depletion of its main prey-fish due to unsustainable fishing practices, poached for its skin.</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>Found primarily in wetland and mangrove habitats.</li> <li>In India, mainly found in the <b>mangrove forests of the Sundarbans</b>, on the foothills of the Himalayas along the Ganga and Brahmaputra river valleys and in the <b>Western Ghats</b>.</li> </ul> <p><b>Conservation Measures:</b></p> <ul style="list-style-type: none"> <li>State animal of West Bengal and also designated as <b>ambassador of Chilika since 2020</b>.</li> </ul>
<b>Slender Loris</b>	<ul style="list-style-type: none"> <li>India's first sanctuary for slender lorises was notified recently, named Kadavur Slender Loris Sanctuary, in Tamil Nadu. It is declared under <b>Wild Life (Protection) Act, 1972</b>.</li> </ul> <p><b>Protection Status:</b></p> <ul style="list-style-type: none"> <li><b>IUCN Status:</b> Grey Slender Loris is Near Threatened and Red Slender Loris is Endangered.</li> </ul> <div style="display: flex; justify-content: space-around;"> <span>  Appendix II         </span> <span>  Wildlife Protection Act            Schedule I Schedule IV         </span> </div>

	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>• <b>Arboreal in nature</b> i.e., spend most of their life on trees.</li> <li>• <b>Primates that cannot jump.</b></li> <li>• <b>Threats:</b> Threat from poachers due to the misplaced belief that these animals have magical and medicinal powers, destruction of their habitat.</li> </ul>
	<p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>• Commonly found in <b>the tropical scrub and deciduous forests</b> and the dense hedgerow plantations bordering farmlands of <b>Southern India and Sri Lanka</b>.</li> <li>• <b>Grey Slender Loris:</b> found only in <b>South India</b> and small parts of <b>Sri Lanka</b>,</li> <li>• <b>Red Slender Loris:</b> found only in <b>Sri Lanka</b>.</li> </ul>
<b>Indian Pangolin</b> 	<ul style="list-style-type: none"> <li>• CITES COP19 urged parties to remove references to <b>pangolins</b> from pharmacopoeia- <b>an official collection of approved pharmaceutical standards.</b></li> </ul>
	<p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span></span> <span></span> <span>Wildlife Protection Act Schedule I Schedule IV</span> </div>
	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>• <b>Large anteater</b> covered dorsally by scales.</li> <li>• <b>Can roll into a ball when in danger</b>, exposing only the tough scales for protection.</li> <li>• <b>Have no teeth and pick up food with their sticky tongues.</b></li> <li>• <b>Only mammal wholly covered in scales.</b></li> <li>• <b>Behavior:</b> solitary, primarily nocturnal animals.</li> <li>• Gestation period: 65-70 days, which is much shorter than for other species of pangolin.</li> <li>• <b>Threats:</b> Hunting and poaching for local consumptive use (e.g. as a protein source and traditional medicine) and international trade, for its meat and scales in East and South East Asian countries.</li> </ul>
	<p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>• <b>There are 8 species of pangolins in the world</b>, of which 2 are found in India: Indian Pangolin (Endangered) &amp; Chinese Pangolin (Critically Endangered).</li> <li>• Indian Pangolin is widely distributed in India, <b>except the arid region, high Himalayas and North East.</b></li> </ul>
<b>Jeypore Ground Gecko</b> 	<ul style="list-style-type: none"> <li>• Jeypore Ground Gecko has been included in <b>Appendix II of CITES</b>.</li> </ul>
	<p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span></span> <span></span> <span>WPA, 1972 Schedule I</span> </div>
	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>• Nocturnal, comes out during the evening, after darkness, and forages on ground.</li> <li>• <b>Threats:</b> Habitat loss and poaching for domestic and international trade.</li> </ul>
	<p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>• <b>Endemic to peninsular India.</b></li> <li>• Found in <b>Eastern Ghats and southern Odisha and northern Andhra Pradesh.</b></li> </ul>
 Avian species	
<b>Great Indian Hornbill</b>	<ul style="list-style-type: none"> <li>• A video of the Great Indian Hornbill being tortured in Wokha District, <b>Nagaland</b> went viral.</li> </ul>
	<p><b>Protection Status:</b></p> <div style="display: flex; justify-content: space-around;"> <span></span> <span></span> <span>Wildlife Protection Act Schedule I Schedule IV</span> </div>


**Characteristics:**

- **Largest member of the hornbill family.**
- **Female Great hornbills are smaller than males** and have bluish white instead of red eyes.
- **Figs comprise a major part of their diet** but the species also takes eggs, amphibians, reptiles, insects, mammals, and small birds.
- **Threats:** Habitat loss from logging and shifting cultivation, hunting (meat, feathers and casque are used for ornamental purposes) etc.

**Habitat:**

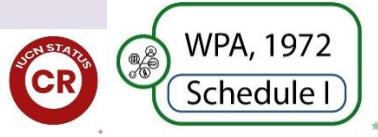
- Found in **wet evergreen and mixed deciduous forests**.
- **Distributed in a range from** western India, through Indochina, south of Malaya and through Sumatra.
- In India, mainly Found in foothills of **Himalayas and parts of northeast India**, along with **Western Ghats**.

**Conservation measures:**

- **State Bird of Kerala.**
- Hornbill Nest Adoption Program (community-based conservation) which was adopted in 2011 to protect breeding populations of hornbills that occur outside **Pakke Tiger Reserve, Arunachal Pradesh**.

**Lesser Florican**


- Recently, **Supreme Court directed the Rajasthan and Gujarat power producers to install bird diverters** to protect endangered Great Indian Bustard and Lesser Florican.

**Protection Status:**

**Characteristics:**

- Also known as Kharma.
- A small and gracile bustard of the bustard family.
- Smallest of India's 3 resident bustards.
- Male floricans are generally shorter and lighter than their female counterparts.
- **Threats:** Hunting, Grassland conversion to agriculture, overgrazing, collision with energy infrastructure.

**Habitat:** Endemic to India and mainly found in grasslands and scrubby fields in parts of Rajasthan, Gujarat, Madhya Pradesh and Maharashtra.

**Indian Skimmer  
(Rynchops albicollis)**


- Indian skimmer is seen in huge flocks during winter at the **Coringa wildlife sanctuary** (Kakinada, Andhra Pradesh).

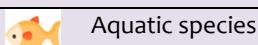
**Protection Status:**

**Characteristics:**

- Breeds colonially on **large, exposed sand-bars and islands**.
- Feeds on surface-dwelling fish, small crustaceans and insect larvae.
- **Threats:** Habitat degradation, Excessive and widespread increases in disturbance, Predation by corvids like House crows etc.

**Habitat:**

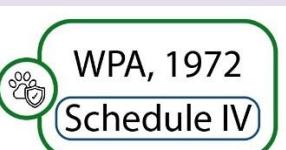
- Found in the coastal estuaries of western and eastern India.
- **Chambal river is an important nesting site** for Indian Skimmer.


**Gangetic River dolphin**


- Dolphins have started coming back to Ganga river with improvement in the quality of its water through **Namami Gange programme**.

**Protection Status:**


	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Can only live in freshwater and is <b>blind</b>.</li> <li><b>Has a slit similar to a blowhole on top of its head</b>, which acts as a nostril.</li> <li>Popularly referred to as '<b>Susu</b>' due to the sound it produces when breathing.</li> <li><b>Symbols of the ecological health</b> of our major river systems.</li> <li><b>Threats:</b> Direct killing, habitat fragmentation by dams and barrages and indiscriminate fishing.</li> </ul> <p><b>Habitat:</b> Found in the Ganges, Brahmaputra and their tributaries.</p> <p><b>Conservation Measures:</b></p> <ul style="list-style-type: none"> <li>India's <b>national aquatic animal</b>.</li> </ul> <p><b>Olive Ridley turtle</b></p> <p><b>Protection Status:</b></p> <div style="display: flex; align-items: center;"> <span style="border: 1px solid yellow; border-radius: 50%; padding: 5px; margin-right: 10px;">IUCN STATUS <b>VU</b></span> <span style="border: 1px solid green; border-radius: 50%; padding: 5px; margin-right: 10px;">WPA, 1972 Schedule I</span> </div>	<div style="border: 1px solid blue; padding: 10px; margin-bottom: 10px;"> <b>DO YOU KNOW?</b> <p>Ganges river dolphins can hunt by emitting ultrasonic sounds waves that bounce off of fish and other prey.</p> </div>
	<p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li>Smallest and most abundant of all sea turtles.</li> <li>Best known for their <b>unique mass nesting called Arribada</b>, where thousands of females lay eggs on the same beach. <ul style="list-style-type: none"> <li>A single turtle can lay over <b>110 - 140</b> eggs around.</li> </ul> </li> <li><b>Diet: Carnivores</b>, feed on jellyfish, shrimp, snails, crabs etc.</li> <li><b>Threats:</b> Unintended capture in fishing gear, Direct Harvest of Turtles and Eggs, loss and degradation of habitat, marine debris, climate change etc.</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>Warm waters of the Pacific, Atlantic and Indian oceans. <ul style="list-style-type: none"> <li><b>Rushikulya river</b> mouth is considered the second-biggest rookery in India after <b>Gahirmatha</b>.</li> </ul> </li> </ul>	<p style="text-align: center;"><b>NESTING SITES OF OLIVE RIDLEY TURTLES</b></p> <p style="text-align: right;"> <span style="border: 1px solid orange; padding: 2px;">Nesting Sites</span>   <span style="border: 1px solid orange; padding: 2px;">Sporadic Nesting Sites</span> </p>
	<p><b>Red-crowned roofed turtle</b></p> <p><b>Protection Status:</b></p> <div style="display: flex; align-items: center;"> <span style="border: 1px solid red; border-radius: 50%; padding: 5px; margin-right: 10px;">IUCN STATUS <b>CR</b></span> <span style="border: 1px solid green; border-radius: 50%; padding: 5px; margin-right: 10px;">CITES Appendix I</span> <span style="border: 1px solid green; border-radius: 5px; padding: 5px 10px; margin-right: 10px;">Wildlife Protection Act Schedule I   Schedule IV</span> </div> <p><b>Characteristics:</b></p> <ul style="list-style-type: none"> <li><b>Freshwater turtle species</b>.</li> <li>Found in <b>deep flowing rivers</b> with terrestrial nesting sites.</li> <li>In comparison to their female counterparts, the males are shorter.</li> <li><b>Threats:</b> Loss or degradation of habitat, drowning by illegal fishing nets, Poaching and illegal trade etc.</li> </ul> <p><b>Habitat:</b></p> <ul style="list-style-type: none"> <li>Native to <b>India, Nepal and Bangladesh</b>.</li> <li>Currently in India, the <b>National Chambal River Gharial Sanctuary</b> is the only area with substantial population of the species.</li> </ul>	
	<p><b>Leith's soft-shell turtle</b></p> <ul style="list-style-type: none"> <li>Two freshwater Indian turtle species have made to Appendix I from Appendix II of CITES- Red-crowned roofed turtles (<b>Batagur kachuga</b>) and Leith's soft-shell turtle (<b>Nilssonia leithii</b>).</li> </ul>	

	<b>Protection Status:</b>   
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Large fresh water soft-shelled turtle.</li> <li>Can grow upto 1 m with average adult size varying from 700 mm to 1 m.</li> <li>Threats: High demand in traditional Chinese medicine and soup delicacy</li> </ul>
	<b>Habitat:</b> <ul style="list-style-type: none"> <li>Endemic to peninsular India and inhabits rivers and reservoirs.</li> <li>Found in all major rivers of the states of Maharashtra, Karnataka, Kerala, Andhra Pradesh, Tamil Nadu and Orissa, like- Cauvery, Tungabhadra, Ghataprabha, Bhavani, Godavari and Moyar.</li> </ul>
<b>Vaquita porpoise</b> 	<ul style="list-style-type: none"> <li>Global population of Vaquita porpoise (porpoise family) declined by 98% in 2 decades.</li> </ul> <b>Protection Status:</b>   
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>World's smallest cetacean and most endangered marine mammal.</li> <li>Most often found close to shore in the Gulf's shallow waters.</li> <li>Known as "panda of the sea" for the distinctive black circles around its eyes.</li> </ul> <b>Habitat:</b> Northern Gulf of California and the Sea of Cortez, Mexico
  Reptiles, Insects, amphibians etc.	
<b>Salt water crocodile</b> 	<ul style="list-style-type: none"> <li>A record number of saltwater crocodiles laid eggs during the nesting season this year in Bhitarkanika National Park situated in Odisha's Kendrapara district.</li> </ul> <b>Protection Status:</b>   
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Largest of all crocodilians, and the largest reptile in the world.</li> <li>Female saltwater crocodiles are smaller in size than their male counterparts.</li> <li>Threats: Illegal hunting for its meat and eggs, as well as for its commercially valuable skin; Habitat loss and habitat alterations; Negative attitude towards the species.</li> </ul> <b>Habitat:</b> <ul style="list-style-type: none"> <li>Extends from northern Australia to eastern India and South-east Asia.</li> <li>Present mostly on the eastern coast of the country around the Bhitarkanika, Sunderbans and Andaman and Nicobar Islands.</li> </ul>
<b>Purple frog</b> <i>(Nasikabatrachus sahyadrensis)</i> 	<ul style="list-style-type: none"> <li>Kerala is likely to announce the Purple Frog as its state frog.</li> </ul> <b>Protection Status:</b>  
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>First discovered in October 2003 in the Idukki district of Kerala.</li> <li>Prefers loose, damp and well-aerated soil close to ponds and ditches or streams.</li> <li>Remains underground most of the year except for 2-3 weeks during the monsoon when it comes out to mate.</li> <li>Threats: Deforestation from expanding cultivation, consumption and harvesting by local communities.</li> </ul> <b>Habitat:</b> Endemic to the Western Ghats in India

 <p><b>Monarch Butterfly</b></p>	<ul style="list-style-type: none"> <li>The International Union for the Conservation of Nature added the migrating monarch butterfly for the first time to its red list of Threatened species and categorized it as "endangered".</li> </ul>
	<b>Protection Status</b> 
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Migratory butterfly known for <b>longest migration of any insect species known to science</b>.</li> <li>Each adult butterfly lives only about four to five weeks.</li> <li><b>Threats:</b> Loss of habitat, increased use of <b>herbicides and pesticides</b> for agriculture, and <b>climate change</b>.</li> </ul>
	<b>Habitat:</b> North, Central, and South America.
 <p><b>Blue Duke</b></p>	<ul style="list-style-type: none"> <li>Blue Duke, a native butterfly species to Sikkim and the eastern Himalayas, edged past another contender Krishna Peacock to be announced as the <b>State Butterfly of Sikkim</b>.           <ul style="list-style-type: none"> <li>Its scientific name is <b>Bassarona durga</b>.</li> </ul> </li> </ul>
	<b>Protection Status</b> 
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Found at an altitude below 1,500 metres</li> <li>Discovered in Sikkim in 1858.</li> </ul>
	<b>Habitat:</b> Native to <b>Sikkim and the eastern Himalayas</b> .
 <p><b>Plant Species</b></p>	<p><b>Red Sanders</b></p> 
	<ul style="list-style-type: none"> <li>Directorate of Revenue Intelligence (DRI) seized Red Sanders worth Rs. 11.70 crore under "<b>Operation Rakth Chandan</b>".           <ul style="list-style-type: none"> <li>Its export from India is prohibited as per the Foreign Trade Policy.</li> </ul> </li> </ul>
	<b>Protection Status</b> 
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Used in cosmetics, medicinal products and high-end furniture/woodcraft.</li> <li>Well-drained red soils with graveled loam are suitable for cultivation.</li> <li>Regenerates well in a dry hot climate and requires rainfall ranging from 800 mm to 1000 mm annually for excellent growth.</li> </ul>
 <p><b>Neelakurinji</b></p>	<p><b>Habitat:</b> Endemic to a distinct tract of forests in <b>Eastern Ghats region of Andhra Pradesh</b>.</p>
	<ul style="list-style-type: none"> <li>The MoEFCC has listed Neelakurinji (<i>Strobilanthes kunthiana</i>) under <b>Schedule III</b> of the Wildlife (Protection) Act, 1972, including it on the list of protected plants.           <ul style="list-style-type: none"> <li>Those who uproot or destroy the plant will invite a fine of ₹25,000 and three years' imprisonment.</li> <li>The cultivation of Neelakurinji and its possession is also not allowed.</li> </ul> </li> </ul>
	<b>Protection Status</b> 
	<b>Characteristics:</b> <ul style="list-style-type: none"> <li>Grows at an altitude of <b>1,300 to 2,400 meters</b>.</li> </ul>

	<ul style="list-style-type: none"> <li>Acts like a soil binder in grasslands and is fire hardy and resistant.</li> <li><b>Blooms once every 12 years</b> season.</li> </ul> <p><b>Habitat:</b> It is endemic to Western ghats generally bloom in the regions of Tamil Nadu, Kerala &amp; Karnataka.</p>
<b>Himalayan medicinal plant species</b>	<ul style="list-style-type: none"> <li>Three Himalayan medicinal plant species have made it to IUCN Red List.</li> <li><b>Meizotropis pellita (IUCN: Critically Endangered)</b> <ul style="list-style-type: none"> <li>Endemic to Uttarakhand.</li> <li>Oil extracted from leaves possesses strong antioxidants and can be natural substitute for synthetic antioxidants in pharmaceutical industries.</li> </ul> </li> <li><b>Fritillaria cirrhosa (IUCN: Vulnerable)</b> <ul style="list-style-type: none"> <li>Used in treatment of bronchial disorders and pneumonia.</li> </ul> </li> <li><b>Dactylorhiza hatagirea (IUCN: Endangered)</b> <ul style="list-style-type: none"> <li>Used in Ayurveda, Siddha, Unani, and other alternative systems of medicine to cure fever, cough etc.</li> </ul> </li> </ul>

### 3.3. FORESTS

#### 3.3.1. FOREST (CONSERVATION) RULES, 2022

##### Why in news?

Recently, **Ministry of Environment, Forest and Climate** change has notified the Forest Conservation Rules 2022.

##### Salient features of Forest (Conservation) Rules, 2022

- These rules are notified under the **Forest (Conservation) Act, 1980** and will replace the **Forest (Conservation) Rules, 2003**.
- The rules establish certain committees to perform various functions-

Committees	Features
<b>Project screening committee</b>	<ul style="list-style-type: none"> <li>To be constituted by State or UT.</li> <li><b>To meet atleast twice every month</b> to recommend projects to State/UTs administration.</li> <li><b>To examine the proposal received from the State Government or Union territory Administration, except proposals involving forest land of five hectares or less.</b></li> </ul>
<b>Regional Empowered Committee</b>	<ul style="list-style-type: none"> <li>To be setup by Central govt in each of the regional offices.</li> <li>To meet atleast twice every month to examine every referred project for approval or rejection.</li> </ul>
<b>Advisory Committee</b>	<ul style="list-style-type: none"> <li>To be setup by the Central govt consisting 6 members to meet every month.</li> <li><b>To advise with regards to grant of approval under various sections of rules.</b></li> </ul>

- Time frame:**
  - Non-mining projects between 5-40 hectares** reviewed within 60 days.
  - Mining projects between 5-40 hectares** reviewed within 75 days.
  - For projects involving a larger area:
    - ✓ **120 days for non-mining projects involving more than 100 hectares.**
    - ✓ **150 days for mining projects involving more than 100 hectares.**
- Proposals for Prior Approval of the Central Government**
  - In- Principle' approval after considering the recommendation of the Advisory Committee.**

##### Forest Conservation Act 1980

- Came into force to address deforestation. Though the Indian Forest Act has been in force since 1927, it was geared to allow the colonial British administration to control the extraction of timber.
- There have been at least two major amendments to the FCA — in 1988 and 1996 to incorporate the Supreme court judgment in the Godavarman case relating to definition of forest.

##### Compensatory Afforestation Fund Act, 2016

- Compensatory Afforestation (CA) refers to afforestation and regeneration activities carried out as a way of compensating for forest land diverted to non-forest purposes.
- The act establishes **National and State Funds for the same purpose.**
- 90% of the all money** collected for compensatory afforestation by a State/UT shall be transferred to the **State Fund** and the **balance 10% to the National Fund.**
  - The money received in the National and State fund shall be an interest bearing and non-lapsable under public account.
- National and State Authority:** Their function is to manage and utilise the respective funds for the purposes of this Act such as conservation and development of forest and wildlife.

- **Final approval:** The Nodal Officer may, after receipt of the 'In-Principle' approval from the Central Government.
- **Compensatory Afforestation**
  - Land for compensatory afforestation shall be provided which is **neither notified as forest under the Indian Forest Act, 1927 or any other law nor managed as forest** by the Forest Department.

**Related news: Zoos Exempted from Permissions Under FCA**

- The Ministry of Environment Forest and Climate Change approved consideration of Central Zoo Authority approved Zoos on forest land as forestry activity under the Forest Conservation Act (FCA), 1980.
- FCA considers zoos, rescue centres etc as a non-forestry activity and makes forest clearance from Centre mandatory.
- Now, zoos will be exempted from taking multiple permissions under FCA.
- **About Central Zoo Authority (CZA)**
  - Wildlife (Protection) Act, 1972 provides for establishment of CZA (1992) to complement and strengthen the national effort in conservation of the rich biodiversity of the country.
  - CZA consists of a Chairman, ten members and a Member Secretary.
  - Every Zoo in India needs CZA recognition for its operation.

### 3.3.2. COMMUNITY FOREST RIGHTS (CFR)

**Why in news?**

Chhattisgarh recognized community forest rights (CFR) of the tribals of the Kanger Ghati National Park (KNP).

**More on the news**

- The KNP became the **2<sup>nd</sup> protected area in the country, after Simlipal in Odisha**, where CFR rights have been recognised.
- CFR area is **common forest land** that has been **traditionally protected and conserved for sustainable use** by a particular community.
  - May include forest of any category – revenue forest, classified & unclassified forest, deemed forest, reserve forest, protected forest, sanctuary and national parks etc.

**About Kanger Ghati National Park (KNP)**

- The name of KNP is derived from the **Kangar river**, which flows in its length.
- Home to three exceptional caves –**Kutumbasar, Kailash and Dandak-** with Stellagmites and Stalactites structures.
- **Tirathgarh Waterfall** is located in the park.
- **Forest type:** Typical mixed humid deciduous type of forest, in which the Sal, Saugaun, teak and bamboo trees are available in abundance.
- **Fauna and flora:** Tiger, Panther, Wildcats, Cheetal (Spotted Deer), Sambhar, Barking Deer, Wild Pig, Jacal, Langur, Rhesus Macaque, Sloth Bear, Flying Squirrel, Python, Hyena, Rabbit, Crocodile other and Civet.
  - The most popular species in this area is **Bastar Maina (State Bird of Chhattisgarh State)**, which is capable of emulating the human voices.

**About community forest rights (CFR)**

- CFR are recognised under the **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act (FRA)**, 2006 which:
  - **Recognize and vest the forest rights and occupation** in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been **residing in such forests for generations but whose right could not be recorded**.
  - Allow the community to **formulate rules for forest use** by itself and others.
  - **Give the authority to the Gram Sabha** to adopt local traditional practices of forest conservation and management within the community forest resource boundary.
- FRA provides for Community Rights (CRs) and CFR rights recognition in **all forest lands, including wildlife sanctuaries, tiger reserves and national parks**.

### 3.3.3. OTHER FOREST RELATED NEWS

<b>Trees Outside Forests in India Initiative</b>	<ul style="list-style-type: none"><li>● <b>Launched by:</b> Ministry of Environment, Forest, and Climate Change and US Agency for International Development (USAID) to:<ul style="list-style-type: none"><li>○ Enhance carbon sequestration,</li><li>○ Support local communities,</li><li>○ Strengthen climate resilience of agriculture.</li></ul></li></ul>
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	<ul style="list-style-type: none"> <li>To be <b>implemented in seven states</b>: Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu, and UP.</li> <li>Will bring together <b>farmers, companies, and private institutions</b> in India to rapidly expand <b>tree coverage</b> outside of traditional forests by 28 lakh hectares.</li> </ul>
'Tree City of the World' (TCW) Tag	<ul style="list-style-type: none"> <li><b>Mumbai and Hyderabad</b> have been jointly recognised as '2021 TCW'.</li> <li>TCW programme has been started by <b>United Nations' Food and Agriculture Organisation</b> and American non-profit organisation <b>Arbor Day Foundation</b>. <ul style="list-style-type: none"> <li>Provides <b>direction, assistance, and worldwide recognition for a community's dedication</b> to its urban forest and framework for healthy, sustainable urban forestry programme in town or city.</li> <li>City was evaluated based on five standards i.e. <b>Establish Responsibility, Set the Rules, Know What You Have, Allocate the Resources, and Celebrate the Achievements</b>.</li> </ul> </li> </ul>
Nagar Van Scheme	<ul style="list-style-type: none"> <li>Launched in 2020, on <b>World Environment Day (5<sup>th</sup> June)</b> to develop 400 Urban Forests (<b>Nagar Van</b>) and 200 Nagar Vatika across the country in the next five years.</li> <li><b>Under the scheme</b> <ul style="list-style-type: none"> <li>A minimum of <b>20 hectares of forests</b> will be created in the city.</li> <li>Forests will <b>come up either on existing forest land or on any other vacant land offered by urban local bodies</b>.</li> <li><b>Van Udyam</b> once established will be maintained by the State Government.</li> <li>Fully funded by the under <b>CAMPA (Compensatory Afforestation Fund Act, 2016)</b> funds.</li> </ul> </li> </ul>
Miyawaki method	<ul style="list-style-type: none"> <li><b>Fazilka district of Punjab</b> has become a trendsetter in expanding forest cover by applying the Miyawaki method.</li> <li>It is a <b>technique of urban afforestation</b> by <b>creating micro forests over small plots of land</b>. <ul style="list-style-type: none"> <li><b>Devised by Japanese botanist Akira Miyawaki</b> in 1980s.</li> <li>Ensures <b>10 times faster growth</b> of plant and 30 times denser than usual.</li> <li>In this technique, <b>native trees of region are divided into four layers</b> (shrub, sub-tree, tree, and canopy) after identification and analysis of soil quality.</li> </ul> </li> </ul>
Vanikaran project	<ul style="list-style-type: none"> <li>Kerala forest department launches 'Vanikaran' project to restore natural vegetation.</li> <li>It is an <b>afforestation project to root out invasive plants</b>, especially <b>Senna spectabilis</b>. <ul style="list-style-type: none"> <li>It is being executed in Sulthan Bathery forest range of <b>Wayanad Wildlife Sanctuary (WWS)</b>.</li> <li>Its pillars include <b>planting saplings</b> of Bamboo, fruit plants etc. and <b>Rainwater harvesting</b>.</li> </ul> </li> <li>WWS is an integral part of <b>Nilgiri Biosphere Reserve</b>.</li> </ul>

## 3.4. WETLANDS, COASTLANDS AND OCEANS

### 3.4.1. NEW RAMSAR SITES

#### Why in news?

Recently, India has designated **26 new wetlands of international importance** under the Ramsar Convention.

#### More on the news

- With this designation, now India has a total of **75 Ramsar sites covering an area of 13,26,677 ha.**
- Designation of these sites would help in **conservation and management of wetlands and wise use of their resources**.

#### Related news: Wuhan Declaration

- 14<sup>th</sup> Conference of the Parties (COP14) to Ramsar Convention on Wetlands adopted the Wuhan Declaration
- Wuhan Declaration calls for practical actions to promote conservation, restoration, management and sustainable use of wetlands worldwide.
- Key priorities of Wuhan declaration are
  - Take measures to halt and reverse wetland loss globally.
  - Incorporate wetlands into national actions to contribute to domestic legislation, plans and implementation of SDGs.
  - Define strategic goals and priority areas for wetlands in partnership with civil society stakeholders, academia and private sector.
  - Importance of healthy wetland ecosystems as nature-based solutions for climate mitigation, adaptation and disaster risk reduction.
- Also, another report presented at COP14 stated that information on 75% of wetlands included in list of Ramsar Sites is outdated.
- Parties to Ramsar Convention are required to update information for their Ramsar Sites at least once every six years.

For more details on the newly added Ramsar Sites, kindly refer appendix at the end of the document.

## About Wetlands

- Defined as any land area that is saturated or flooded with water, either seasonally or permanently.
- As per Ramsar convention, wetlands include areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.
- India has over 7 lakh wetlands covering ~16 Mha i.e., 4.86% of the total geographic area of the country.
- In comparison to man-made wetlands area in India, natural wetlands area is approximately two times.



### Ramsar convention

**Genesis:** An intergovernmental treaty adopted in 1971 (came into force in 1975)

**Objectives:** Provide the framework for the conservation and wise use of wetlands and their resources.

Wise use of wetlands is defined as the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development.

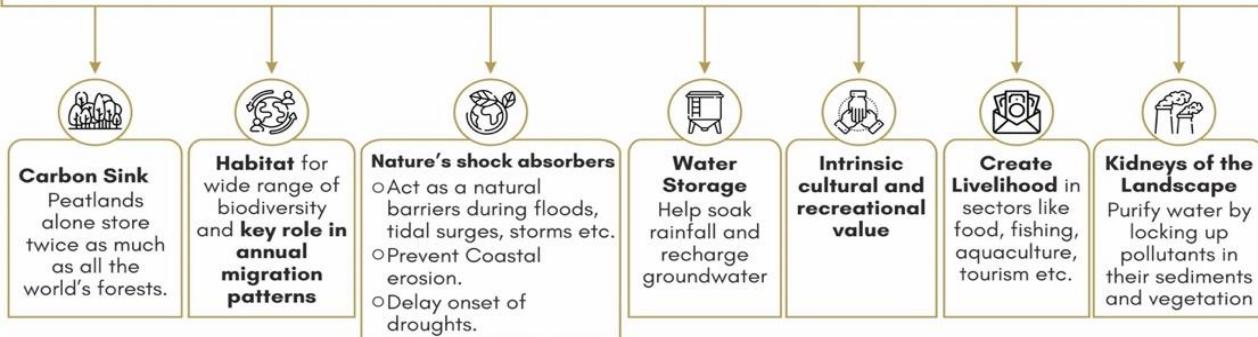
**Membership:** 172 contracting parties 

**A Party**

**Other key information:**

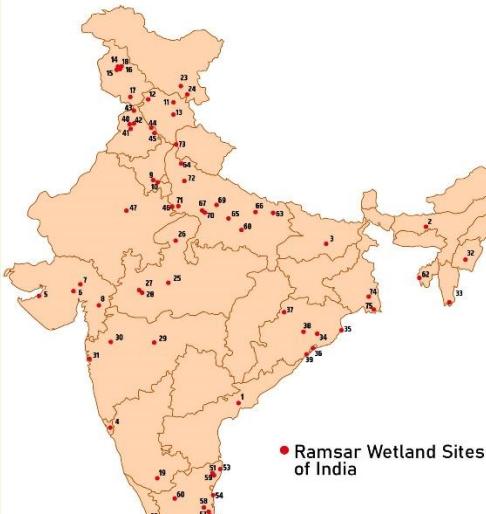
- Has 6 formally recognized International Organization Partners:
  - BirdLife International
  - International Union for Conservation of Nature (IUCN)
  - International Water Management Institute (IWMI)
  - Wetlands International
  - WWF International
  - Wildfowl & Wetlands Trust (WWT)
- Ramsar Sites which are potentially at risk as a result of technological developments, pollution or other human interference may be placed on Montreux Record.

## Significance of Wetlands



STATE	SITE
1 Andhra Pradesh	Kolleru Lake
2 Assam	Deepor Beel
3 Bihar	Kabartal Wetland
4 Goa	Nanda Lake
5 Gujarat	Khijadia Wildlife Sanctuary
6 Gujarat	Nalsarovar Bird Sanctuary
7 Gujarat	Thol Lake Wildlife Sanctuary
8 Gujarat	Wadhvana Wetland
9 Haryana	Bhindawas Wildlife Sanctuary
10 Haryana	Sultanpur National Park
11 Himachal pradesh	Chandertal Wetland
12 Himachal pradesh	Pong Dam Lake
13 Himachal pradesh	Renuka Wetland
14 J&K	Hokersar Wetland
15 J&K	Hygam Wetland Conservation Reserve
16 J&K	Shallibagh Wetland Conservation Reserve
17 J&K	Surinsar-Mansar Lakes
18 J&K	Wular Lake
19 Karnataka	Ranganathittu Bird Sanctuary
20 Kerala	Asthambudi Wetland
21 Kerala	Sasthamkotta Lake
22 Kerala	Vembanad Kol Wetland
23 Ladakh	Tso Kar Wetland Complex
24 Ladakh	Tsomoriri Lake
25 Madhya Pradesh	Bhoj Wetlands
26 Madhya Pradesh	Sakhya Sagar
27 Madhya Pradesh	Sirpur Wetland
28 Madhya Pradesh	Yashwant Sagar
29 Maharashtra	Lonar Lake
30 Maharashtra	Nandur Madhameshwar
31 Maharashtra	Thane Creek
32 Manipur	Loktak Lake
33 Mizoram	Pala Wetland
34 Odisha	Ansupa Lake
35 Odisha	Bhitarkanika Mangroves
36 Odisha	Chilka Lake
37 Odisha	Hirakud Reservoir
38 Odisha	Satkosia Gorge

## RAMSAR WETLAND SITES IN INDIA



Ramsar Wetland Sites of India

STATE	SITE
39 Odisha	Tamara Lake
40 Punjab	Beas Conservation Reserve
41 Punjab	Harike Lake
42 Punjab	Kanji Lake
43 Punjab	Keshupur-Miani Community Reserve
44 Punjab	Nangal Wildlife Sanctuary
45 Punjab	Ropar Lake
46 Rajasthan	Keoladeo Ghana NP
47 Rajasthan	Sambhar Lake
48 Tamil Nadu	Chitrangudi Bird Sanctuary
49 Tamil Nadu	Gulf of Mannar Marine Biosphere Reserve
50 Tamil Nadu	Kanjirankulam Bird Sanctuary
51 Tamil Nadu	Karikili Bird Sanctuary
52 Tamil Nadu	Koonthankulam Bird Sanctuary
53 Tamil Nadu	Pallikaranai Marsh Reserve Forest
54 Tamil Nadu	Pichavaram Mangrove
55 Tamil Nadu	Point Calimere Wildlife and BirdSanctuary
56 Tamil Nadu	Suchindram Theroor Wetland Complex
57 Tamil Nadu	Udhayamarthandapuram Bird Sanctuary
58 Tamil Nadu	Vaduvur Bird Sanctuary
59 Tamil Nadu	Vedanthangal Bird Sanctuary
60 Tamil Nadu	Vellode Bird Sanctuary
61 Tamil Nadu	Vembanur Wetland Complex
62 Tripura	Rudrasagar Lake
63 Uttar Pradesh	Bakhira Wildlife Sanctuary
64 Uttar Pradesh	Haiderpur Wetland
65 Uttar Pradesh	Nawabganj Bird Sanctuary
66 Uttar Pradesh	Parvati Agra Bird Sanctuary
67 Uttar Pradesh	Saman Bird Sanctuary
68 Uttar Pradesh	Samaspur Bird Sanctuary
69 Uttar Pradesh	Sandi Bird Sanctuary
70 Uttar Pradesh	Sarsai Nawar Jheel
71 Uttar Pradesh	Sur Sarovar
72 Uttar Pradesh	Upper Ganga River
73 Uttarakhand	Asan Conservation Reserve
74 West Bengal	East Kolkata Wetlands
75 West Bengal	Sunderbans Wetland

**Nine criteria for identifying Wetlands of International Importance**

1. Contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
2. Supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
3. Supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
4. Supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.
5. Regularly supports 20,000 or more waterbirds.
6. Supports 1% of the individuals in a population of one species or subspecies of waterbird.
7. Supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
8. Important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
9. Supports 1% of the individuals in a population of one species or subspecies of wetland-dependent nonavian animal species.

### 3.4.2. OTHER RAMSAR SITES IN NEWS

Ramsar Site	Details
Chilika lake	<ul style="list-style-type: none"><li>• Number of Irrawaddy dolphins in Chilika lake has fallen.</li><li>• Chilika Lake, located in east coast of Odisha, is Asia's largest brackishwater lake and second largest coastal lagoon in the world.</li><li>• Irrawaddy dolphins are coastal dolphins that are patchily distributed in the nearshore waters of south and southeast Asia.<ul style="list-style-type: none"><li>○ Three discrete riverine populations occur in the Mekong, Mahakam and Ayeyarwady Rivers of Cambodia, Indonesia and Myanmar, respectively.</li><li>○ IUCN status: Endangered</li></ul></li></ul>
Sundarbans Wetland	<ul style="list-style-type: none"><li>• Comptroller and Auditor General pointed out delay in the coastal zone management plan (CZMP), construction of multi-purpose cyclone shelters without clearances of CRZ norms in Sunderbans.</li><li>• CRZ Notification, 2011 designated Sunderbans as Critically Vulnerable Coastal Area (CVCA) and any development requires permission of WBSCZMA (West Bengal State Coastal Zone management authority).<ul style="list-style-type: none"><li>○ However, no permission was taken before construction of the eco-tourism hub at Jharkhali.</li><li>○ Project resulted in the destruction of mangroves, riverine channels and natural habitats of wildlife.</li></ul></li></ul> <p><b>About Sunderbans</b></p> <ul style="list-style-type: none"><li>• It is located within the largest mangrove forest in the world, in the delta of the Rivers Ganges and Brahmaputra.</li><li>• It is home to Tigers (Sundarban Tiger Reserve) and a number of other rare and threatened species such as Irrawaddy Dolphin, fishing cat etc.</li></ul>
East Kolkata Wetlands (EKW)	<ul style="list-style-type: none"><li>• Comptroller and Auditor General pointed out lack of effective action by the EKWMA (East Kolkata Wetland Management Authority).</li><li>• It is a unique peri-urban ecosystem on the eastern fringes of Kolkata.</li><li>• It is a multiple use wetland with facilities to treat the city's wastewater and use it to support pisci-culture or fish farming and agriculture.</li></ul>
Loktak Lake	<ul style="list-style-type: none"><li>• The Central Bureau of Communication is organizing a floating photo exhibition at Loktak Lake, Manipur.</li><li>• Loktak Lake, situated in a valley near Imphal, is the largest freshwater lake of Northeast India.</li><li>• Hosts hundreds of floating islands called Phumdis with multiple plant species and Keibul Lamjao National Park- the only floating national park in the world.</li><li>• Last natural habitat of Sangai Deer, an endangered deer, also known as dancing deer.</li><li>• Other Species of Loktak Lake: Hog Deer, Otter, a host of waterfowls and migratory birds.</li></ul>

### 3.4.3. ISLAND PROTECTION ZONE

#### Why in news?

Ministry of Environment, Forest and Climate Change has approved changes under Island Protection Zone (IPZ) and Island Coastal Regulation Zone (ICRZ) for setting up gas-powered plants in A&N Islands.

#### More on the news

- The decision is based on the **National Coastal Zone Management Authority (NCZMA)** recommendation for **Gas based power plant** within the **ICRZ-III** area i.e. between 200-500m to:
  - Meet the islanders' energy requirements**, and
  - Reduce dependence** on highly polluting conventional fuels such as **Diesel**.
- Under IPZ 2011 notification certain coastal stretches were declared as CRZ** and restrictions were imposed on the setting up and expansion of industries, operations, and processes in that area.
- Further, **ICRZ 2019 notification, limits infrastructure development on vulnerable coastal stretches**, especially for places such as A&N Islands.
  - It divides the **8 bigger oceanic islands** in Andaman and Nicobar into 2 groups and declares their coastal stretches and the water area up to the territorial water limits of the country, as the ICRZ.
  - ICRZ covers the land area from the **High Tide Line to 200 meters** on the **landward side** along the sea front for **Group-I Islands** and **100 meters** on the **landward side** along the sea front for **Group-II Islands**.

#### Grouping of eight bigger oceanic islands in Andaman and Nicobar ( ICRZ Islands )

##### GROUP I

Islands with geographical areas > 1000 sq.km such as South Andaman, Middle Andaman, North Andaman and Great Nicobar

##### GROUP II

Islands with geographical areas > 100 sq.km but < 1000 sq.km such as Baratang, Little Andaman, Havelock and Car Nicobar

### 3.4.4. BLUE FLAG BEACHES

#### Why in news?

The globally recognized **International eco-label "Blue Flag"**, has been accorded to two new beaches – **Minicoy Thundi Beach and Kadmat Beach**- both in Lakshadweep, taking the number of beaches certified under the Blue Flag certification to 12.

#### About Blue Flag certification

- Awarded by: the Denmark-based non-profit Foundation for Environmental Education or FEE.
- Mission: To promote sustainability in the tourism sector, through environmental education, environmental protection and other sustainable development practices.
- Awarded to: beaches, marinas and sustainable boating tourism operators.
- Eligibility criteria: A series of stringent environmental, educational, safety, and accessibility criteria must be met and maintained.
- Award is based on compliance to four main categories:
  - Environmental Education and Information;
  - Water Quality;
  - Environmental Management;
  - Safety and Services.

#### BLUE FLAG BEACHES OF INDIA



**Related news: Abidjan Convention**

- The COP13 of the Abidjan Convention was held.
- Formally, Convention for Cooperation in the Protection, Management and Development of the **Marine and Coastal Environment of the Atlantic Coast of the West and Central & Southern Africa Region** came into force in 1984.
- It covers marine environment, coastal zones and related inland waters falling within **West and Central and Southern African Region**.
- Mission:** To “Protect, Conserve and Develop the Abidjan Convention Area and its Resources for the Benefit and Well-being of its People.”

### 3.4.5. GREAT BARRIER REEF (GBR)

**Why in news?**

Scientists have successfully trialled a **new method i.e., Cryomesh** to freeze and store coral larvae.

**More on the news**

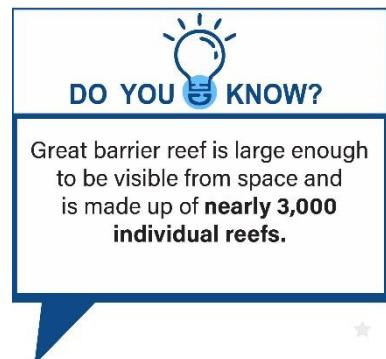
- Cryomesh method will **help in building reefs threatened by climate change**.
- Mesh technology will help to **store coral larvae at -196° C (-320.8°F)**.

**About GBR**

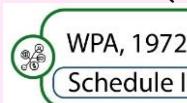
- GBR is **world's largest barrier reef**, located at **north eastern coast of Australia** in coral sea.
  - It was declared a **World Heritage Area in 1981** because of its 'outstanding universal value'.

**About Corals**

- Invertebrate animals** belonging to a large group of colourful animals called Cnidaria.
- Features:**
  - Each coral called a **polyp**.
  - Contain microscopic algae called **zooxanthellae** (exist with animal in a **symbiotic relationship**).
  - Coral polyps (animals) provide algae (plants) **a home**, and in exchange the algae provide polyps with **food they generate through photosynthesis**.
- Significance of Coral reefs:**
  - Share less than **1% of the earth's surface** but provide a home to nearly 25% of marine life.
  - Form barriers to protect shoreline** from waves and storms.
- Types of Corals:**
  - Hard corals**, primary reef-building corals, extract calcium carbonate from seawater to build hard, white coral exoskeletons.
  - Soft Corals**, flexible because they lack solid skeleton.
- Threats:** Ocean acidification, unsustainable fishing (Blast fishing), nutrients run-offs, coral harvesting etc.


**Coral reefs in India**

- Found in **Gulf of Mannar, Palk-bay, Gulf of Kutch, Andaman & Nicobar Islands, Lakshadweep islands and Malvan (Maharashtra)**.
- About **570 species of hard corals found in India** and almost 90% of them are found in waters surrounding A&N Islands.
- They are protected under **Schedule I of Wildlife Protection Act (WPA), 1972**.


**Related news**
**List of World Heritage in Danger**

- A joint report by the IUCN and UNESCO's World Heritage Centre (WHC) has recommended that the GBR “**be inscribed on the List of World Heritage in Danger**”.
  - Warming waters, coral bleaching, and crown-of-thorns starfish are contributing to the reef's decline.
- Inscribing a site on the Danger List allows the WHC to **allocate immediate assistance from the World Heritage Fund**, while simultaneously gathering international support and attention to the site.

**Acropora corals**

- A recent report stated that **highest levels of coral cover**, within the past 36 years, **have been recorded in northern and central parts of GBR**, fuelled largely by increases in fast-growing **Acropora corals**.
- These fast-growing corals are also **most susceptible to environmental pressures** such as rising temperatures, cyclones, pollution etc.

**Black Corals**

- Researchers have discovered new species of **black corals** living 2,500 feet below surface off the coast of Australia.
- They are **all over the world and at all depths**. However, typically, they are known as **deep-sea corals**.
- They are rarely black, but rather **vary in color** from white to red, green, yellow, or brown.
- They are **filter feeders** and eat tiny zooplankton.

**Azooxanthellate Corals**

- For the first time, Zoological Survey of India (ZSI) recorded **four species of azooxanthellate corals** from waters of **Andaman and Nicobar (A&N) Islands**.
- All four groups of corals are from **same family Flabellidae**.
  - Four species, namely **Truncatoflabellumcrassum**, **T. incrassatum**, **T. aculeatum**, and **T. irregulare**, were previously found from **Japan to Philippines and Australian waters**.
  - **Only T. crassum** was reported within **range of Indo-West Pacific distribution including Gulf of Aden and Persian Gulf**.
- **Azooxanthellate corals** are a **group of corals that do not contain zooxanthellae** and derive nourishment not from the sun but from capturing different forms of plankton.
  - They are **deep-sea representatives**, with the majority of species reporting from between 200 m to 1000 m.
  - Their occurrences are also **reported from shallow coastal waters**.

### 3.5. OTHER BIODIVERSITY RELATED INITIATIVES

<b>Animal Welfare Board of India (AWBI)</b>	<ul style="list-style-type: none"><li>• AWBI has issued advisories regarding stray dogs and pet dogs because of rising atrocities against dogs, feeders of dogs and caregivers.</li><li>• A <b>statutory body</b> (HQ: Ballabhgarh, Haryana) established in <b>1962</b> under <b>Prevention of Cruelty to Animal Act, 1960 (PCA Act)</b>.<ul style="list-style-type: none"><li>○ <b>Mandate:</b> Prevent infliction of unnecessary pain or suffering on animals under provisions of <b>PCA Act, 1960</b> and <b>Rules</b> framed under this Act.</li></ul></li><li>• Acts as an <b>advisory body</b> to Central Government and State Government.</li></ul>
<b>Champions of the Earth award</b>	<ul style="list-style-type: none"><li>• Indian wildlife biologist Dr Purnima Devi Barman honoured with <b>UN Environment Programme's (UNEP) 2022 Champions of the Earth</b> award in <b>Entrepreneurial Vision</b> category.</li><li>• Barman leads <b>Hargila Army</b>, an <b>all-female grassroots conservation movement</b> to protect <b>Greater Adjutant Stork</b> from extinction in Assam.</li><li>• <b>About Champions of the Earth award:</b><ul style="list-style-type: none"><li>○ Inception in <b>2005</b>, awarded <b>annually</b>.</li><li>○ <b>UN's highest environmental honour</b>, it recognizes outstanding leaders from government, civil society, and private sector.</li></ul></li><li>• Honours <b>individuals and organisations</b> whose actions have a transformative impact on environment.</li></ul>
<b>Oran land</b>	<ul style="list-style-type: none"><li>• Residents from Jaisalmer (Rajasthan) are demanding the <b>Oran land to be declared as community-conserved sacred spaces</b> against its current status of wastelands.</li><li>• <b>Orans</b> are sacred spaces, which are rich in biodiversity and usually include a water body.<ul style="list-style-type: none"><li>○ The orans are habitats of the great Indian bustard, desert cat, etc.</li></ul></li><li>• Orans are also spaces where herders take their livestock for grazing and are places for communal congregations, festivals, and other social events.</li></ul>
<b>Aceclofenac</b>	<ul style="list-style-type: none"><li>• Indian Veterinary Research Institute has demanded a ban on using aceclofenac in cattle.</li><li>• <b>Aceclofenac is a veterinary painkiller</b>.</li><li>• It <b>metabolises into diclofenac in water buffaloes and cows</b> which eventually threatens <b>vulture populations</b> in the country.</li><li>• Diclofenac, an anti-inflammatory drug, was <b>banned in 2006 as it was the main cause of dramatic decline (99 per cent) of vulture population</b> across Asia.</li></ul>
<b>World Green City Award 2022</b>	<ul style="list-style-type: none"><li>• Hyderabad city won the <b>overall 'World Green City Award 2022'</b> and '<b>Living Green for Economic Recovery and Inclusive Growth</b>' award.</li><li>• The results are announced by <b>The International Association of Horticulture Producers</b>.</li></ul>
<b>Sponge bleaching</b>	<ul style="list-style-type: none"><li>• This year, <b>New Zealand recorded the largest-ever sponge bleaching event</b> off its southern coastline.</li><li>• <b>About Sponges</b> – simple aquatic animals with dense, yet porous, skeletons</li></ul>

	<ul style="list-style-type: none"> <li>○ <b>Habitat</b> - reefs across the world.</li> <li>○ <b>Key features</b> <ul style="list-style-type: none"> <li>✓ Filter large quantities of water</li> <li>✓ Captures small food particles</li> <li>✓ Moves carbon from water column to seafloor where it can be eaten by bottom-dwelling invertebrates.</li> <li>✓ Provides habitat for species such as crabs, shrimps and starfish.</li> </ul> </li> <li>● <b>Threats</b> – Like coral they are prone to bleaching due to heat stress.</li> </ul>
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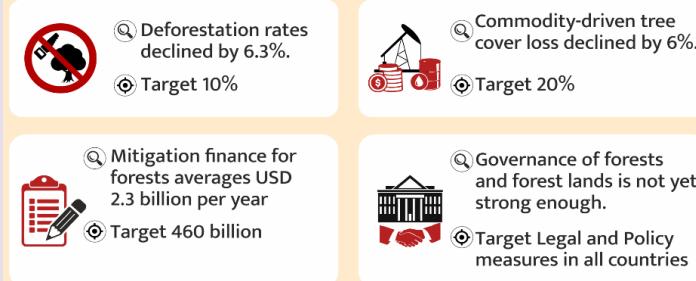
### 3.6. REPORTS AND INDICES

Reports	Details										
<b>State of the World's Birds</b> 	<ul style="list-style-type: none"> <li>● <b>Released by:</b> BirdLife International <ul style="list-style-type: none"> <li>○ It is a non-profit global conservation group, is the <b>official Red List Authority for birds</b>.</li> <li>○ From India, Bombay Natural History Society (BNHS), Mumbai is BirdLife International partner.</li> </ul> </li> </ul> <p><b>Key findings of the report</b></p> <ul style="list-style-type: none"> <li>● Report highlighted threat to almost half of the 10,994 recognised extant species of birds.</li> <li>● <b>Maleo Macrocephalon maleo</b> and <b>Vietnamese Crested Argus Rheinardia ocellata</b> are added to Critically Endangered (CR).</li> <li>● Threats affecting the greatest number of world's threatened bird species are (in descending order): Agriculture, logging, hunting and trapping, invasive alien species, residential and commercial development, and fire and fire suppression.</li> <li>● Apart from tropical forests, <b>threat of natural grasslands</b> has been particularly worrying for North America, Europe, and India.</li> <li>● <b>More threatened bird species (86.4%) are found in tropical</b> than in temperate latitudes.</li> </ul> <div style="display: flex; align-items: center;"> <div style="flex-grow: 1;"> <p><b>INDIA RELATED FINDINGS</b></p> <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Trend</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Declining strongly</td> <td>50%</td> </tr> <tr> <td>Declining</td> <td>30%</td> </tr> <tr> <td>Rising population</td> <td>14%</td> </tr> <tr> <td>Stable population</td> <td>6%</td> </tr> </tbody> </table> </div> </div>	Trend	Percentage	Declining strongly	50%	Declining	30%	Rising population	14%	Stable population	6%
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<b>State of the World's Forests 2022</b> 	<ul style="list-style-type: none"> <li>● <b>Released by:</b> United Nations Food and Agriculture Organization (FAO) during World Forestry Congress</li> <li>● Presents <b>data and analysis on the interaction between forests and people every two years</b>, with a focus on a specific pertinent topic.</li> <li>● SOFO 2022 explores the potential of three forest and tree based pathways for achieving green recovery and tackling environmental crises, including climate change and biodiversity loss.</li> <li>● <b>Key Findings</b> <ul style="list-style-type: none"> <li>○ More than half (54%) of the world's forests is in only five countries – the Russian Federation, Brazil, Canada, the United States of America and China.</li> <li>○ Forests absorbed more carbon than they emitted in 2011–2020.</li> <li>○ The rate of deforestation is declining but was still 10 million ha per year in 2015–2020.</li> </ul> </li> </ul>										
<b>IPBES Assessment Report: Sustainable Use of Wild Species</b> 	<ul style="list-style-type: none"> <li>● <b>Released by:</b> Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)</li> <li>● Offers insights, analysis and tools to establish more sustainable use of wild species of plants, animals, fungi and algae around the world.</li> <li>● First of its kind and has been conceived after a period of four years.</li> <li>● Identifies five broad categories of 'practices' in the use of wild species i.e. fishing, gathering, logging, terrestrial animal harvesting (including hunting), and non-extractive practices such as observing.</li> </ul>										

	<p> <b>INTERGOVERNMENTAL SCIENCE-POLICY PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES)</b></p> <p></p> <p><b>Genesis:</b> Established in 2012, it is an independent intergovernmental body.</p> <p><b>Objective:</b> To strengthen science-policy interface for conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.</p> <p><b>Membership:</b> 139 member countries including India </p> <p><b>Other Key Information:</b></p> <ul style="list-style-type: none"> <li>○ It is not a United Nations body. However, United Nations Environment Programme (UNEP) provides secretariat services to IPBES.</li> <li>○ All States Members of the United Nations are eligible for IPBES membership.</li> </ul>
<b>State of Mangroves 2022</b>  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> Global Mangrove Alliance (annual report).</li> </ul> <p><b>Key findings</b></p> <ul style="list-style-type: none"> <li>• Global Mangrove extent is of <b>147,359 km<sup>2</sup></b> (2020). It is higher than previous estimates of <b>136,000 km<sup>2</sup></b> (for 2016) largely due to improved maps rather than real gains.</li> <li>• The <b>rates of loss</b> have greatly diminished, with averaged losses over the last decade of just <b>66 km<sup>2</sup></b> of all mangroves per year (<b>327 km<sup>2</sup></b> between 1996 and 2010).</li> </ul> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p> <b>Global Mangrove Alliance (GMA)</b></p> <p><b>Genesis:</b> Launched in 2018 at the World Ocean Summit by Conservation International (CI), the International Union for Conservation of Nature (IUCN), The Nature Conservancy (TNC), Wetlands International, and World Wildlife Fund (WWF).</p> <p><b>Objective:</b> To increase the global area of mangrove habitat through conservation, restoration and equitable management.</p> <ul style="list-style-type: none"> <li>❖ This includes supporting research, advocacy, education and practical projects on the ground with local and community partners with focus on <b>3 key areas</b>:</li> <li>➢ <b>Halting Mangrove Loss;</b></li> <li>➢ <b>Implementing science-based restoration;</b> and</li> <li>➢ <b>Building Awareness.</b></li> </ul> <p><b>Membership:</b> Includes more than <b>30 organizations</b>, coordinated by members Conservation International, The International Union for the Conservation of Nature, The Nature Conservancy, Wetlands International and World Wildlife Fund.</p> <p><b>Other key information:</b></p> <ul style="list-style-type: none"> <li>❖ Published the inaugural '<b>The State of the World's Mangroves 2021</b>'.</li> <li>❖ Runs a number of initiatives for Mangroves such as '<b>Mangroves for the Future</b>' (MFF) - a unique partner-led initiative to promote investment in coastal ecosystem conservation for sustainable development.</li> <li>➢ MFF covers <b>Bangladesh, Cambodia, India, Indonesia, Maldives, Myanmar, Pakistan, Seychelles, Sri Lanka, Thailand and Vietnam</b>.</li> </ul> </div>
<b>Living Planet Report 2022 and Living Planet Index (LPI)</b>  	<ul style="list-style-type: none"> <li>• <b>Released by:</b> World Wide Fund for Nature (WWF) <ul style="list-style-type: none"> <li>○ WWF is an <b>international non-governmental organization</b> founded in 1961, headquartered in <b>Gland, Switzerland</b>.</li> </ul> </li> <li>• Released every two years, measures how species are responding to pressure in the environment due to biodiversity loss and climate change.</li> <li>• <b>Title:</b> Building A Nature-Positive Society</li> </ul> <div style="border: 1px solid black; padding: 10px; background-color: #fce4ec; margin-top: 10px;"> <p><b>Living Planet Index (LPI).</b></p> <ul style="list-style-type: none"> <li>• LPI measure of state of world's biological diversity based on population trends of vertebrate species from terrestrial, freshwater and marine habitats.</li> <li>• LPI has been adopted by the Convention of Biological Diversity as an indicator of progress towards its 2011-2020 targets and can play an important role in monitoring progress towards the post-2020 goals.</li> </ul> </div>

	<ul style="list-style-type: none"> <li><b>Key findings</b> <ul style="list-style-type: none"> <li>69% decline in the wildlife populations of mammals, birds, amphibians, reptiles, and fish, across the globe in the last 50 years.</li> <li>Highest decline was in Latin America and the Caribbean region.</li> </ul> </li> </ul>
<b>Global Forest Declaration Assessment (2022)</b>	<p><b>Forest Report</b></p> <ul style="list-style-type: none"> <li><b>Global Forest Declaration Assessment</b> is an <b>independent, civil society-led initiative</b>.</li> <li>The report assesses progress towards halting deforestation and restoring 350 million hectares of degraded land by 2030.           <ul style="list-style-type: none"> <li>These goals are set through international manifestos. These include <b>the New York Declaration on Forests (2014)</b> and <b>the Glasgow Leaders Declaration on Forests and Land Use (2021)</b>.</li> </ul> </li> <li>The Report divides the assessment in <b>4 major themes. Overarching forest Goals</b> i.e., <b>Ending the loss and degradation of natural forests by 2030; Sustainable Production and development; Forest Governance including legal, policy, and institutional frameworks; and Finance for forest.</b></li> </ul>

### KEY FINDINGS OF THE REPORT





**ENGLISH MEDIUM**  
**17 Feb | 5 PM**

**हिन्दी माध्यम**  
**27 Feb | 5 PM**

- Specific targeted content: oriented towards Prelims exam
- Doubt Clearing sessions and mentoring
- Complete coverage of The Hindu, Indian Express, PIB, Economic Times, Yojana, Economic Survey, Budget, India Year Book, RSTV, etc from April 2022 to April 2023
- Live and online recorded classes that will help distance learning students and who prefers flexibility in class timing

**One Year CURRENT AFFAIRS**

**FOR PRELIMS 2023 IN 60 HOURS**



## 4. SUSTAINABLE DEVELOPMENT

### 4.1. SUSTAINABLE DEVELOPMENT REPORT 2022

#### Why in news?

India ranked at **121 out of 163 countries** in the **Sustainable Development Report (SDR)**, 2022, published by a group of independent experts at the **Sustainable Development Solutions Network (SDSN)**.

#### About the report

- SDR (formerly SDG Index & Dashboards) assess where each country stands with regard to achieving SDGs.
- Key Findings of the report
  - For the second year in a row, **world is no longer making progress on the SDGs**.
  - Based on **2022 International Spillover Index**, rich countries generate negative international spillovers notably through unsustainable consumption.
    - ✓ Spillover effect refers to **effect on the economy** of a country from **unrelated events happening in another country**.
  - Peace, diplomacy, and international cooperation are fundamental conditions for the world **to progress on the SDGs towards 2030 and beyond**.



### Sustainable Development Solutions Network (SDSN)



**Genesis:** Launched in 2012 by UN Secretary-General Ban Ki-moon to mobilize global scientific and technological expertise to promote practical problem solving for sustainable development and implement SDGs.



**Objective:** To promote integrated approaches to implement the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change, through education, research, policy analysis, and global cooperation.



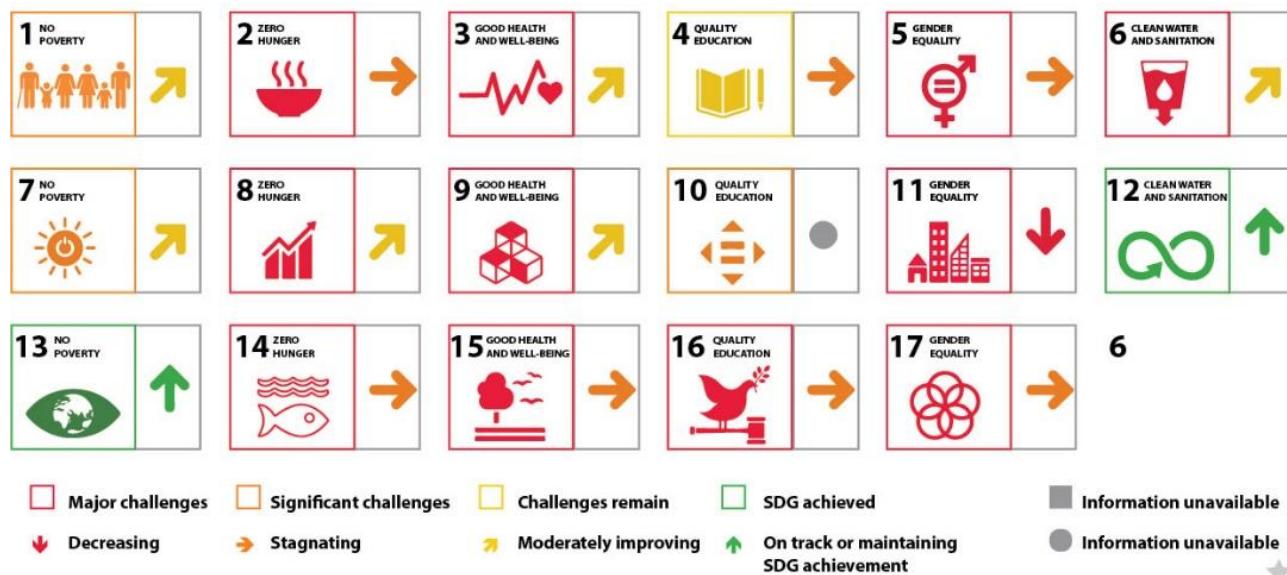
**Membership:** Over 1,700 members in 50 networks across 144 countries.



**Other key information:**

- ◆ Works closely with UN agencies, multilateral financing institutions, the private sector, and civil society.
- ◆ In 2019, SDSN published a new framework to mobilize transformative efforts toward the SDGs, the Six Transformations Framework.
- ◆ Is an independent non-profit organization in the United States and a non-profit Association 1901 in France.

#### India's Performance on SDGs



#### India's Performance

- India's rank slipped for the 3<sup>rd</sup> consecutive year from 117 in 2020 and 120 in 2021.
- India achieved 2 SDG goals (SDG 12 & 13), challenges remain in 1 (SDG 4), significant challenges remain in 3 (SDG 1, 7 & 10) and major challenges remain in 11 out of total 17 SDGs (SDG 2, 3, 5, 6, 8, 9, 11, 14, 15, 16 & 17).

#### Related news: India-UN Sustainable Development Cooperation Framework 2023-27

- The framework is the single most important instrument capturing the entirety of 26 UN entities' plans and programmes in India.

- It aims to align the **four pillars of the 2030 Agenda**—People, Prosperity, Planet and Participation, with India's national priorities.
- **It has six outcome areas:** (i) health and well-being (ii) nutrition and food (iii) quality education (iv) economic growth and decent work (v) environment, climate, wash and resilience (vi) empowering people, communities, and institutions.
- It takes up from the GoI-UNSD 2018-22 and will be signed as India completes 75 years of independence.

## 4.2. SUSTAINABLE CITIES INTEGRATED APPROACH PILOT (SCIAP) PROJECT

### Why in news?

UN-Habitat has, based on its **findings on sustainable cities integrated approach pilot (SCIAP) project**, highlighted issues related to Jaipur's urban development to **propose strategic interventions and promote sustainable development**.

### About sustainable cities integrated approach pilot (SCIAP) project

- Implemented by: **UNIDO and UN-Habitat** in partnership with the Ministry of Housing and Urban Affairs (**MoHUA**), Government of India.
- Funded by: **Global Environment Facility**.
- Covers 5 pilot cities: **Jaipur, Mysore, Vijayawada, Guntur and Bhopal**.
- **Goal:** To infuse **sustainability strategies into urban planning and management at the city level** and create an enabling climate for **investments in green infrastructure** that would reduce greenhouse gas emissions, improve service delivery and enhance the quality of living for all citizens, thereby building resilience and strengthening the governance capacity of the cities.
- **Major component of the project:** To develop an **Urban Sustainability Assessment Framework (USAf)** for spatial planning in India.
  - It is designed as a **decision support tool for municipal commissioners and urban practitioners** to support sustainable and resilient urban planning and management of cities in India.
- Jaipur has received an overall **sustainability rating of three on USAf**.



## United Nations Human Settlements Programme (UN-Habitat)



Nairobi, Kenya



**Genesis:** UN's agency for human settlements, mandated by UN General Assembly



**Objective:** To promote socially and environmentally sustainable towns and cities to provide adequate shelter for all.



**Other key information:** UN-Habitat Publications

- ◆ The State of the World's Cities
- ◆ The Global Report on Human Settlements
- ◆ New Urban Agenda
- ◆ Sustainable Development Goals and Urban
- ◆ Local Bodies – The Future We Want

### 4.2.1. OTHER SUSTAINABLE HABITAT INITIATIVES

<b>11<sup>th</sup> World Urban Forum (WUF), 2022</b>	<ul style="list-style-type: none"><li>• Held at Katowice, Poland, the <b>WUF</b> is the <b>premier global conference on sustainable urbanization co-organized by UN-Habitat</b>.</li><li>• WUF was <b>established in 2001</b> by the <b>UN</b> to examine <b>rapid urbanization</b> and <b>its impact</b> on communities, cities, economies, climate change and policies.<ul style="list-style-type: none"><li>◦ First WUF was held in Nairobi, Kenya in 2002.</li></ul></li><li>• At 11<sup>th</sup> WUF, the <b>National Institute of Urban Affairs (NIUA) Climate Centre for Cities (NIUA C-Cube)</b>, <b>World Resources Institute India (WRI India)</b> etc. launched India's first <b>national coalition platform</b> for urban <b>nature-based solutions (NbS)</b>.</li></ul>
<b>GRIHA (Green Rating for</b>	<ul style="list-style-type: none"><li>• <b>UIDAI Headquarter</b> in New Delhi has won the <b>GRIHA Exemplary Performance Award 2022</b>.</li></ul>

Integrated Habitat Assessment)	<ul style="list-style-type: none"><li>GRIHA was developed by TERI (private energy research institute) and was adopted as national rating system for green buildings by Government of India in 2007.</li><li>It evaluates environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a 'green building'.</li><li>It is also recognized as India's own green building rating system in INDIA's INDC submitted to UNFCCC.</li></ul>
CITIIS (City Investments to Innovate, Integrate & Sustain) program	<ul style="list-style-type: none"><li>The National Institute of Urban Affairs (NIUA) under the CITIIS program organised a photography exhibition, titled "Cities of Tomorrow".</li><li>CITIIS is a joint program of the Ministry of Housing and Urban Affairs the French Development Agency the European Union, and NIUA.<ul style="list-style-type: none"><li>Aim: to provide financial assistance by way of grants and technical assistance through international and domestic experts.</li><li>Main component of the 'Program to fund Smart City projects through a Challenge Process.'</li></ul></li></ul>

### 4.3. INDIA'S FIRST SOVEREIGN GREEN BONDS (SGB) FRAMEWORK

#### Why in news?

Ministry of Finance approves India's First Sovereign Green Bonds (SGB) Framework.

#### About Sovereign Green Bonds

- A green bond is a fixed-income instrument designed to support specific climate-related or environmental projects.
  - SGBs are issued by the Government.
- Earlier, Union Budget 2022-23 announced the issuance of SGBs.
- Key highlights of framework**
  - A 'green project' classification is based on the principles like: Encourages energy efficiency, reduces carbon & GHG emissions etc.
  - Eligible projects under the framework include: Renewable energy, clean transportation, water and waste management, green building etc.
  - Excludes, nuclear power generation, landfill projects, direct waste incineration, hydropower plants larger than 25 MW etc.
  - Green Finance Working Committee constituted to validate key decisions on issuance of SGB.
  - Proceeds will be deposited with Consolidated Fund of India.

#### Green Bonds in India

- In 2017, SEBI had brought disclosure norms for green bonds whereby issuer will have to make disclosure about environmental objectives of issue of such securities.
- India's First Green Bond was issued by Yes Bank Ltd in 2015.

#### Related news

##### Municipal Green Bonds

- Sebi has announced that issuers of municipal debt securities can issue green bonds in compliance with guidelines for issuance and listing non-convertible debentures.
- Eligible projects include, renewable energy, clean transportation, water and waste management, green building etc.

##### Blue Bonds

- SEBI has proposed the concept of blue bonds as a mode of sustainable finance.
- A blue bond is a relatively new form of debt instrument that is issued to support investments in healthy oceans and blue economies.
  - Blue Economy is sustainable use of ocean resources for economic growth, improved livelihoods, and jobs.
- Blue bonds offer an opportunity for mobilising private sector capital to be mobilized to support the blue economy.
- India can deploy blue bonds in various aspects of blue economy like oceanic resource mining, sustainable fishing, national offshore wind energy policy etc.

### 4.4. GREEN PERMITS

#### Why in news?

Ministry of Environment extends tenure of green permits.

#### More on the news

- The tenure of Environmental Clearances (EC) given has been extended for the following projects -

- River valley projects to have **13-year validity**
- Nuclear power projects or those involving the processing of nuclear fuel to have **15 years** validity
- For projects and activities other than mining and river valley projects will valid for **10 years**.
- EC for mining leases is also under review as presently, **mining leases are granted for 50 years and EC is valid for 30 years.**
- Need for the extension arose as-
  - Nuclear power and hydropower projects have high gestation period due to geological surprises, delays in forest clearance, etc.
  - Considering the time taken for addressing local concerns including environmental issues relating to implementation of such projects.

#### About EC

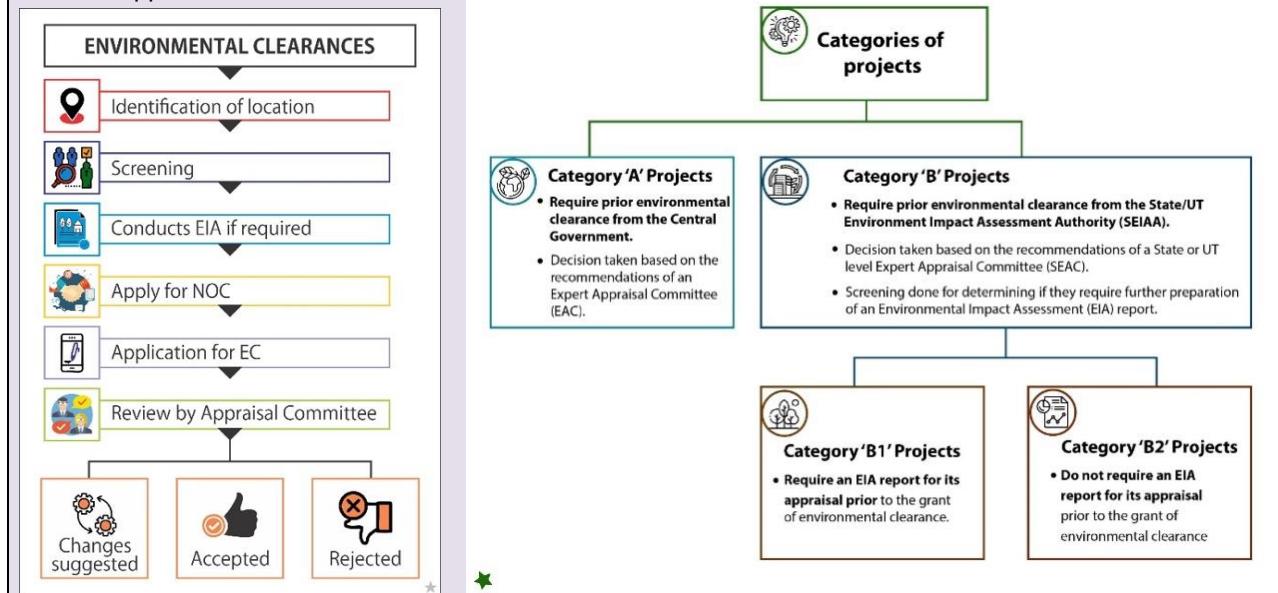
- First made mandatory under the Environmental (Protection) Act 1986 for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification.
- Currently, EIA process in India is ruled by **EIA Notification, 2006 and its subsequent amendments.**

#### Other recent Amendments to Environmental Impact Assessment (EIA) rules 2006

- Exempts highway projects related to defence and strategic importance within 100 km of Line of Control or border from requirement of environmental clearance.
- Increases exemption threshold of biomass-based power plants which use auxiliary fuels such as coal, lignite or petroleum products up to 15% and fish handling capacity of ports and harbours which exclusively handle fish.
- Exempts projects pertaining to expansion of terminal buildings at airports (without an increase in existing area of airport) from seeking green nod.
- Any Category 'B' projects of national importance shall be appraised at the Central level as Category 'B' projects. These projects are related to-
  - National Defence or strategic or security importance
  - Notified by the Central Government on account of exigencies such as pandemics, natural disasters or to promote environmentally friendly activities under National Programmes or Schemes or Missions.

#### Key Features of Environmental Impact Assessment (EIA) rules 2006

- Prior Environmental Clearance (EC) mandatory for notified projects such as mining, thermal power plants, river valley, infrastructure and industries like electroplating or foundry units to get.
- EC process for projects comprises of 4 stages namely screening, scoping, public consultation and appraisal.
  - Time period of 105 days for granting EC which includes 60 days for appraisal and 45 days for decision by regulatory authority.
- Categorization of the projects based on the spatial extent of potential impacts and potential impacts on human health and natural and man-made resources.
- All Category 'A' and Category B1 projects or activities shall undertake Public Consultation with some exemptions like- modernization of irrigation projects, expansion of Roads and Highways which do not involve any further acquisition of land, Building /Construction projects/Area Development projects and Townships etc.
  - Public hearing is completed within a period of 45 days from date of receipt of the request letter from the Applicant.



**Related news:****State Environment Impact Assessment Authorities (SEIAAs)**

- Ministry of Environment, Forest and Climate Change (MoEF&CC) has been directed by NGT to form **panel to formulate safeguards and guidelines to be followed by SEIAAs.**
  - Earlier, MoEF&CC had decentralised environmental clearance process required for a certain category of projects.
- SEIAAs are **responsible for providing environmental clearance** for a bulk of infrastructure, developmental and industrial projects.
  - Their main purpose is to **assess the impact of proposed project on environment and people**, and to try and minimize this impact.

**Revised Draft of Standards for Firms to Self-Report Environmental Impact**

- The draft has been published for public comment by the **Global Sustainability Standards Board (GSSB)**, the independent standard-setting body of the **Global Reporting Initiative (GRI) Biodiversity Standard**.
- GRI: **A global entity that helps businesses take responsibility for their impacts on biodiversity.**
  - GRI Standards designed to be used by organisations to report on their impacts on the economy, the environment and society.
  - GRI disclosures on biodiversity were last revised in 2006.

## 4.5. CLOUD FOREST ASSETS

**Why in News?**

Recently a new report "**Cloud Forest Assets Financing a Valuable Nature-Based Solution**" was released by **Earth Security**, a global nature-based asset management advisory firm.

**More on News**

- The suggested Cloud forest bonds as per the report are a part of '**Nature Based Solutions (NBS)**' and their financing to protect these Cloud forests.



### What is a cloud forest?

Areas with forest cover greater than 10% and fog present greater than 70% of the time.			
	<b>Found mostly at between 1,500 and 3,000 above sea level.</b>		<b>Shorter trees covered in mosses and ferns.</b>
	<b>Cooler and wetter than other forests.</b>		<b>Blanketed in dense ground-level clouds.</b>

**About Cloud Forest and The Cloud Forest 25 (CF25) initiative**

- Cloud Forests are **mountain tropical forests** generally found at the river headstreams and **mostly covered with clouds**.
  - These forests **serve as the storage of clean water** for communities, industries and hydropower plants.
  - Majority of Cloud Forest i.e., 90%** are found in **25 developing countries** in tropical regions which bears the disproportionate impact of climate change.
- CF25 is an **Investment Initiative** to bring countries, their creditors and multilaterals organizations together to accelerate, and consolidate the progress and scale such investment products.
- Financing Mechanisms**
  - Water Payments:** To create a mechanism for payments for ecosystem services from water users such as hydropower dams which works on a national scale and is subject to compliance norms.
  - Sovereign Carbon:** The financing of forest carbon at sovereign and sub-sovereign jurisdictional scales as part of an approach to wider areas of lowland tropical rainforests.
  - For these, the report proposes Cloud Forest bonds, which** can be issued through such collective mechanisms.

- Cloud forest bonds are **debt based instruments** to mobilise finance for protection of cloud forest. Their value is based on the economic value of a country's Cloud forest resources.

## What is Nature Based Solutions?

<p>► Actions to protect, sustainably manage, or restore natural ecosystems.</p> <p>► Address societal challenges such as climate change, human health, food and water security, and disaster risk reduction effectively and adaptively.</p> <p>► Simultaneously provide <b>human well-being and biodiversity benefits</b>.</p> <p>► Leverage nature and the power of healthy ecosystems to protect people, optimize infrastructure and safeguard a stable and biodiverse future.</p>	<p style="text-align: center;"><b>NATURE-BASED SOLUTIONS</b></p> <div style="display: flex; justify-content: space-around; font-size: small; margin-bottom: 5px;"> <span>Restoration</span> <span>Issue-specific</span> <span>Infrastructure</span> <span>Management</span> <span>Protection</span> </div> <p style="text-align: center;"><b>Ecosystem-based approaches</b></p> <p style="text-align: center;">Human well-being      Biodiversity benefits</p>
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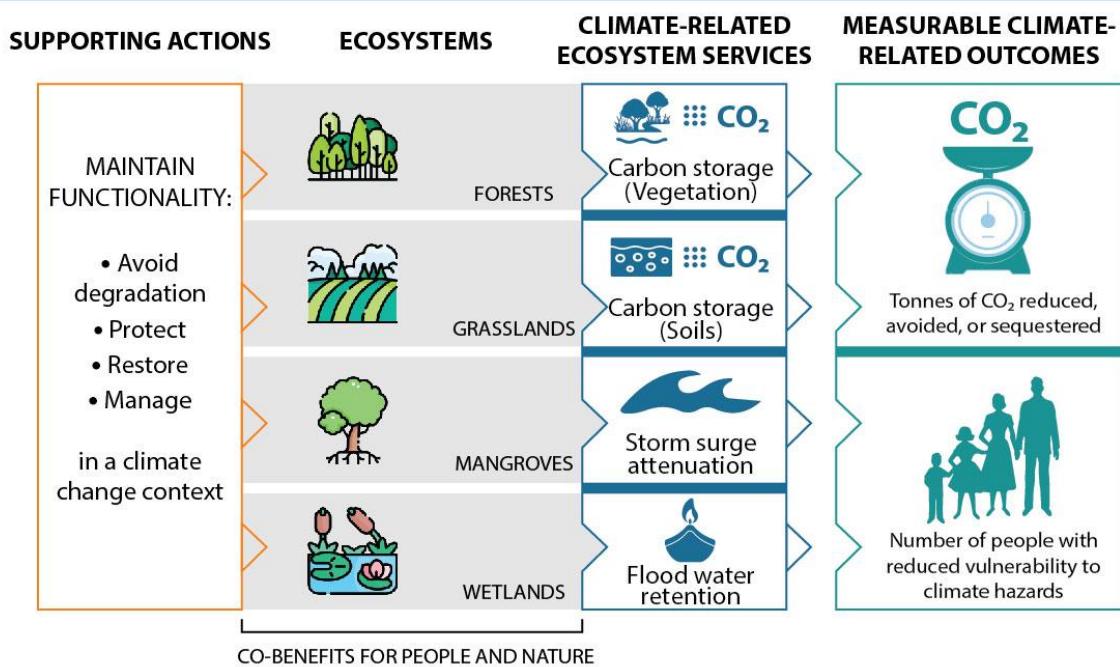
## Benefits of Nature Based Solutions

**Adaptation**  
Climate sensitive agriculture by cultivating drought resistant crops like millets can help in saving groundwater and achieve food security.

**Mitigation**  
Nature based solutions, for instance afforestation, can help provide 37 percent mitigation needed by 2030 to achieve Paris climate targets.

**Resilience**  
The recent initiative MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes) helps build resilience against cyclones and tsunamis using mangroves along with providing income opportunities for coastal communities.

## NBS for Tackling Climate Change



**Related news: State of Finance for Nature (SFN) 2022 report**

- The recently released 'State of Finance for Nature (SFN) 2022' report revealed that nature-based solutions are still significantly under-financed.
- It was released by the **UN Environment Programme (UNEP)** and the BMZ-financed **Economics of Land Degradation (ELD) Initiative** with support from Vivid Economics by McKinsey.
  - ELD is a global initiative aimed at **integrating the true value of land into decision-making processes and promoting sustainable land use**.
  - It was launched in 2011 by the **German Federal Ministry for Economic Cooperation and Development (BMZ)**, the **United Nations Convention to Combat Desertification (UNCCD)** and the **European Commission**.
- It quantifies public and private finance flows to nature-based solutions (NbS) to tackle global challenges related to biodiversity loss, land degradation and climate change.

## 4.6. ALTERNATIVE FUELS AND ENERGY RESOURCES

### 4.6.1. OCEAN THERMAL ENERGY

#### Why in news?

The **National Institute of Ocean Technology (NIOT)**, an autonomous Institute under Ministry of Earth Sciences (MoES) is establishing India's first Ocean Thermal Energy Conversion (OTEC) plant.

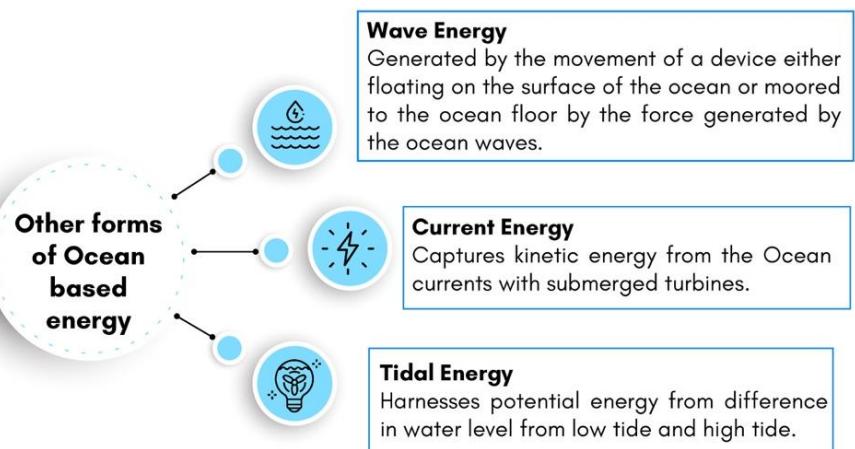
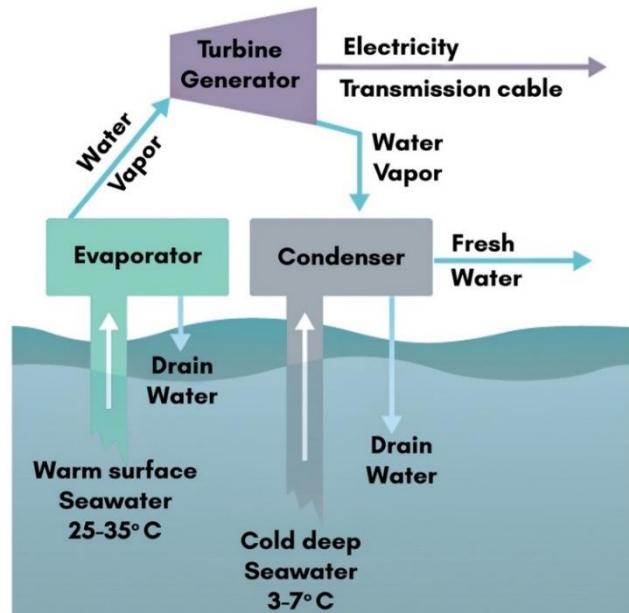
#### More about news

- OTEC plant will have a **capacity of 65kW in Kavaratti, Lakshadweep** with indigenous technology.
- It will power the Low Temperature Thermal Desalination (LTTD) based desalination plant for conversion of Sea water into Potable water.
- Earlier in 1980, India had planned to set up an OTEC plant, off the Tamil Nadu coast, but it was abandoned.

#### About Ocean Thermal Energy Conversion (OTEC)

- A process for **producing energy by harnessing the temperature differences** (thermal gradients) between **ocean surface waters and deep ocean waters**.
  - In tropical regions, surface water, heated by Sun's energy, can be much warmer than deep water.
  - This temperature difference can be used to produce **electricity and to desalinate ocean water**.
- OTEC systems use a **temperature difference of at least 20° Celsius** to power a turbine to produce electricity.
- India's potential:** OTEC has a theoretical **potential of 180,000 MW in India** subject to suitable technological evolution.
- Advantages:** India is geographically well-placed; Generates a constant, clean source of electricity unlike intermittent electricity from renewable resources like wind and solar; **Potential to generate potable water, hydrogen, and ammonia; Cold and nutrient rich water from the OTEC process can benefit commercial products such as air conditioning, aquaculture, etc.**

#### OCEAN THERMAL ENERGY CONVERSION SYSTEM



- Challenges associated with OTEC:**
  - High up-front capital costs;
  - Currently at pre-R&D/demonstration stage or the initial stage of commercialization;
  - Potential impact on marine organisms and ecosystem due to discharge of cooler, denser and nutrient rich water from OTEC facilities, entanglement in cables, entrapment, noise generation, accidental release of biocides (used for water treatment) or other potential pollutants etc.

**Related news: Sindhuja-I**

- It is an Ocean Wave Energy Converter developed by IIT Madras.
- It consists of a floating buoy, a spar, and an electrical module.
  - Electric module generates electricity by using the relative motion between floating buoy (moving up and down with waves) and fixed spar passing through buoy centre.
  - It can help India to meet energy needs of its islands and also achieve climate change-related goal of generating 500 GW (gigawatt) of renewable energy (RE) by 2030.
- Seawater stores tidal, wave and ocean thermal energy, make the harnessing of 40 GW wave energy possible in India.
- Advantages:** No pollution, Renewable, Higher available energy densities, Predictable and Less volatile in comparison to some other RE sources.
- Disadvantages:** High Initial Cost, Threat to Marine Life and Navigation, Location dependent and risk of damage from natural forces.

## 4.6.2. COAL GASIFICATION

**Why in news?**

Union government has allowed a concession of 50% in revenue share for coal gasification.

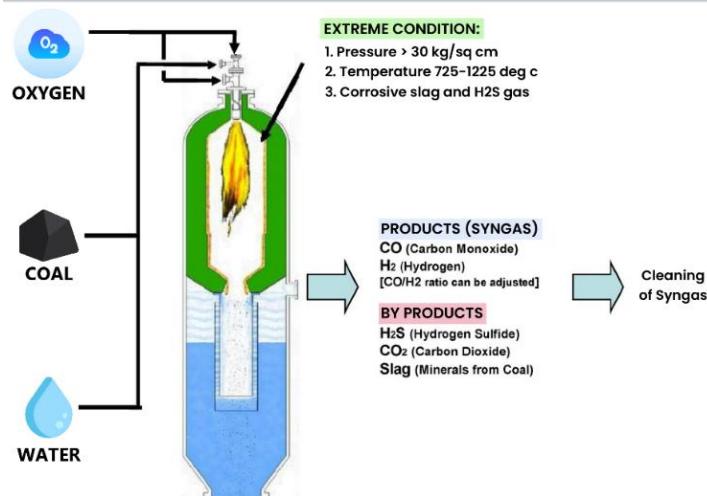
**More about news**

- Concession of 50% in revenue share can be availed** if the successful bidder consumes the coal produced either in its own plant(s) or plant of its holding, subsidiary, affiliate, associate for coal gasification or liquefaction or sells the coal for coal gasification or liquefaction on a yearly basis.
  - This is subject to conditions that at least 10% of scheduled coal production as per approved mining plan for that year shall be consumed or sold for gasification or liquefaction.

**About coal gasification (CG)**

- Process converting coal into synthesis gas (syngas),** which is a mixture of hydrogen ( $H_2$ ), carbon monoxide ( $CO$ ) and carbon dioxide ( $CO_2$ ).
- In-situ process,** in which oxygen is injected into the seam along with water and ignited at high temperature.
  - In ex-situ process,** reactor is developed for simulating the gasification process above the surface of ground.
- In the gasification process, sulphur present in the coal is converted to hydrogen sulphide ( $H_2S$ ) and minor amounts of carbonyl sulphide ( $COS$ ).
  - These sulphur compounds can be easily and economically removed using acid gas removal systems.

### BASICS OF COAL GASIFICATION PROCESS



### TYPES OF GASIFIERS

**Fixed Bed Gasifiers**

Flow of solids is independent of the flow of gas.  
Requires minimal pre-treatment of feed coal.  
Have high thermal efficiency.


**Fluidized Bed Gasifiers**

Characterised by uniform particle mixing, uniform temperature gradients with high char recycling rate and less capital cost.


**Entrained Flow Gasifiers**

Ability to handle practically any feed. Syngas obtained is free of oils and tars.



- **Advantages:**
  - **Clean coal technology** compared to burning of coal as CG plants **do not produce any scrubber sludge**;
  - Most part of the **wash water is recycled** and the **residual waste waters** from gasification plants can be **effectively treated**.
  - **Coal can be used to produce number of products using clean coal technologies**
    - ✓ Hydrogen, Methanol and Fertilizers through coal gasification.
    - ✓ Carbon Fibres, Plastic composites using ash/ residue of the coal power plant/ gasifier.

#### Related news

- Centre has prepared a **National Mission document to achieve 100 million tonne (MT) coal** gasification by 2030.
- Under Atmanirbhar Bharat Abhiyaan, Ministry of Coal has taken **National Coal Gasification Mission** initiative for utilizing coal through coal gasification and achieve 100 MT coal gasification by year 2030.
  - **Nodal officer:** All coal companies have been advised to appoint a nodal officer and to prepare an action plan for gasifying at least 10% of their coal production.
  - **Interest Rate Subvention:** Interest Rate Subvention may be provided thereby reducing the interest burden on coal gasification projects and improve the bankability of these projects.
  - **Import duty exemption:** Import duty exemption for capital goods for setting up coal gasification projects may be considered.

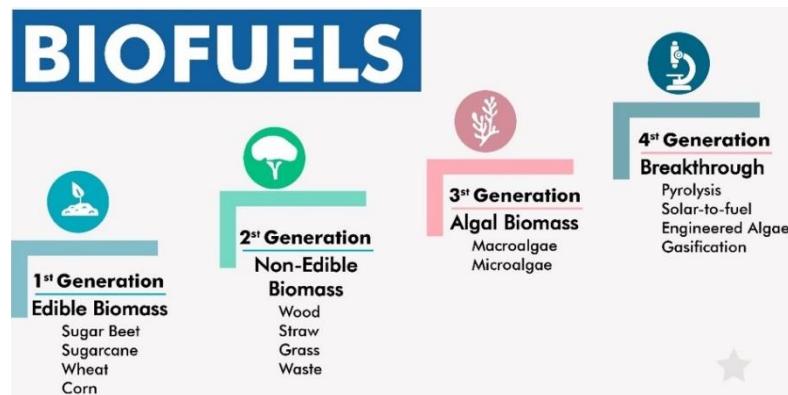
### 4.6.3. NATIONAL POLICY ON BIOFUELS-2018

#### Why in News?

Recently, the Cabinet approved amendments to the National Policy on Biofuels, 2018 to **advance the target of 20% ethanol blending in petrol to Ethanol Supply Year (ESY) 2025-26** from earlier 2030.

#### About Biofuels

- Refers to **liquid transportation fuels**, such as **ethanol** and **biodiesel**, derived from agricultural produce, forests or any other organic material (feedstock).
- Based on the feedstock (raw materials) used to produce biofuels, they are classified into **four generations** (see image).
  - Presently, first-generation biofuels are the main source of biofuels globally despite **140 billion tonnes** of **agro-waste** or biomass generated from agriculture every year.



#### National Policy on Biofuels-2018

- **Aim:** To increase usage of biofuels in the energy and transportation sectors of the country in the coming decade; and to utilize, develop and promote domestic feedstock and its utilization for production of biofuels.
- **Biofuels Covered:** Bioethanol, Biodiesel and BioCNG.
- **Implementation:** By **National Bio-fuel Coordination Committee (NBCC)**, set up in **2020**, chaired by **Minister Petroleum and Natural Gas**. It has representatives from 14 other ministries and departments to-
  - **Take decisions for effective implementation and monitoring** of biofuels program in the country, and
  - **Provide overall coordination** among FCI and oil marketing companies.
- **Recent Amendments:** Apart from advancing of target, the cabinet also approved:
  - Use of **more feedstock** for production of biofuels.
  - Production of biofuels **under the 'Make in India' programme** in Special Economic Zones and Export Oriented Units.
  - To grant permission for **export of biofuels** in specific cases.
  - **Addition of new members to the NBCC** and it has the permission to change the policy.
- **Other Features (apart from achieved and amended targets):**



India has achieved the target of **10% ethanol blending in petrol**, ahead of the **National Biofuels Policy-2018** target of year end (2022).

- **Categorization of Biofuels up to three generations** and support production of second generation ethanol Bio refineries through **Viability Gap Funding**.
- **Increased scope of Raw Material** for 1<sup>st</sup> Generation Ethanol such as damaged foodgrains, Starch containing materials, sugar containing materials etc.
- Allows use of surplus foodgrains as raw material after **NBCC** approval.
- To develop the **National Biomass Repository** by conducting appraisal of biomass across the country.

#### 4.6.4. NATIONAL BIOENERGY PROGRAMME

##### Why in news?

Recently, **Ministry of New and Renewable Energy (MNRE)** has notified that **National Bioenergy Programme (NBP)** will continue from FY 2021-22 to 2025-26 with a budget outlay of ₹858 crore for the first phase.

##### About NBP

NBP will comprise the three sub-schemes namely **Waste to Energy Programme, Biomass Programme, and Biogas Programme**.

##### Related terms

- Bioenergy refers to **electricity and gas that is generated from organic matter, known as biomass**.
- Biomass is **renewable organic material** that comes from plants and animals. Biomass is the **raw material to produce biogas**. Major component of biomass is **carbon**.
- Biogas is a **renewable fuel produced by the breakdown of organic matter** such as food scraps and animal waste by microorganisms **in absence of oxygen**.
  - Biogas is composed mostly of **methane (CH<sub>4</sub>)**, and **carbon dioxide (CO<sub>2</sub>)**.

Sub-scheme	Objective	Scope	Advantages
<b>Waste to Energy Programme</b> (Programme on Energy from Urban, Industrial and Agricultural Wastes /Residues)	<ul style="list-style-type: none"><li>• To support the setting up of Waste to Energy projects for generation of <b>Biogas/ Bio-CNG/ Power plants</b> (excluding municipal solid waste to power project)/ <b>producer or syngas</b> from urban, industrial and agricultural wastes/residues.</li><li>• <b>Implementing agency: Indian Renewable Energy Development Agency (IREDA).</b><ul style="list-style-type: none"><li>○ IREDA, established in 1987, is a <b>Mini Ratna (Category-I) Enterprise under administrative control of MNRE</b>.</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Provides <b>Central Financial Assistance (CFA)</b> to project developers and service charges to implementing/inspection agencies in respect of successful commissioning of waste to energy plants.</li></ul>	<ul style="list-style-type: none"><li>• <b>Safe, technologically advanced means of waste disposal</b> that reduces greenhouse gases, generates clean energy and recycles metal.</li></ul>
<b>Biomass Programme</b> (Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries)	<ul style="list-style-type: none"><li>• To support setting up of <b>Biomass Briquette/Pellet manufacturing plants</b> and to support Biomass (non-bagasse) based <b>cogeneration projects</b> in Industries.</li><li>• <b>Implementing agency: IREDA.</b></li></ul>	<ul style="list-style-type: none"><li>• Provides <b>CFA to project developers and service charges to implementing agency and inspection agencies</b> in respect of setting up of Briquette / Pellet manufacturing plants and Biomass (non-bagasse) cogeneration projects in industries.</li></ul>	<ul style="list-style-type: none"><li>• Reduce stubble burning.</li><li>• Provide additional source of income to farmers and better environmental practices and reduced pollution.</li></ul>
<b>Biogas Programme</b>	<ul style="list-style-type: none"><li>• Setting up of biogas plants for small power needs of users.</li><li>• Implemented by designated <b>Programme Implementing Agency (PIA) of State/ Union Territory/Biogas Development and Training Centres (BDTC)</b>.</li><li>• IREDA, NABARD/ RBI approved Financial Institutions may also implement it in consultation with PIAs.</li></ul>	<ul style="list-style-type: none"><li>• Covers setting up of <b>small and medium biogas plants ranging from 1M<sup>3</sup> (cubic meter) to 2500 M<sup>3</sup></b> biogas generation per day for individual user, farmers, poultry etc.</li></ul>	<ul style="list-style-type: none"><li>• <b>GHG reduction, improved sanitation, Employment Creation, and digested slurry from biogas plants can supplement / reduce use of chemical fertilizers.</b></li></ul>

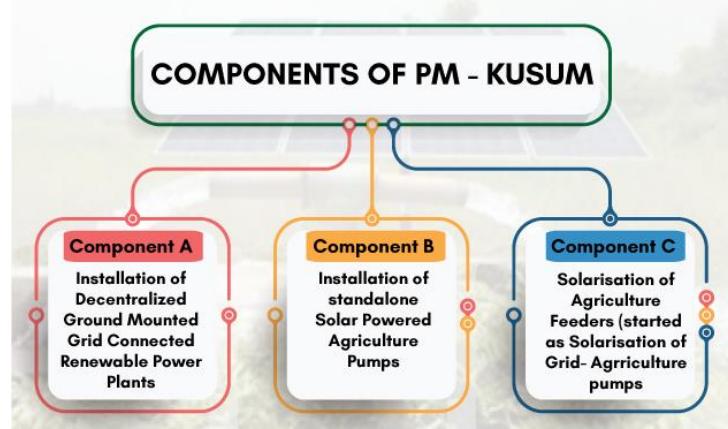
## 4.6.5. PRADHAN MANTRI URJA SURAKSHA EVAM UTTHAAN MAHABHIYAAN (PM KUSUM) SCHEME

### Why in News?

Recently, the Central Government removed the performance bank guarantee (PBG) clause for Solar Power Generators (in Component-A) to improve the PM-KUSUM Scheme performance.

### About PM-KUSUM Scheme

- Launched in 2019 by the **Ministry of New and Renewable Energy (MNRE)**.
- State Nodal Agencies (SNAs) of MNRE will coordinate** with States/UTs, Discoms and farmers for implementation of the scheme.
- Aim:** To ensure **energy security for farmers** by Harvesting Solar Energy and **increase the share of installed capacity of electric power** from non-fossil-fuel sources to 40% by 2030 as part of **Intended Nationally Determined Contributions (INDCs)**.
- Target:** To add **30.8 Gigawatt (GW) of solar capacity by FY2025-26** (Earlier target was to be completed by 2022), and De-dieselization of Farm Sector by replacing Diesel Pumps with Solar Pumps.



PM-KUSUM: Components and Implementation		
<b>Component-A:</b> <ul style="list-style-type: none"> <li>To set up <b>500 KW to 2 MW</b> Renewable Energy based power plants by <b>individual farmers/ cooperatives/panchayats /farmer producer organizations (FPO)</b>, on their barren or cultivable lands or pastureland and marshy land, referred as <b>Renewable Power Generator (RPG)</b>.           <ul style="list-style-type: none"> <li><b>Projects smaller than 500 kW</b> may be allowed (earlier not allowed) by states based on techno-commercial feasibility.</li> </ul> </li> <li>The <b>power generated will be purchased by the DISCOMs</b> at a pre-fixed tariff determined by respective SERC.</li> <li><b>Performance Based Incentives @ Rs. 0.40 per unit</b> or Rs. 6.60 lakhs/MW/year, whichever is less, will be provided by MNRE to DISCOMs for five years for buying from RPGs.</li> </ul>	<b>Component-B:</b> <ul style="list-style-type: none"> <li>To support 20 lakh individual farmers in installing <b>standalone solar pumps</b> of capacity up to <b>7.5 Horsepower (HP)</b> where grid supply is not available.           <ul style="list-style-type: none"> <li>Pumps of Higher Capacity can also be installed; however, the financial support will be limited to 7.5 HP capacity.</li> <li>It is <b>mandatory to use indigenously manufactured solar panels</b> with indigenous solar cells and modules.</li> </ul> </li> </ul>	<b>Component-C:</b> <ul style="list-style-type: none"> <li><b>Restructured to Solarisation of agricultural feeders instead of pumps</b> and supports 15 lakh <b>individual farmers</b> to <b>solarise pumps</b> of capacity up to 7.5 HP.</li> <li>For <b>Components B and C</b> Centre bears <b>30% of pump cost</b> while <b>70%</b> is borne by <b>State-owned DISCOMs</b>.</li> </ul>

### 4.6.5.1. OTHER SOLAR ENERGY RELATED NEWS

<b>Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects</b> <ul style="list-style-type: none"> <li>Under the '<b>Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects</b>', a total of 57 solar parks of aggregate capacity of 39,285 MW were sanctioned until November-end.           <ul style="list-style-type: none"> <li>However, only solar power projects of 10,027 MW have been commissioned in these parks.</li> </ul> </li> <li><b>Scheme</b> was rolled out by <b>Ministry for New and Renewable Energy (MNRE)</b> in 2014 to help solar project developers set up projects in a plug-and-play model.           <ul style="list-style-type: none"> <li><b>Target:</b> To set up at least 25 Solar Parks and Ultra Mega Solar Power Projects targeting over 20 GW of solar power installed capacity within a span of 5 years starting from 2014-15.</li> </ul> </li> </ul>	<b>STATUS OF ADOPTION OF SOLAR ENERGY IN INDIA</b> <ul style="list-style-type: none"> <li><b>175 GW target of renewable energy by 2022 (100 GW Solar)</b></li> <li><b>61 GW of solar power had been installed</b></li> <li><b>6.48 GW Roof Top Solar deployment achieved (2021)</b></li> <li><b>4th in solar photovoltaics (PV) deployment across the globe</b></li> <li><b>280 GW future target for Solar Energy</b></li> </ul>
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	<ul style="list-style-type: none"> <li>○ Capacity of the Scheme: <b>enhanced from 20 GW to 40 GW</b> in 2017.</li> <li>○ <b>Implementing agency:</b> Solar Power Park Developer (SPPD).</li> <li>○ <b>Facilitates and speeds up installation of grid connected solar power projects</b> for electricity generation on a large scale.</li> </ul>
Organic solar cells (OSCs)	<ul style="list-style-type: none"> <li>• Recently researchers at IIT Kanpur have developed an <b>organic solar cell on steel substrates</b>.</li> <li>○ <b>It can convert a steel roof</b> into an energy producing device.</li> <li>• OSCs are <b>one of the emerging photovoltaic (PV) technologies</b> and are classified as <b>third-generation solar cells</b> with organic polymer material as the light absorbing layer.</li> <li>• <b>Benefits of OSCs</b></li> <li>○ <b>Lightweight</b>, can cover a much larger area, and <b>has low manufacturing costs</b>.</li> <li>○ <b>Potential to store much larger amounts of solar energies</b> than other solar technologies.</li> </ul>
India's Largest Floating Solar Power Project	<ul style="list-style-type: none"> <li>• NTPC has said it has <b>commissioned India's largest floating solar power project</b>.</li> <li>• <b>100 MW</b> Floating Solar Power Project has been operationalized at <b>NTPC Ramagundam, Telangana</b>.</li> <li>• The project is <b>endowed with advanced technology</b> as well as environment friendly features.</li> </ul>
'Gharkeupar solar is super' campaign (Solar Rooftop)	<ul style="list-style-type: none"> <li>• Minister of State for New and Renewable Energy <b>launched the Pan-India Rooftop Solar Awareness Campaign</b> in a bid to mobilize public support for installing solar rooftop panels.</li> <li>• The campaign is aimed at mobilizing local government, citizens, and municipalities to spread awareness of <b>Solar Rooftop</b> among <b>100 Indian towns and cities</b>, especially tier 2 and tier 3 towns/cities.</li> <li>○ Government is providing <b>40% of subsidy</b> for households to install solar.</li> </ul>

#### 4.6.6. ELECTRICITY (PROMOTING RENEWABLE ENERGY THROUGH GREEN ENERGY OPEN ACCESS) RULES, 2022

##### Why in news?

Ministry of Power has notified Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022.

##### Key highlights of the Rules

- Consumers are entitled to **demand supply of Green Power from Discoms**.
- Commercial and Industrial consumers are **allowed to purchase green power on voluntarily basis**.
- **Green Open Access** is allowed to any consumer and **reduction in the limit of Open Access Transaction** from 1 MW to 100 KW for green energy.
  - This aims to **enable small consumers also to purchase renewable power through open access (OA)**.
- **Increase transparency** in approval process of OA.
  - OA approvals will be **granted in 15 days** or else it will be deemed to have been approved subject to fulfilment of technical requirements. It will be **through national portal**.
- **Uniform renewable purchase obligation** on all obligated entities in the area of a distribution licensees.
- **Green certificates for consumers** if they consume green power.
- **Cross subsidy surcharge and additional surcharge shall not be applicable** if green energy is utilized for production of green hydrogen and green ammonia.

##### Related news: Green Energy Open Access Portal

- Union Minister of Power and New & Renewable Energy **launched Green Energy Open Access Portal**.
- Portal will allow **consumers to access green power** easily through transparent and **streamlined procedure**.
- Any consumer with a **connected load of 100 kW or above** can get Renewable Energy (RE) **through open access** from any RE generating plant.
  - Open access means **non-discriminatory access to electricity transmission and distribution system** to eligible consumers, generators and state distribution companies (DISCOMS).

#### 4.6.7. OTHER ALTERNATIVE ENERGY SOURCES

Coal-bed Methane (CBM)	<ul style="list-style-type: none"> <li>• Ministry of Coal has released policy guidelines for utilisation of de-coaled land for <b>setting up thermal and renewable energy (RE) power plants, CBM extraction units, and coal to chemical plants</b>.</li> <li>• CBM is an <b>unconventional form of natural gas</b> found in coal deposits or coal seams, formed during the <b>process of coalification, transformation of plant material into coal</b>.</li> </ul>
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	<ul style="list-style-type: none"> <li>When coal and methane conversion process occur such that <b>coal is saturated with water and methane is trapped within coal</b>, the result is CBM.</li> <li><b>Uses:</b> Power generation, as CNG auto fuel, feedstock for fertilisers, industrial uses such as in cement production, rolling mills, steel plants, and for methanol production.</li> <li>Ministry of Petroleum &amp; Natural Gas formulated <b>CBM Policy</b> under Oilfields (Regulation &amp; Development) Act 1948 and Petroleum &amp; Natural Gas Rules 1959 to harness the potential of CBM.</li> </ul>							
Geothermal Energy	<ul style="list-style-type: none"> <li><b>ONGC has reportedly started drilling its first well at Puga (Ladakh)</b> to generate electricity using geothermal power.</li> <li><b>Geothermal power plants use hydrothermal resources that have both water (hydro) and heat (thermal).</b> <ul style="list-style-type: none"> <li>Hot water and steam from deep underground can be piped up through underground wells and <b>used to generate electricity in a power plant</b>.</li> </ul> </li> <li><b>Benefits of Geothermal:</b> carbon-free, renewable, provides a continuous, uninterrupted supply etc.</li> <li><b>Disadvantages:</b> Location-specific energy source, associated with other emissions like sulphur dioxide and hydrogen sulphide, causes mini tremors in area of operation, high initial cost etc.</li> <li>As per <b>preliminary investigations undertaken by Geological Survey of India</b>, there are <b>around 300 geothermal hot springs</b> in India. <ul style="list-style-type: none"> <li><b>Other promising geothermal sites</b> are Chumathang in Ladakh, Cambay in Gujarat, Tattapani in Chhattisgarh, Khammam in Telangana &amp; Ratnagiri in Maharashtra.</li> </ul> </li> </ul>	<p><b>Basic Types of Geothermal Power Plants</b></p> <table border="1"> <tr> <td><b>Dry steam</b></td> <td>Use steam directly from a geothermal reservoir to turn generator turbines.</td> </tr> <tr> <td><b>Flash steam</b></td> <td>Use high pressure hot water from the geothermal reservoir to produce steam.</td> </tr> <tr> <td><b>Binary cycle</b></td> <td>Transfers heat from geothermal hot water to another liquid which is turned to steam.</td> </tr> </table>	<b>Dry steam</b>	Use steam directly from a geothermal reservoir to turn generator turbines.	<b>Flash steam</b>	Use high pressure hot water from the geothermal reservoir to produce steam.	<b>Binary cycle</b>	Transfers heat from geothermal hot water to another liquid which is turned to steam.
<b>Dry steam</b>	Use steam directly from a geothermal reservoir to turn generator turbines.							
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<b>Binary cycle</b>	Transfers heat from geothermal hot water to another liquid which is turned to steam.							
Biomass co-firing	<ul style="list-style-type: none"> <li><b>Government had launched the SAMARTH Mission</b> i.e., National Mission on Use of Biomass in coal based thermal Power Plants. <ul style="list-style-type: none"> <li>While till FY 2020-21, only 8 power plants had co-fired biomass pellets, the corresponding number has increased to 39 as on date.</li> </ul> </li> <li>Co-firing biomass consists of burning biomass in coal-fired power plants along with coal. <ul style="list-style-type: none"> <li><b>Three</b> different concepts for co-firing i.e, Direct co-firing, Indirect co-firing, Parallel co-firing.</li> </ul> </li> <li><b>Advantages:</b> lower capital costs, higher efficiency, increased economies of scale, Lower electricity costs due to the larger size and superior performance of conventional coal power plants.</li> </ul>							
Green Methanol	<ul style="list-style-type: none"> <li>National Thermal Power Corporation Limited (NTPC) and Tecnimont (Italy based company) signed MoU to jointly explore green methanol production facility at a NTPC project in India.</li> <li><b>Green Methanol</b> is methanol produced via a process that emits zero or a minimal amount of GHGs, usually measured as an equivalent amount of CO<sub>2</sub>. <ul style="list-style-type: none"> <li>It is produced from sustainable biomass, or from carbon dioxide and hydrogen produced from renewable electricity.</li> </ul> </li> <li><b>Applications:</b> material for the chemical industry, storing renewable electricity, transportation fuel and substitute fuel for maritime fuel applications.</li> </ul>							
Compressed Bio-Gas (CBG)	<ul style="list-style-type: none"> <li>Union Minister of Petroleum and Natural Gas inaugurated <b>Asia's largest CBG plant</b> in Sangrur, Punjab.</li> <li>CBG is the <b>compressed and purified bio-gas</b> produced from waste/bio-mass sources like agricultural residue, cattle dung etc. <ul style="list-style-type: none"> <li>In 2018, the government launched the <b>Sustainable Alternative Towards Affordable Transportation (SATAT) scheme</b> to establish the CBG production ecosystem.</li> </ul> </li> </ul>							

	<ul style="list-style-type: none"><li><b>Benefits:</b><ul style="list-style-type: none"><li>Reduce the problem of Stubble Burning and related carbon dioxide emissions.</li><li>Produce fermented organic manure for organic farming.</li><li>Generate employment and additional income for farmers.</li></ul></li></ul>
World's First compressed natural gas (CNG) Terminal	<ul style="list-style-type: none"><li>Prime Minister laid foundation stone of the World's First CNG Terminal and of the brownfield port at Bhavnagar, Gujarat.<ul style="list-style-type: none"><li>Expected to be operational by 2026.</li><li>Developed using a public-private partnership (PPP) approach and has a cargo handling capacity of 1.5 million metric tonnes per annum (MMTPA).</li></ul></li><li>The upcoming project will have direct door-step connectivity to the existing roadway and railway network connecting to the largest industrial zones, Dedicated Freight Corridor and northern hinterland of India.</li></ul>
Global Offshore Wind Alliance	<ul style="list-style-type: none"><li>Nine new countries including Belgium, Colombia, Germany, US, UK etc. join GOWA.</li><li>Initiated by: International Renewable Energy Agency (IRENA), Denmark and Global Wind Energy Council (GWEC).<ul style="list-style-type: none"><li>GWEC is international trade association for the wind power industry (India is also a member).</li></ul></li><li>Brings together governments and other stakeholders to accelerate deployment of offshore wind power.</li><li>Objective: To contribute to achieving a total offshore wind capacity of a minimum of 380 GW by 2030 and an installed capacity increase of at least 70 GW per year from 2030.</li></ul>

## 4.7. ENERGY EFFICIENCY

### 4.7.1. ENERGY CONSERVATION (AMENDMENT) ACT, 2022

#### Why in news?

Recently Energy Conservation (Amendment) Act, 2022 came into force.

#### About Energy Conservation (Amendment) Act, 2022

- Amends Energy Conservation Act, 2001 which provides a framework for regulating energy consumption and promoting energy efficiency and energy conservation.
- While 2001 act deals with saving energy, 2022 amendment deals with saving the environment and tackling climate change, thus broadening scope and objective of principal Act.

#### Key Features

- Empowers central government to specify a carbon credit trading scheme.
  - Carbon credit implies a tradable permit to produce a specified amount of CO<sub>2</sub> or other GHGs.
  - Central government or any authorized agency may issue carbon credit certificates to entities registered and compliant with scheme.
- Government empowered to set requirements for designated consumers to meet a minimum share of energy consumption from non-fossil sources like green hydrogen, green ammonia, etc.
  - Failure to meet obligation will be punishable with a penalty of up to Rs 10 lakh.
- 'Energy Conservation and Sustainable Building Code' to replace Energy Conservation Code for buildings.
  - This new code will provide norms for energy efficiency and conservation, use of renewable energy, and other requirements for green buildings.
  - Also applicable to the office and residential buildings meeting above criteria. It also empowers state governments to lower the load thresholds.
- Expands the scope of energy consumption standards to include vehicles (as defined under the Motor Vehicles Act, 1988), and vessels (includes ships and boats), in addition to equipment and appliances.

2010 amendments to Energy Conservation Act (ECA), 2001. The Act was first amended in 2010 to expand its scope and bring the following subjects under its ambit

- Energy conservation norms for buildings; enhanced energy efficiency norms for appliances and equipment,
- A framework for the trade of energy savings among energy-intensive Designated Consumers (DCs).
- Increased penalties for offences committed under the Act, including violation of norms for efficiency and consumption standards.
- Provided room for appeals to be heard by the Appellate Tribunal for Electricity (APTEL).

- State Electricity Regulatory Commissions (SERCs) empowered to make regulations for discharging their functions.
- State Governments required to constitute energy conservation funds for promotion of energy efficiency and conservation measures. It will receive contribution by both Union and State govt.
- Increases and diversifies number of members and secretaries in governing council of BEE.

#### 4.7.2. STATE ENERGY & CLIMATE INDEX

##### Why in news?

NITI Aayog has recently launched the State Energy & Climate Index (SECI)-Round I.

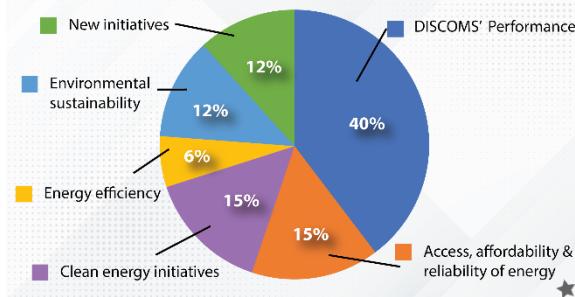
##### About the Index

- First index that aims to track the efforts made by states and union territories (UTs) in the climate and energy sector.
- Objectives of the index:**
  - Ranking the States based on their efforts towards improving energy access, energy consumption, energy efficiency, and safeguarding environment;
  - Helping drive the agenda of affordable, accessible, efficient and clean energy transition at the State level;
  - Encouraging healthy competition among the states on different dimensions of energy and climate.
- Parameters:** SECI rank states and UTs on six parameters which include a total of 27 indicators
  - Discoms' Performance;
  - Access, Affordability and Reliability of Energy;
  - Clean Energy Initiatives;
  - Energy Efficiency;
  - Environmental Sustainability; and
  - New Initiatives.
- Classification of States:** For better comparison, the states have been classified based on size and geographical differences as larger states, smaller states, and UTs.
- Categorization of State and UTs based on the outcome of SECI Round-1 scores:** States and UTs have been categorized into three groups: 'Front Runners', 'Achievers', and 'Aspirants'.

##### Performance of States and UTs

- More than half the states scored higher than the average.
- Overall performance- Top Scorer- Chandigarh, Lowest scorer- Lakshadweep
- Top 3 performers based on classification
  - Larger States: Gujarat, Kerala, and Punjab.

##### WEIGHTAGE OF PARAMETERS IN THE SECI



CATEGORY	SECI SCORE
Front-runners (Top one-third)	Composite SECI score >= 46
Achievers (Middle one-third)	Composite SECI score one-third between 36 and 46
Aspirants (Lowest one-third)	Composite SECI score <= 36

##### Other Energy Indexes across the globe and India's performance

Index	World Energy Trilemma Index(WETI)	Energy Transition Index (ETI)	Renewable Energy Country Attractiveness Index (RECAI)	Climate Change Performance Index (CCPI)
Publishing Agency	World Energy Council	World Economic Forum (WEF)	Ernst & Young (EY)	German watch eV.
What it measures	Measures energy system performance in terms of Energy Security, Energy Equity, Environmental Sustainability in Country context	Checks nation's energy system information	Ranks performance of economies based on the investment made in the renewable energy sector - energy supply, renewable technologies, & ease of doing business	Measures country's progress towards the NIDC 2030 targets and compares climate protection performance of countries
India's Rank	75/127(2021)	87/115(2021)	3/40(2021)	3/40(2021)
Best performing countries	Top 3: Sweden, Switzerland, Denmark	Top 3: Sweden, Norway, Denmark	Top 2: USA & Mainland China	Top 6: Denmark (4 <sup>th</sup> ), Sweden (5 <sup>th</sup> ), Norway (6 <sup>th</sup> )

- **Smaller States:** Goa, Tripura, and Manipur.
- **UTs:** Chandigarh, Delhi, and Daman & Diu/Dadra & Nagar Haveli.

### 4.7.3. OTHER ENERGY EFFICIENCY INITIATIVES

Initiative	Details
Promoting energy efficiency and renewable energy in selected MSME clusters in India project	<ul style="list-style-type: none"> <li>• Project's success was showcased in National Conclave which was organised by Bureau of Energy Efficiency (BEE).</li> <li>• Project was initiated in 2011 and <b>executed by United Nations Industrial Development Organization (UNIDO) in collaboration with BEE.</b> <ul style="list-style-type: none"> <li>○ Funded by <b>Global Environment Facility (GEF)</b>.</li> <li>○ Aims to <b>develop market environment for introducing energy efficiency</b> and enhance use of renewable energy in selected energy-intensive MSME sector.</li> </ul> </li> <li>• Has been <b>supported by Ministry of Micro, Small, and Medium Enterprises and Ministry of New and Renewable Energy</b>.</li> </ul>
Saksham 2022	<ul style="list-style-type: none"> <li>• Saksham 2022 was launched recently.</li> <li>• <b>An annual one-month long people centric fuel conservation campaign of the Petroleum Conservation Research Association (PCRA).</b> <ul style="list-style-type: none"> <li>○ PCRA is a registered society set up under the aegis of <b>Ministry of Petroleum &amp; Natural Gas</b>.</li> <li>○ It helps the government in <b>proposing policies and strategies for petroleum conservation</b>, aimed at reducing excessive dependence of the country on oil requirement.</li> <li>○ Aim: To spread the message of fuel conservation and greener environment across India.</li> </ul> </li> </ul>

## 4.8. SUSTAINABLE AGRICULTURE

### 4.8.1. NATIONAL MISSION ON NATURAL FARMING

#### Why in news?

Recently, the Government launched a portal on National Mission on Natural Farming (NMNF) for the benefit of the farming community.

#### More about news

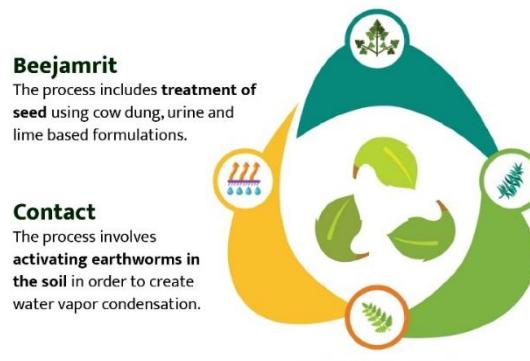
- The portal has been developed by the Union Ministry of Agriculture and Farmers Welfare.
- It contains all the information about the mission, implementation outline, resources, implementation progress, farmer registration, which will help in promoting natural farming in the country.
- Presently, more than 10 lakh ha. area is covered under natural farming in India.

#### About Natural farming

- An **ecological farming approach** where farming system works with the natural biodiversity, encouraging the soil's biological activity and managing the complexity of living organisms to thrive along with food production system.
- **Chemical-free farming and livestock based.**



#### COMPONENTS OF NATURAL FARMING



**Jivamrit**  
The process enhances the fertility of soil using cow urine, dung, flour of pulses and jaggery concoction.

**Mulching**  
The process involves creating micro climate using different mulches with trees, crop biomass to conserve soil moisture.

#### Benefits of natural farming



## About National Mission on Natural Farming

- In India, Natural farming is promoted as **Bharatiya Prakritik Krishi Paddhati Programme (BPKP)** and is a sub-mission under centrally sponsored scheme- Paramparagat Krishi Vikas Yojana (PKVY).
  - PKVY falls within the umbrella of the National Mission on Sustainable Agriculture (NMSA).
- BPKP is being up-scaled as '**National Mission on Natural Farming (NMNF) / (Bhartiya Prakratik Krishi Paddhati)**' for implementation all across the country.
- Financial outlay: Rs 4645.69 crore**
- Tenure: 6 years (2019-20 to 2024-25).**
- It will be a demand driven programme and states shall prepare a long-term perspective plan with year-wise targets and goals.
- Knowledge partner for natural farming extension: **National Institute of Agricultural Extension Management (MANAGE).**
- National Centre of Organic and Natural Farming (NCONF)** shall work towards development of certification programme for Natural Farming, establish secretariat for certification management, portal development, management, maintenance and integration with other portals.

## OBJECTIVES OF THE MISSION



### SIMILARITY BETWEEN ORGANIC FARMING AND NATURAL FARMING

- Both are non-chemical system of farming.
- Both are based on diversity, on-farm biomass management and biological nutrient recycling.
- Diversity, rotation multiple cropping and resource recycling is key.

### Differences between Organic Farming and Natural Farming

Organic Farming	Natural Farming
Open for use of off-farm organic and biological inputs	No external inputs, only on-farm inputs based on Desi Cow (Jeevamrit, Beejamrit, Ghanajeevamrit)
Open for micronutrient correction through use of minerals	Use of compost/vermicompost and minerals are not allowed
Plowing, tilling, mixing manure, weeding, and other fundamental agro activities are still required.	There is no plowing, no soil tilling, no fertilizers, and no weeding.
Widely popular, Global market at 132 billion US\$	Evolving markets are yet to be developed

## 4.8.2. INTERNATIONAL YEAR OF MILLETS (IYM) 2023

### Why in news?

Recently, the Food and Agriculture Organization (FAO) of the United Nations, organized an opening ceremony for the International Year of Millets – 2023 (IYM2023) in Rome, Italy.

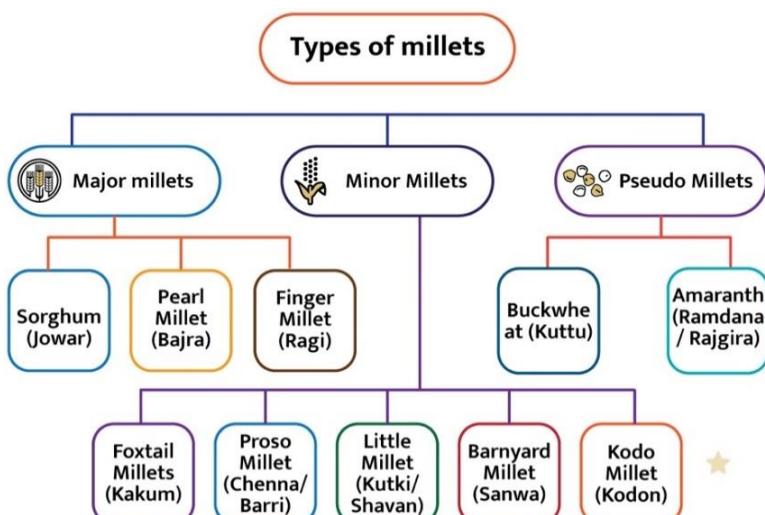
### About millets

- A diverse family of **small-grained cereals** (Poaceae family), **indigenous to various parts of India.**

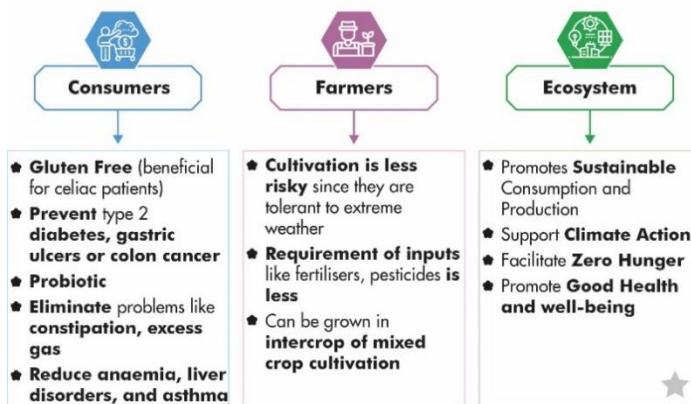
### About International Year of Millets (IYM) 2023

- The United Nations 2021 has adopted India's proposal to declare 2023 as the IYM.
- The IYM 2023 will raise awareness about the **importance of millets in food security and nutrition.**
- The IYM 2023 will provide an opportunity to:
  - increase global production,
  - efficient processing and better use of crop rotation,
  - promote millets as a major component of the food basket,
  - promote research and development on millet.

- Popularly known as **Nutri-cereals** as they provide most of the nutrients required for normal functioning of the human body.
- Contain **7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre**.
- **Before the Green Revolution**, millets were **one of the largest grown staples in India**, but have been reduced to a **marginal fodder crop to feed livestock**.
  - India produces **20% of the globe's production** that is led by Africa and the Americas.
  - India exports millets products worth of **USD 34.32 million during 2021-22**.
- Top 5 millet-producing states in India - **Madhya Pradesh, Gujarat, Karnataka, Rajasthan, and Maharashtra**.
- **Initiative to promote millet**
  - **National year of millets** was observed in 2018
  - **Increase in Minimum Support Price (MSP)** to support millet cultivators.
  - **Saksham Anganwadi and Poshan 2.0** mandates supply of millets at least once a week in midday meal scheme.



## Benefits of millets



### 4.8.3. DIRECT-SEEDED RICE (DSR)

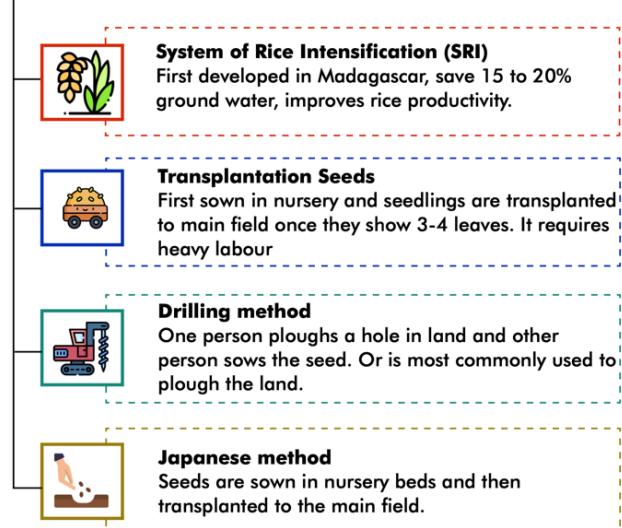
#### Why in news?

Farmers have rejected the direct-seeded rice (DSR) technique for transplanting paddy in Punjab.

#### About direct-seeded rice (DSR)

- DSR refers to the **process of establishing a rice crop from seeds sown in the field** rather than by transplanting seedlings from the nursery.
  - It is a **water-saving method of sowing paddy**.
  - DSR is also known as **broadcasting seed technique**.

#### OTHER METHODS OF RICE CULTIVATION



Advantages of DSR	Issues with DSR
<ul style="list-style-type: none"> <li>• <b>Saves labour.</b></li> <li>• Sowing can be done in stipulated time frame because of easier and faster planting.</li> <li>• <b>Early crop maturity by 7-10 days</b> which allows timely planting of subsequent crops.</li> <li>• <b>More efficient water use</b> and higher water stress tolerance.</li> <li>• Less methane emission.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Uses more seed</b> than transplanting.</li> <li>• <b>Laser land levelling</b> costs Rs 1,000/acre is compulsory in DSR. This is not so in transplanting.</li> <li>• Some direct-sown crops may be harder to get started in cold (or hot) conditions.</li> <li>• Non-availability of the herbicides.</li> <li>• <b>Seed requirement for DSR is higher</b>, at 8-10 kg/acre, compared to 4-5 kg in transplanting.</li> </ul>

## 4.9. MISCELLANEOUS

### 4.9.1. RIGHT TO REPAIR

#### Why in news?

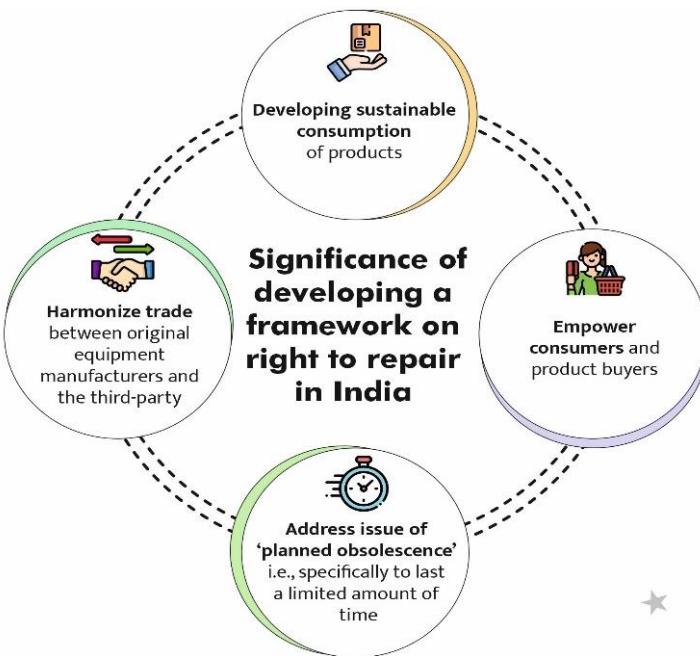
Department of Consumer Affairs (DCA) recently set up committee on the Right to Repair to emphasize on the LiFE (Lifestyle for the Environment) movement through sustainable consumption.

#### More on the news

Key sectors identified for this framework include Farming Equipment, Mobile Phones/ Tablets, Consumer Durables and Automobiles & Automobile Equipment.

#### About Right to repair movement

- Calls for manufacturers to make authentic parts available to consumers so that they can get their device repaired from independent shops as well, if they so desire.
  - Recognised in many countries including the US, UK and European Union.
- Concern associated with right to repair: Large tech companies including Apple, Tesla, etc. argued that it'll open their intellectual property to third party repair services or amateur repairers could jeopardise safety and security of their devices.



#### Related news: 'Right to Repair' Portal

- Ministry of Consumer Affairs, Food and Public Distribution unveiled 'right to repair' portal on occasion of National Consumer Day (December 24).
- On the portal, manufacturers would share manual of product details with customers so that they could either repair by self, by third parties, rather than depend on original manufacturers.
  - Initially, mobile phones, electronics, consumer durables, automobile and farming equipment would be covered.

### 4.9.2. SCOPE OF AUTHORITY UNDER DAM SAFETY ACT 2021

#### Why in news?

Supreme Court asked the Centre to specify the plan as regards making functional the National Dam Safety Authority (NDSA) and the other bodies under the Dam Safety Act 2021.

#### More on the news

During the hearing, SC cited that the Dam Safety Act of 2021 is a panacea to end the "perennial" legal battle between Tamil Nadu and Kerala over the Mullaperiyar dam.

#### About the Dam Safety Act

- A comprehensive act postulation for surveillance, inspection, operation, and maintenance of dams to prevent disasters.
- Mandates the setting up of 2 specialized bodies to evolve policies, recommend regulations for dam safety standards, and resolve disputes between the States:
  - National Committee on Dam Safety
  - NDSA
- Under the Act, Dam owners will be required to prepare an emergency action plan, and carry out risk assessment studies for each dam at specified regular intervals.



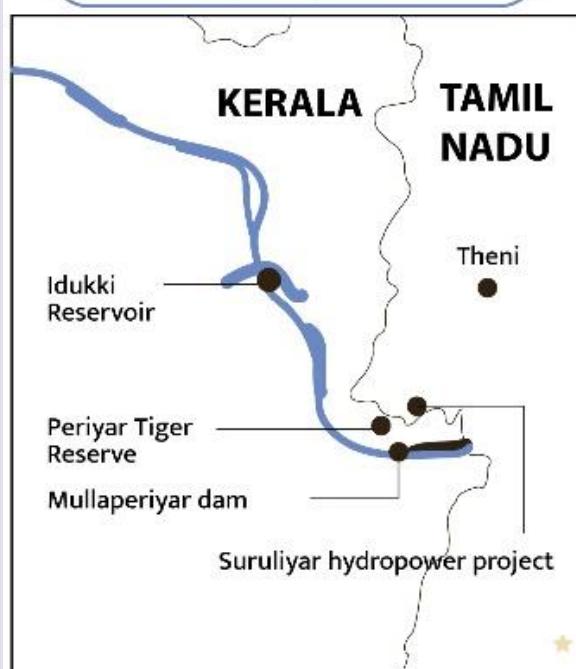
India ranks **third**, after **US and China**, in the number of **large dams** (5,334).

**Related news**
**Mullaperiyar Dam**

- A 126-year-old dam owned, operated, and maintained by Tamil Nadu Government.
- Located in the upper reaches of the river Periyar, which flows into Kerala after originating in Tamil Nadu. The reservoir is within the Periyar Tiger Reserve.
- Dispute
  - In 1886, the then Maharaja of Travancore signed a 999-year lease agreement with British rule that the operational rights were handed over to Tamil Nadu.
  - Kerala says that the dam structure is weak and can give way at any moment, causing the deaths of thousands in the state, Tamil Nadu claims Mullaperiyar is safe and well-maintained.

**Rule Curve**

- As per Tamil Nadu Water Resources Organisation, Mullaperiyar is first reservoir to have Rule Curve implemented in country.
- Rule Curve is a tabulation which specifies quantum of storage of water or empty space to be maintained in a reservoir during different times of year, based on the rainfall data for 35 years.
  - Under Rule Curve method, water is not allowed to be stored to permissible maximum level at the time when reservoir receives huge inflows.
  - It is part of core safety mechanism in a dam.

**Mullaperiyar Dam**

**4.9.2.1. HYDROELECTRIC PROJECTS IN NEWS**

Project	Details
Kwar Hydroelectric Project	<ul style="list-style-type: none"> <li>• Location: Kishtwar district of Jammu and Kashmir.</li> <li>• River: River Chenab.</li> <li>• Other Details: Other projects (running or under-construction) initiated to harness potential of Chenab basin: Baglihar HE Power project; Dulhasti Power Station; Salal Power Station; PakalDul HE Project; Kiru HE Project; Kirthai-II HE Project.</li> </ul>
Upper Siang multi-purpose storage project	<ul style="list-style-type: none"> <li>• Location: Yingkiong in Arunachal Pradesh.</li> <li>• River: Brahmaputra.</li> <li>• Other Details: NHPC has been tasked with building the 10 GW Storage project that is central to counter China's water diversion scheme of Siang river that feeds downstream into the Brahmaputra.</li> </ul>
Dibang hydel project (DHP)	<ul style="list-style-type: none"> <li>• Location: Lower Dibang Valley district in Arunachal Pradesh</li> <li>• River: Dibang, with dam site located upstream of the confluence of Ashu Pani and Dibang rivers.</li> <li>• Other Details: The DHP has been designed as the world's tallest concrete gravity dam at 278 metres above sea level.</li> </ul>
Etalin Hydroelectric Project (HEP)	<ul style="list-style-type: none"> <li>• Location: Dibang Valley in Arunachal Pradesh           <ul style="list-style-type: none"> <li>○ Dibang Valley is situated in the Eastern Himalayan Global Biodiversity Hotspot and home to unique and endemic species of flora and fauna such as Tigers, Clouded Leopard, Asiatic Golden Cat, Red Panda etc.</li> </ul> </li> <li>• River: Dibang river (tributary of Brahmaputra river).</li> <li>• Other Details:           <ul style="list-style-type: none"> <li>○ Proposed in 2008, expected to produce 3097MV of electricity.</li> <li>○ Envisages construction of two dam on Dir River and Tangon river (tributaries of Dibang).</li> <li>○ Anonpani small HEP and Athunli HEP are other HEP on the Tangon River.</li> </ul> </li> </ul>

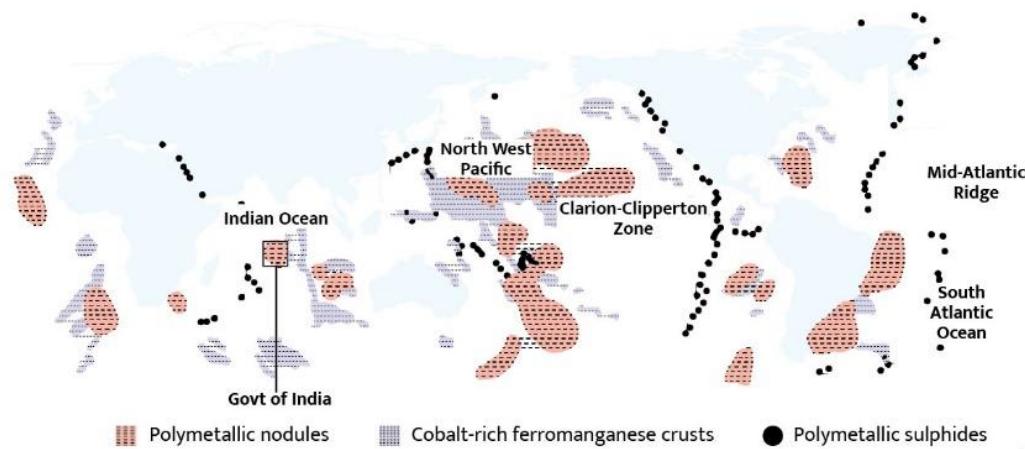
### 4.9.3. DEEP SEA MINING

#### Why in news?

Experts during the 27th session of the **International Seabed Authority (ISA)** meeting highlighted that deep sea mining can lead to **loss of species and ecosystem** (or fragmentation) of Deep-Sea Habitat.

#### About Deep-Sea Mining

- Involves extracting ores rich in cobalt, manganese, zinc and other rare metals from the sea floor of the deep ocean.
- India has a **Deep-Sea mission for mining** Central Indian Ocean Basin, access for which was granted by ISA.
- 54% of the world's ocean seafloor is beyond national jurisdiction and their mineral resources are designated as the **common heritage of all mankind**.
- Deep-sea contains a number of **critical minerals** needed for batteries, smartphones, laptops and renewable energy capacity; found in **three main resource types-**



○ **Polymetallic Nodules**, i.e. the precipitated iron oxyhydroxides and manganese oxides on abyssal plain sediments at about 3,500–6,000 m water depths.

○ **Seafloor Massive Sulphides** or Polymetallic Sulphides formed along tectonic plate boundaries and volcanic provinces in water depths from <500 to 5000m.

○ **Cobalt-rich Ferromanganese Crusts** on rock outcrops on seamounts and ridges at water depths of 400–7,000 m.

International Seabed Authority (ISA)

**Genesis:** An autonomous international organisation which came into existence in 1994 when United Nations Convention on the Law of the Sea (UNCLOS), 1982 came into force.

**Objective:** To ensure the effective protection of the marine environment from harmful effects that may arise from deep-seabed related activities.

**Membership:** 168 members, including 167 member States and the European Union

**Member**

**Other key information:** UNCLOS also established 2 other bodies namely, International Tribunal for the Law of the Sea (ITLOS) and Commission on the Limits of the Continental Shelf (CLCS).

### 4.9.4. RIVER PROJECTS

<b>Kalasa-Banduri project</b>	<ul style="list-style-type: none"> <li>Centre has given approval for implementation of <b>Kalasa-Banduri canal construction project</b>.</li> <li>Proposes to divert water from two tributaries of the <b>Mahadai river</b> (also known as Mandovi): Kalasa and Banduri to the <b>Malaprabha river</b> (Tributary of Krishna River).           <ul style="list-style-type: none"> <li>Entire project aims to construct several dams on the river <b>Mandovi</b>.</li> <li>Aimed at facilitating drinking water for towns in drought-hit northern Karnataka.</li> </ul> </li> </ul>
<b>Eastern Rajasthan Canal Project (ERCP)</b>	<ul style="list-style-type: none"> <li>At 20<sup>th</sup> meeting, <b>Special Committee for Interlinking of Rivers (SCILR)</b> approved proposal of considering the modified Parbati-Kalisindh-Chambal (PKC) link project integrated with Eastern Rajasthan Canal Project (ERCP) as a part of national perspective plan.</li> </ul>

	<ul style="list-style-type: none"> <li>○ A SCILR was <b>constituted in September, 2014</b> for the <b>implementation of Interlinking of Rivers (ILR)</b> programme in a consultative manner.</li> <li>● ERCP envisages <b>intra-basin transfer</b> of water within the <b>Chambal Basin</b>.</li> <li>● ERCP will create a network of water channels which will cover 23.67 % area of Rajasthan along with 41.13 % population of the state.</li> </ul>
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## 4.10. REPORTS AND INDICES

Reports	Details
Fostering Effective Energy Transition  	<ul style="list-style-type: none"> <li>● <b>Released by:</b> World Economic Forum (WEF)</li> <li>● Report uses '<b>Energy Transition Index</b>' to benchmark countries' energy transition progress annually on the <b>three dimensions of energy triangle</b> and the <b>enabling dimensions for transition</b> (see image).</li> <li>○ Energy transition refers to <b>shift from fossil-based systems</b> of energy production and consumption to <b>renewable energy sources</b> like wind and solar.</li> </ul> <div style="text-align: center;"> <p>The Energy Transition Index Framework</p> <p><b>System performance imperatives</b></p> <p>Security and access      Environmental sustainability</p> <p><b>Energy triangle</b></p> <p>Economic development and growth</p> <p><b>Transition readiness: Enabling dimensions</b></p> <p>Capital and investment</p> <p>Energy system structure      Regulation and political commitment</p> <p>Human capital and consumer participation      Institutions and governance</p> <p>Infrastructure and innovative business environment</p> <p><b>Enabling dimensions</b></p> </div>
Environment Performance Index (EPI)  	<ul style="list-style-type: none"> <li>● <b>Released by:</b> World Economic Forum (WEF) in collaboration with Yale Center for Environmental Law and Policy and Columbia University Center for International Earth Science Information Network</li> <li>● A <b>biennial index, started in 2002 as Environmental Sustainability Index</b>.</li> <li>● Ranks <b>180 countries</b> on climate change performance, environmental health, and ecosystem vitality.</li> <li>● <b>India ranked at 180<sup>th</sup>with a score of 18.9</b> in EPI 2022.</li> </ul>
Renewables 2022 Global Status Report  	<ul style="list-style-type: none"> <li>● <b>Released by:</b> REN21 <ul style="list-style-type: none"> <li>○ REN21 is the <b>only global community of actors from science, governments, NGOs and industry</b> working collectively to drive the rapid uptake of renewables.</li> <li>○ It was <b>created in 2004 as an outcome of the Bonn 2004 International Conference</b> on Renewable Energy.</li> </ul> </li> <li>● <b>India specific findings:</b> <ul style="list-style-type: none"> <li>○ <b>India added around 15.4 GW of renewable power capacity</b> in 2021, third highest after China (136 GW) and the US (43 GW).</li> <li>○ <b>India is now the third-largest market in the world for new solar PV capacity</b> and <b>ranked fourth in the world for total solar energy installations (60.4 GW)</b> following China (305.9 GW).</li> <li>○ India ranked <b>2<sup>nd</sup>in new Solar Water Heating Capacity addition, 3<sup>rd</sup> in Hydropower capacity addition and 5<sup>th</sup> in Ethanol production addition in 2021.</b></li> </ul> </li> </ul>
Renewable Capacity Statistics 2022  	<ul style="list-style-type: none"> <li>● <b>Released by:</b> International Renewable Energy Agency (IRENA) <ul style="list-style-type: none"> <li>○ IRENA is an <b>intergovernmental organisation</b> that <b>supports countries in their transition to a sustainable energy</b>, and serves as the principal platform for international cooperation.</li> </ul> </li> <li>● India's total renewable capacity has marked an increase of 9% over the last year.</li> </ul>
Renewable Power Generation Costs in 2021  	<ul style="list-style-type: none"> <li>● <b>Released by:</b> IRENA</li> <li>● It highlighted <b>increased competitiveness of Renewable Energy (RE)</b> on account of: <ul style="list-style-type: none"> <li>○ <b>Increasing fossil fuel costs,</b></li> <li>○ <b>Technology improvements-</b> increasing efficiency and scale of RE (e.g. Photo Voltaic modules),</li> <li>○ <b>Decline in RE cost etc.</b></li> </ul> </li> </ul>

**Renewable Energy (RE) and Jobs Annual Review 2022**



- Released by: IRENA and the International Labour Organization
- The report provides the latest estimates of renewable energy employment globally.
- India related findings**
  - Reaching India's goal of 500 GW of non-fossil-fuel energy sources by 2030 could create 3.4 million new job opportunities.
  - India accounted for about 18% of global hydropower employment, followed by Brazil.

**Estimated Number of direct and indirect jobs in renewable energy, by industry, 2020-202 (thousand jobs)**

			India
Solar PV	217		
Liquid biofuels	35		
Hydropower	414		
Wind power	35		
Solar heating and cooling	19		
Solid biomass	58		
Biogas	85		
Geothermal energy			
CSP			
Total	863		

**Renewable Energy (RE) Report 2022**



- Released by: International Energy Association (IEA).
- Key findings of report**
  - RE will comprise 90 percent of global electricity capacity expansion in next five years and much of it will be in India.
  - With addition of 145 GW, India is forecast to almost double its renewable power capacity over 2022-2027.
  - Solar photovoltaic accounts for three-quarters of this growth, followed by onshore wind (15 percent) and hydropower providing rest of it.

**World Energy Employment Report 2022**



- Released by: International Energy Agency (IEA)
- It provides a comprehensive inventory of the global energy workforce.
- Key findings**
  - Energy sector employed over 65 million people in 2019, equivalent to around 2% of global formal employment.
  - Clean energy employs over 50% of total energy workers, owing to the substantial growth of new projects coming online.
  - Over half of energy employment is in the Asia Pacific region.
  - Construction of new projects, including the manufacture of their components, is the largest driver of energy employment.

**World Energy Outlook 2022**



- Released by: International Energy Agency (IEA) (Annual report).
- Key findings:**
  - World is in the midst of the first global energy crisis, triggered by Russia's invasion of Ukraine.
  - India is likely to see world's biggest rise in energy demand this decade, with demand climbing 3 per cent annually.
- Outlook projects continued expansion in coal generation (in absolute terms) in India, peaking around 2030.

**Global Wind Report 2022**



- Released by: Global Wind Energy Council
- Report examines the challenges of scaling up wind energy in an increasingly interconnected world, like supply chain geopolitics, social impacts, disinformation, cybersecurity and cryptocurrencies.
- Global Wind Energy Council is the international trade association for the wind power industry.

**State of India's Environment (SoE) in figures, 2022**



- Released by: Centre for Science and Environment
- Key findings**
  - India recorded 280 heatwave days across 16 states in 2022 — most in decade.
  - Himachal Pradesh (HP), Uttarakhand and Jammu & Kashmir — all in Himalayan regions — have been unusually warm.
  - April was the hottest month for northwest and central India.
- Rajasthan, Madhya Pradesh, Himachal Pradesh, Gujarat and Haryana accounted for 54 percent of heatwaves.

## EnviStats India 2022

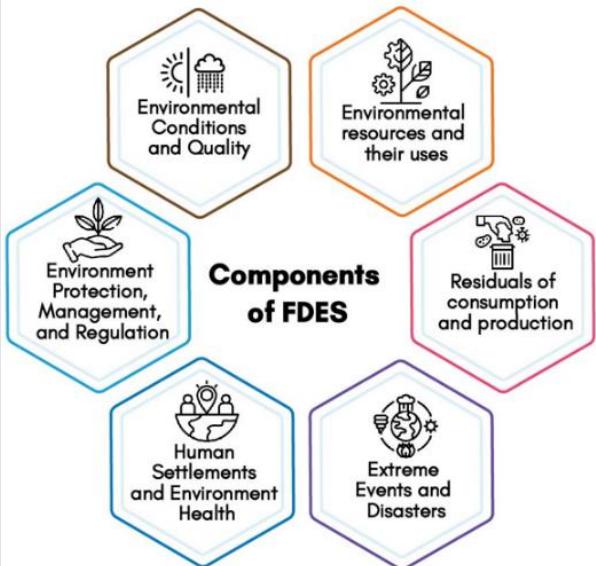


National Statistical Office

- **Released by:** National Statistics Office (NSO).
- EnviStats brings together a large number of statistics bracketed in a **single publication** which is **sourced from the coordination of multiple public institutions**.
- Environment statistics aims at **providing statistical information to improve knowledge of the environment**. It helps
  - to support evidence-based policy and decision-making.
  - to provide information for the general public, as well as for specific user groups.
- The data in EnviStats is **categorized in six sections based on the division in Framework for Development of Environment Statistics (FDES 2013)**.

**Framework for Development of Environment Statistics (FDES 2013)**

- The FDES 2013 is a **multipurpose conceptual and statistical framework** that is comprehensive and integrative in nature.
- FDES is based on a conceptual foundation that considers **people and their demographic, social, and economic activities as integral parts of and interacting with the environment**.



# PERSONALITY DEVELOPMENT PROGRAMME

## CIVIL SERVICES EXAMINATION - 2022

Admission Open

### Programme Features

- ★ DAF Analysis Session with senior faculty members of Vision IAS
- ★ Mock Interview Session with Ex-Bureaucrats/ Educationists
- ★ Interaction with Previous toppers and Serving bureaucrats
- ★ Performance Evaluation and Feedback



# 5. GEOGRAPHY

## 5.1. SEA FLOOR SPREADING

### Why in news?

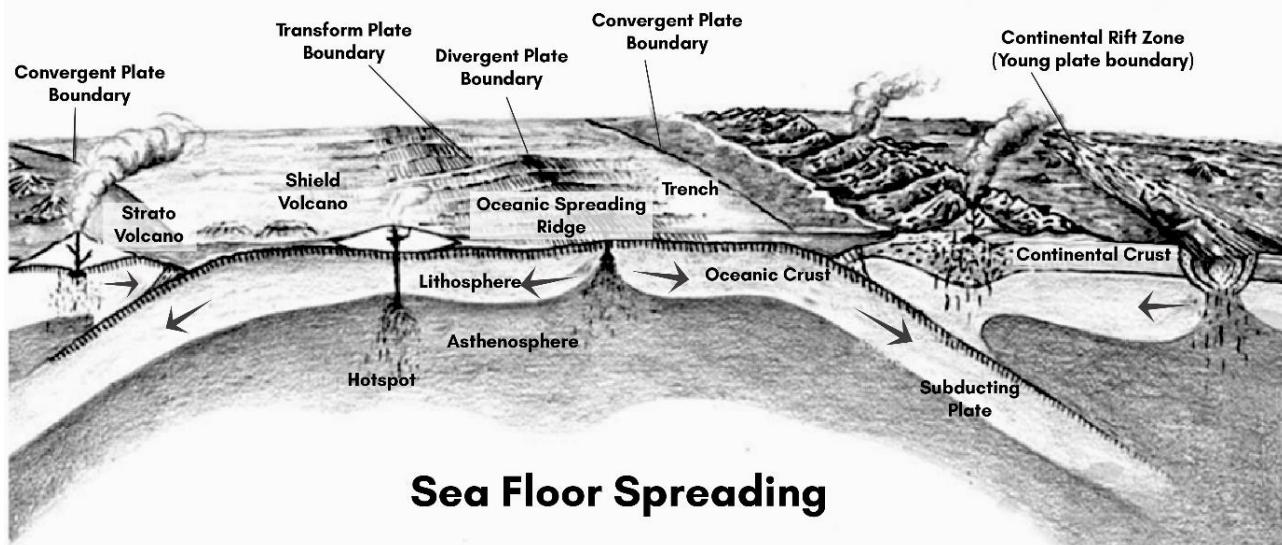
A study pointed that sea floor spreading has slowed by 35% globally.

### More on the news

- Key findings from study**
  - Not all ridges moved alike:** Some sped up while others slowed down.
    - Ridges along the eastern Pacific were 100 millimetres per year slower**, lowering the world's average.
- Reasons identified by the report** include **growing mountains and changes in mantle convection** which transports heat from the earth's interior to the surface.

### About Sea floor spreading

- A geological process that creates crusts**, the outermost shell of Earth.
- Tectonic plates separate, allowing magma from the earth's interior to fill the gap** in this phenomenon. The magma cools to form a new oceanic crust.
- These **activities occur along mid-ocean ridges** - large mountain ranges rising from the ocean floor.



## 5.2. LA NINÃ CONDITIONS ENTER 3RD YEAR, 6TH TIME SINCE 1950

### Why in news?

As per India Meteorological Department (IMD) data, La Niña conditions prevailing over Equatorial Pacific Ocean since September 2020 have entered third year.

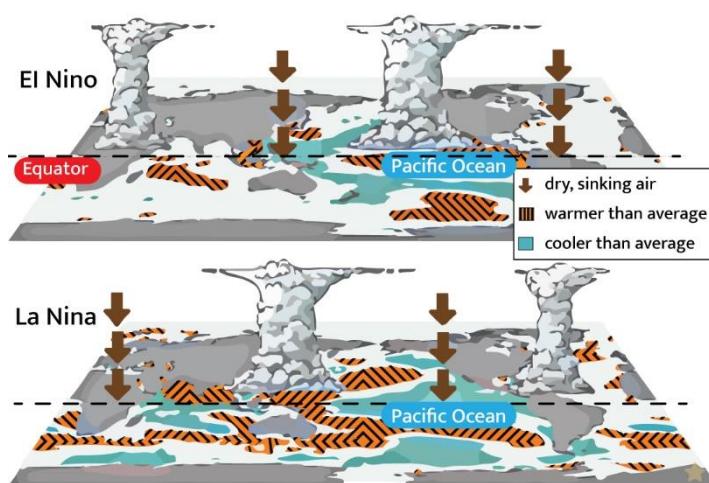
### More on the news

Having started in September 2020, it has prevailed for the last 24 months, and looks set to continue for another six months, and has thus been classified as a 'triple dip' La Niña.

### About La Niña

- La Niña** (known as little girl) is a weather pattern that occurs in Pacific Ocean.

### Difference between El Niño and La Niña



- Observed when sea surface temperatures (SSTs) in Eastern Equatorial Pacific (EEP) get comparatively colder than normal.
  - This results in a strong high pressure over EEP (i.e. tropical west coast of South America).
- A counterpart to El Niño (known as little boy or Christ Child), which is characterized by unusually warm SSTs in EEP and causes suppressed Monsoon.
- Together, La Niña and El Niño are "cold" and "warm" phases of El Niño-Southern Oscillation (ENSO), which involves temperature changes in waters of Eastern and Central Pacific Ocean.
- Generally, El Niño and La Niña occur every 4 -5 years. El Niño is more frequent than La Niña.
- Impact of La Niña
  - Better monsoon rains in India.
  - Frequent and intense hurricanes and cyclones in Atlantic Ocean and Bay of Bengal.
  - Causes drought in Peru and Ecuador, heavy floods in Australia, high temperatures in Western Pacific, Indian Ocean, off Somalian coast.
  - The recent case of rising heat wave events in India were being driven by the La-Nina.
    - ✓ Due to a weak La Niña, this temperature difference was low and so the western disturbances that came to India were weak with hardly any rain driving hot Westerly winds into India.

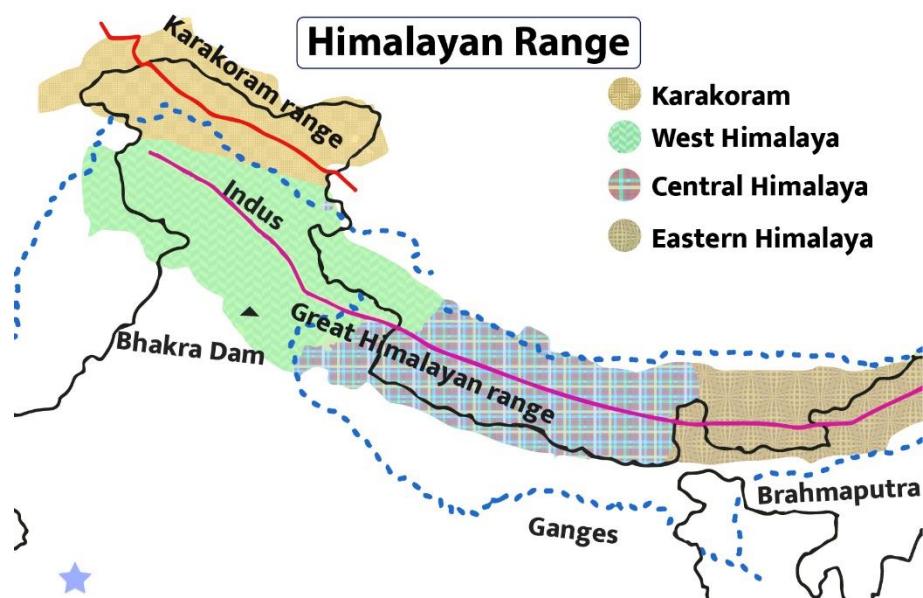
### 5.3. KARAKORAM ANOMALY

#### Why in news?

Scientists solve the case of the Karakoram Anomaly (KA).

#### About Karakoram Anomaly

- Refers to the stability or abnormal growth of glaciers in the central Karakoram, in contrast to the retreat of glaciers in nearby mountainous ranges of the Himalayas and other mountainous ranges of the world.
- A recent study conducted by researchers has postulated new theory to explain the reasons of **glaciers in Karakoram Range are resisting glacial melt due to global warming**.
  - While previous studies highlighted role of temperature in establishing and sustaining anomaly, it is for the first-time highlighted impact of precipitation in feeding the anomaly.
- Reasons of KA
  - Revival of western disturbances (WDs) has been instrumental in triggering and sustaining KA.
  - Contribution of WDs in terms of snowfall volume over core glacier regions of Karakoram have increased by about 27% in recent decades, while precipitation received from non-WD sources have significantly decreased by around 17%.
  - Winter precipitation associated with WDs over Karakoram–Himalayas as one of key drivers behind its emergence.
- Hindu Kush Himalayan (HKH) region is a critically important natural global asset that extent up to 3500 km over 8 countries i.e., Afghanistan in the west to Myanmar in the east and crossing Pakistan, India, China, Nepal, Bhutan, and Bangladesh.



## 6. DISASTER MANAGEMENT

### 6.1. JOSHIMATH LAND SUBSIDENCE

#### Why in news?

Joshimath has been declared as a landslide and subsidence-hit zone.

#### About Land subsidence

- Gradual settling or sudden sinking** of Earth's surface due to **removal or displacement of subsurface earth materials**.
- Land subsidence vs. Landslides:** Land subsidence refers to the gradual sinking of the ground surface while Landslides are sudden and rapid movements of soil and rock downhill.



#### Importance of Joshimath in Uttarakhand



**Gateway to famous pilgrimage** sites like Badrinath, Hemkund Sahib and the international **skiing destination Auli**.



**Hosts one of the four cardinal maths** established by Adi Shankaracharya, the other three being at Dwarka, Puri, and Shringri.

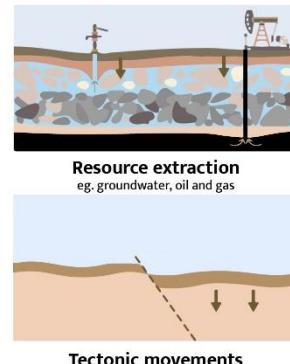


**Strategically important** to Indian armed forces and is home to one of the **Army's most important cantonments**.

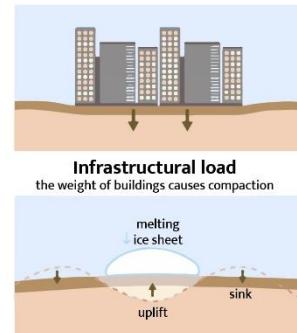
#### WHAT CAUSES LAND SUBSIDENCE?

#### Factors that make Joshimath highly vulnerable to sinking

- Situated in middle slopes** of a hill.
- Area around town covered with **thick layer of overburden material**.
- Perennial streams-** Karmanasa and Dhaknala streams on west and east and Dhauliganga and Alaknanda rivers on south and north.
- Snow in upper reaches, and highly weathered rocks** with low cohesive characteristics.
- Tectonic activity** due to location on a **fault line (Vaikrita Thrust)** and near **Main Central Thrust and Pandukeshwar Thrust**.
- City built on an ancient landslide material** i.e. rests on a deposit of sand and stone, not rock, which doesn't have high load-bearing capacity.
- Unplanned construction and improper water drainage** without due regard to bearing capacity.



Tectonic movements  
eg. earthquakes



Melting ice sheets  
the ground around the melting ice sheet shifts

#### Related information: Mahesh Chandra Mishra committee (1976)

- The government appointed MC Mishra committee for **reconnaissance of the land subsidence near the Himalayan border**.
- Findings of the report:** Joshimath was situated on an old landslide zone, and it does not have high load bearing capacity.
  - Joshimath could sink if development **continued unabated**.
- Recommendation**
  - Restrictions on heavy construction work**, agriculture on slopes, felling of trees.
  - Construction of pucca drainage** to stop seepage of rainwater, proper sewage system, and cement blocks on riverbanks to prevent erosion.

### 6.2. CYCLONE ASANI

#### Why in news?

As per Indian Meteorological Department (IMD), Cyclone Asani, which developed over southeast regions of Bay of Bengal, had intensified into a 'severe cyclone' storm.

#### About Asani

- Asani was the **first cyclonic storm in North Indian Ocean region in 2022**.
- Named by Sri Lanka**, meaning "wrath" in Sinhalese.
- Cyclone that form after Asani will be called Sitrang, name given by Thailand.
- Ghurni, Probaho, Jhar and Murasu are **upcoming names from India**.

## About Tropical cyclones

- **Violent storms that originate over warm ocean waters near the equator.**
- **Favourable conditions** for their formation are-
  - Large sea surface with **temperature higher than 27° C.**
  - Presence of **the Coriolis force.**
  - Small variations in the vertical wind speed.
  - A **pre-existing weak low-pressure area** or low-level-cyclonic circulation.
  - **Upper divergence** above the sea level system.
- **Naming of cyclone**
  - **Six Regional Specialised Meteorological Centres (RSMCs)**, including IMD, and **five regional Tropical Cyclone Warning Centres** are mandated for issuing **advisories and naming of cyclonic storms.**
  - **Naming of cyclones in Bay of Bengal and Arabian Sea started in September 2004.**

## CLASSIFICATION OF CYCLONES

Types of Disturbances	Wind Speed in Km/h
	Low Pressure
	Less than 31
	31-49
	49-61
	61-88
	88-117
	More than 221



### Related news:

#### Fujiwhara Effect

- Recently two cyclones, namely **Hinnamnor** and **Gardo** interacted showcasing Fujiwhara Effect.
- Fujiwhara effect is **any interaction between tropical storms** with the following features:
  - **Storms are formed around same time in same ocean region.**
  - **Their centres or eyes are at a distance of less than 1,400 km.**
  - **Intensity that could vary between a depression** (wind speed under 63 km per hour) and a **super typhoon** (wind speed over 209 km per hour).
- **Outcome of Fujiwhara effect**
  - **Changes in track and intensity** of either or both systems.
  - In rare cases, two systems **could merge to form a bigger storm.**

#### Dvorak Technique

- US meteorologist **Vernon Dvorak**, credited for **developing Dvorak technique** (read as Do-rak), passed away.
- It is a **statistical method for estimating intensity of tropical cyclones (TCs)** based on cloud patterns on satellite imagery.
  - **Uses enhanced Infrared and/or visible satellite imagery** to quantitatively estimate intensity of a tropical system.
  - **Quantifies TCs intensity** on a **1-8 scale** (at **0.5 intervals**) called **T-numbers** and final output is **Current Intensity (CI) number.**

#### Bomb Cyclone

- Also known as an explosive cyclogenesis, is a **meteorological phenomenon** that occurs-
  - When a **low-pressure system** experiences a **rapid and drastic drop in atmospheric pressure.**
  - When this rapid pressure drop is **accompanied by strong winds** and can lead to severe weather, including heavy snowfall, strong winds, and thunderstorms.
- **Typically associated with the winter months**, but they can also occur during other seasons.
- **Most common in the mid-latitudes**, such as the eastern United States, Europe, and Asia

#### Cyclone Mandous

- Tamil Nadu and Southern part of Andhra Pradesh were affected due to **cyclone Mandous** (named by UAE) expected to make landfall.

## 6.3. COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI)

### Why in news?

India signed 'Headquarter Agreement' with CDRI, thereby according the status of an 'independent and international legal entity' to CDRI.

#### About International legal personality

- Refers to entities endowed with rights and obligations under public international law. This **includes states, international organizations, NGOs etc.**
- It will allow CDRI to
  - **Deputing experts and also bringing in experts from member countries** to India.
  - **Deploying funds globally and receiving contributions** from member countries.
  - Making available **technical expertise** to assist countries to develop resilient infrastructure.
  - **Leveraging international engagement** to foster disaster resilient infrastructure at home.

### About Headquarters Agreement (HQA)

- An agreement between an international organisation and host state to determine the privileges and immunities necessary for its good functioning.
- Enables CDRI to pursue functions internationally with all rights, immunities, and privileges, as per Section-3 of United Nations (Privileges & Immunities) Act, 1947.
  - India enacted UN (Privileges & Immunities) Act, 1947 to give effect to Convention on Privileges and Immunities of United Nations, adopted by UN General Assembly in 1946.
  - Article 104 and 105 of the UN Charter allows UN to enjoy in the territory of each of its Members with such legal capacity, privileges and immunities which are necessary for the exercise of its functions and the fulfillment of its purposes.



### COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI)



New Delhi



**Genesis:** A global partnership of national governments, UN agencies and programmes, private sector, and academic and research institutions, launched in 2019 by Indian Prime Minister at UN Climate Action Summit (New York).



**Objective:** To promote resilience of infrastructure systems to climate and disaster risks, thereby ensuring sustainable development.



**Membership:** Currently, it has 31 Countries, 6 International Organisations and 2 private sector organisations as members.



**Other Key Information:**  
It'll work at intersection of Sendai Framework for Disaster Risk Reduction and Paris Climate Agreement.



#### Related news: PM addresses 4th Edition of the International Conference on Disaster Resilient Infrastructure (ICDRI)

- Coalition for Disaster Resilient Infrastructure (CDRI) in partnership with United States Agency for International Development (USAID) has organized the ICDRI 2022.
- ICDRI is an annual international conference of CDRI in partnership with member countries, organizations and institutions to strengthen the global discourse on disaster and climate resilient infrastructure, with an emphasis on human-centered approaches.

## 6.4. GLOBAL PLATFORM FOR DISASTER RISK REDUCTION 2022 (GP2022)

### Why in news?

Recently, the seventh session of the GP2022 was organized by the UN Office for Disaster Risk Reduction (UNDRR) in Bali, Indonesia.

### About GP2022

- Main global forum to assess and discuss progress on the implementation of the Sendai Framework for Disaster Risk Reduction.
- Key takeaways of GP2022 outcomes as summarised in the Bali Agenda for Resilience:
  - Need for a whole-of-society approach to disaster risk reduction (DRR), ensuring no one is left behind.
  - DRR must be at the core of development and finance policies, legislation and plans to achieve the 2030 Agenda for Sustainable Development.
  - A participatory and human rights-based approach in DRR planning and implementation is crucial as people are affected differently by disasters.
  - DRR and climate change adaptation have the common objective of reducing vulnerability and enhancing capacity as well as resilience.

#### About UNDRR:

- United Nations system's focal point for disaster risk reduction and the custodian of the Sendai Framework, supporting countries and societies in its implementation, monitoring and review of progress.
- Sendai Framework for Disaster Risk Reduction
  - It was the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster.

## 6.5. OTHER DISASTER RELATED NEWS

Earthquake observatory	<ul style="list-style-type: none"> <li><b>Ministry of Earth Science</b> inaugurated a seismological observatory at Udhampur in Jammu and Kashmir.           <ul style="list-style-type: none"> <li>Udhampur is <b>India's 153rd Seismic Station</b>.</li> </ul> </li> <li>Udhampur district lies between the <b>two major seismogenic faults</b>, namely <b>Main Frontal Thrust (MFT)</b> and <b>Main Boundary Thrust (MBT)</b>, which are among the potential factors for generating earthquakes in the J&amp;K region.</li> <li>Udhampur will <b>record the data related to the inner activities of the earth's crust and will provide data to various seismological stations across the globe</b>.</li> </ul>
Derecho	<ul style="list-style-type: none"> <li>Several states in U.S. were hit by a <b>storm system derecho that turned skies green</b>.           <ul style="list-style-type: none"> <li>Green color is due to <b>light interacting with huge amount of water</b> held by such systems.</li> </ul> </li> <li>A derecho is a <b>widespread, long-lived, straight-line windstorm</b> that is associated with a band of <b>rapidly moving showers or thunderstorms</b>.           <ul style="list-style-type: none"> <li>In straight-line storms <b>thunderstorm winds have no rotation</b> unlike a tornado.</li> <li>For a storm to be classified as a derecho it must have wind gusts of at least 93 km per hour.</li> </ul> </li> <li>Being a warm-weather phenomenon, a <b>derecho generally occurs during summertime</b>.</li> </ul>
Avalanche Monitoring Radar (AMR)	<ul style="list-style-type: none"> <li>An AMR the <b>first of its kind in India</b>, has been installed in <b>North Sikkim</b>.</li> <li>It has the capability to <b>detect avalanches</b> (mass of snow, rock, etc, that flows down a mountain) <b>within three seconds of its trigger</b>.</li> <li>It was made operational by the Army and <b>Defence Geoinformatics and Research Establishment (DGRE)</b>, a laboratory under the Defence Research Development Organisation (DRDO).</li> <li>DGRE is involved in <b>forecasting and mitigation of avalanche hazards</b> faced by the Army in the Himalayan region.</li> </ul>
South Asia Drought Monitoring System (SADMS)	<ul style="list-style-type: none"> <li>SADMS was developed by <b>International Water Management Institute (IWMI)</b> and <b>Indian Council of Agricultural Research (ICAR)</b>.</li> <li>SADMS aims to <b>address existing and potential challenges to drought management</b> and <b>provide a framework for proactive drought mitigation measures</b> across nations in South Asia.</li> <li>It <b>monitors drought conditions</b>.</li> <li>It provides agriculture and water resources authorities with all information needed to forecast, monitor and manage drought on weekly basis.</li> <li>It has been <b>tested in India, Pakistan, Bangladesh, Sri Lanka, Nepal, Maldives, Afghanistan and Bhutan</b>.</li> </ul>
Damini App	<ul style="list-style-type: none"> <li>Recently Home Minister stressed on <b>making Damini app available in all local languages</b>.</li> <li>App is <b>monitoring all lightning activity</b> which are happening over India and <b>alert the person if lightning is happening near the person by GPS notification under 20KM and 40KM radius</b>.</li> <li>Gives <b>lightning warning three hours in advance</b>.</li> <li><b>Developed by</b> the Indian Institute of Tropical Meteorology (IITM-Pune) and Earth System Science Organization (ESSO) under the <b>Ministry of Earth Sciences</b>.</li> </ul>

## 6.6. REPORTS AND INDICES

Reports	Details
<b>Global Assessment Report on Disaster Risk Reduction 2022</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> UN, published biennially by the <b>UN Office for Disaster Risk Reduction (UNDRR)</b></li> <li>Builds on the analysis of <b>United Nations-mandated SDG data on increased gender-based violence in disasters</b>.</li> </ul>
<b>Global Status of Multi-Hazard Early Warning Systems (MHEWS) - Target G</b> 	<ul style="list-style-type: none"> <li><b>Released by:</b> Jointly by United Nations Disaster Risk Reduction and World Meteorological Organisation</li> <li><b>Assesses current global status of MHEWS against Target G</b> (one of the seven targets) of Sendai Framework.           <ul style="list-style-type: none"> <li><b>Target-G aims to increase availability of and access to MHEWS</b> and disaster risk information and assessments by 2030.</li> </ul> </li> <li>Early warning systems (EWS) <b>reduce harm to people and damage to assets</b> ahead of impending hazards, including storms, tsunamis etc.</li> </ul>

## 6.7. MAWMLUH CAVE

### Why in news?

Mawmluh Cave, in Meghalaya has been listed as one of the 'First 100 IUGS (International Union of Geological Sciences) Geological Sites' in the world.

### About IUGS Geological Heritage Site

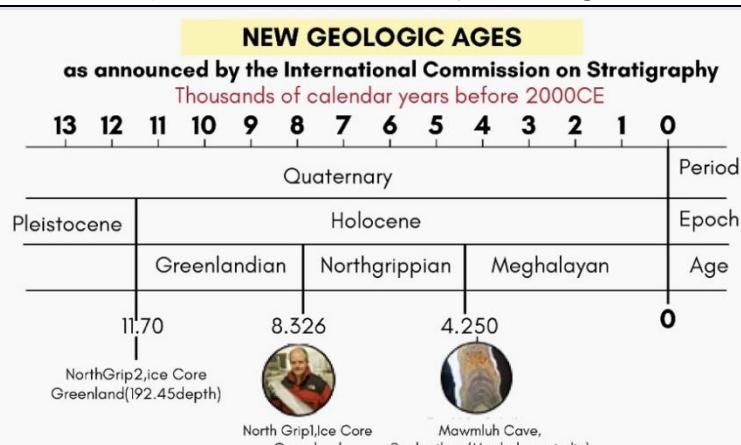
- According to IUGS, a Geological Heritage Site is a key place with geological elements and/or processes of scientific international relevance, used as a reference with a substantial contribution to the development of geological sciences through history.
- The designation of First 100 geological sites is done under the project International Geoscience Programme (IGCP-731).
  - IGCP serves as a knowledge hub of UNESCO to facilitate international scientific cooperation in the geosciences.
- Under the list of first 100 sites, all kinds of geological sites like tectonic, stratigraphical, sedimentological, petrological, mineralogical, hydrogeological paleontological, geomorphological and those related to the history of geological sciences, are considered.

### About Mawmluh Cave (also known as Krem Mawmluh)

- Fourth longest cave** in the Indian subcontinent with a total length of seven kilometre of cave passages.
- Location:** Sohra (well-known as Cherrapunji) of the East Khasi Hills District (Meghalaya) and was first explored by a British official named Lieutenant Yule in 1844.
- Set at an altitude of 4503 m, the cave belongs to the Meghalayan Age and is famous for its stalagmite and other rock formations.
  - Stalagmites are upward-growing mounds of mineral deposits** and are crucial for understanding the global climate system.
- There's a **deep pool inside the cave** which is formed by five different rivers that pass through the cave.

#### Meghalayan Age

- The most recent subdivision of the Holocene Epoch, and began about 4,200 years ago, at a time when agricultural societies around the world experienced a very abrupt, critical and significant drought and cooling.
- Unique among the many intervals of the Geologic Time Scale in that its beginning coincides with a cultural event produced by a global climatic event.
- Resulted in the collapse of civilisations in Egypt, Greece, Syria, Palestine, Mesopotamia, the Indus Valley, and the Yangtze River Valley.
- The Holocene epoch (which started 11,700 years ago) falls under Cenozoic Era and is the time after Ice Age.
  - It itself can be subdivided, according to the International Commission on Stratigraphy (ICS) into 3 stages.
  - Each subdivision of the Holocene Epoch is marked out by sediments accumulated on sea floors, lake bottoms, glacial ice and in stalactites and stalagmites across the world.

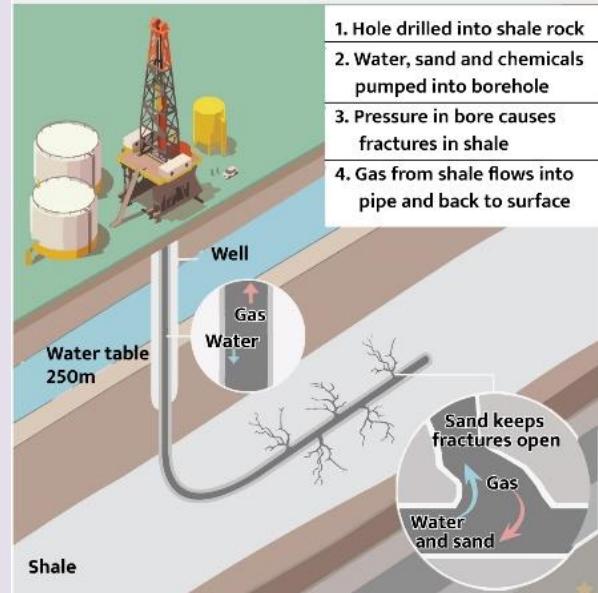


## 6.8. OTHER IMPORTANT NEWS

Mei Yu Front	<ul style="list-style-type: none"> <li>All-India June rainfall this year was 152.3 mm against an average of 165.3 mm (based on 1971-2020 data).</li> <li>Reasons for deficit rainfall:           <ul style="list-style-type: none"> <li>Mei Yu Front: It is an active rainfall spell over western Pacific regions (eastern China) which drives away moisture from the Indian region.</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>○ <b>Madden Julian Oscillation (MJO)</b> remained out of phase and did not bring much rainfall over India.</li> <li>✓ MJO is the rain-bearing, eastward propagating intraseasonal circulation over the tropical atmosphere.</li> </ul>
Azores High	<ul style="list-style-type: none"> <li>• An extremely large 'Azores High' has resulted in <b>abnormally dry conditions across the western Mediterranean</b>, including the Iberian Peninsula, primarily occupied by Spain and Portugal, according to a new study.</li> <li>• It is a <b>subtropical high pressure system</b> that extends over the <b>eastern subtropical North Atlantic and western Europe during winter</b>.</li> <li>○ Formed by <b>dry air aloft descending the subtropics and coincides with the downward branch of the Hadley Circulation</b>.</li> <li>○ Associated with <b>anticyclonic winds</b> in the subtropical North Atlantic.</li> </ul>
Hydraulic Fracking	<ul style="list-style-type: none"> <li>• Hydraulic fracturing, or fracking ban has been lifted in England.</li> <li>• <b>Fracking: Technique for recovering gas and oil from shale rock.</b></li> <li>• Opposed as injection of fluid at high pressure into the rock can <b>cause earth tremors</b> - small movements in the earth's surface.</li> <li>• <b>Guar gum or cluster bean powder is used in fracking</b> in order to release oil and gas trapped in the rock.</li> </ul>

#### How gas is extracted by shale fracking



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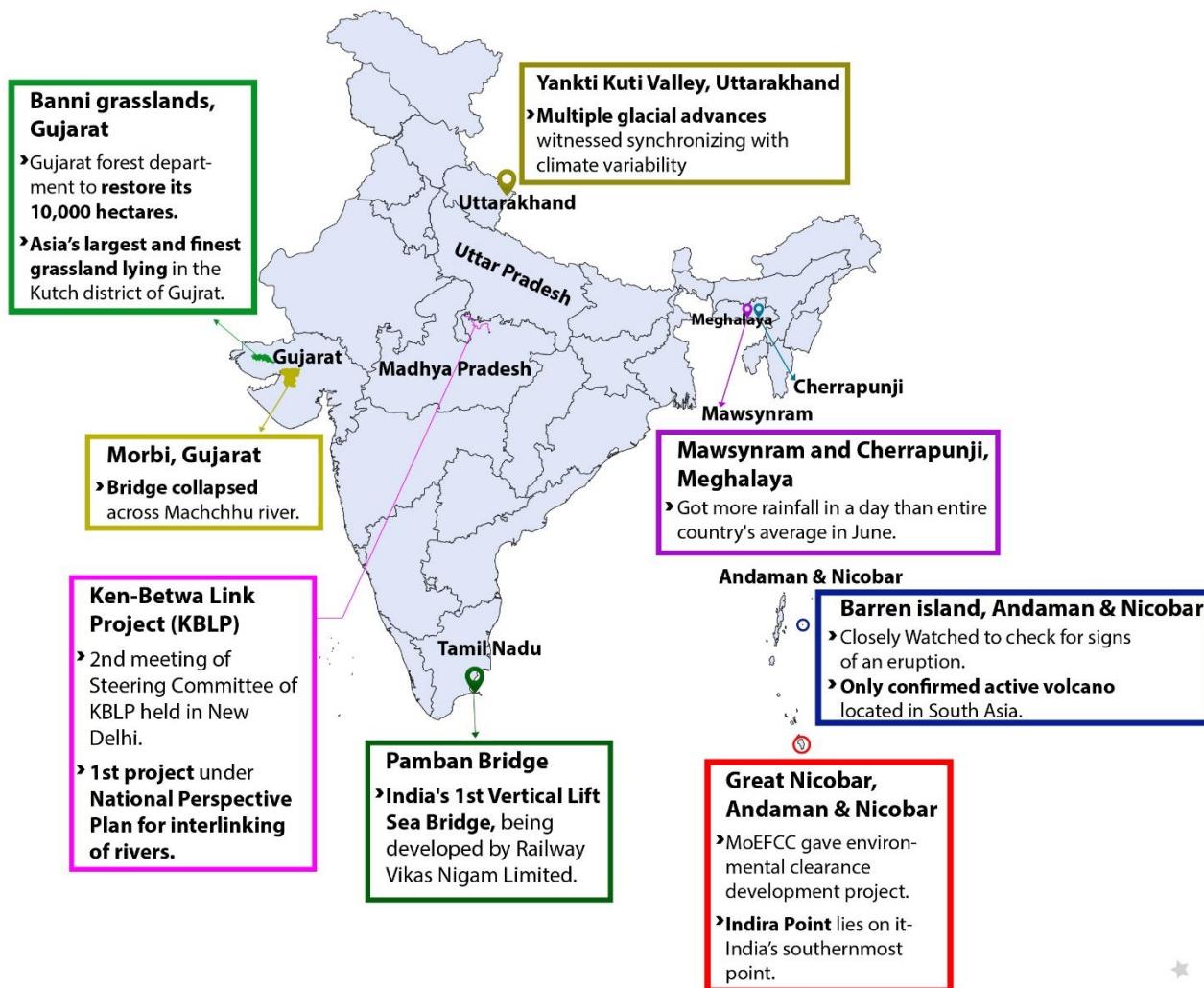
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## 6.9. PLACES IN NEWS

### 6.9.1. PLACES IN NEWS: INDIA

# PLACES IN NEWS: INDIA



## Rivers in News: India

### Chenab river

- » Pakistan objected to the construction of Rattle and Kwar hydroelectric projects.

### Sabarmati River

- » PM inaugurated the Atal Bridge over it.
- » Major Tributaries: Sei, Wakal, Harnav, Hathmati and Watrak.

### Narmada river

- » PM inaugurated the Bhuj-Mandvi Narmada branch canal to bring water from Sardar Sarovar Dam on it.
- » Largest west flowing river.
- » Major Tributaries: Burhner, banjar, Dudhi, Kundi, Hirani, Kolar, Uri, Hatni etc.

### Bedti river & Varada river

Environmental groups in Karnataka criticised the project to link the Bedti and Varada rivers.

### Kameng river

- » Ministry of Power has built a 600 MW Kameng Hydro Power Station.
- » Tributary of Brahmaputra.

### Kushiyara River

- » Cabinet approves MoU with Bangladesh on withdrawal of its water.
- » A distributary of Barak River.

### Sukapaika river

- » National Green Tribunal directed to revive it in the next 6 months.
- » Distributary of Mahanadi river.

### Pranhita river

- » Pranhita Pushkaralu festival organised on banks.
- » Largest tributary of the Godavari River.

# ESSAY

## ENRICHMENT PROGRAMME 2023

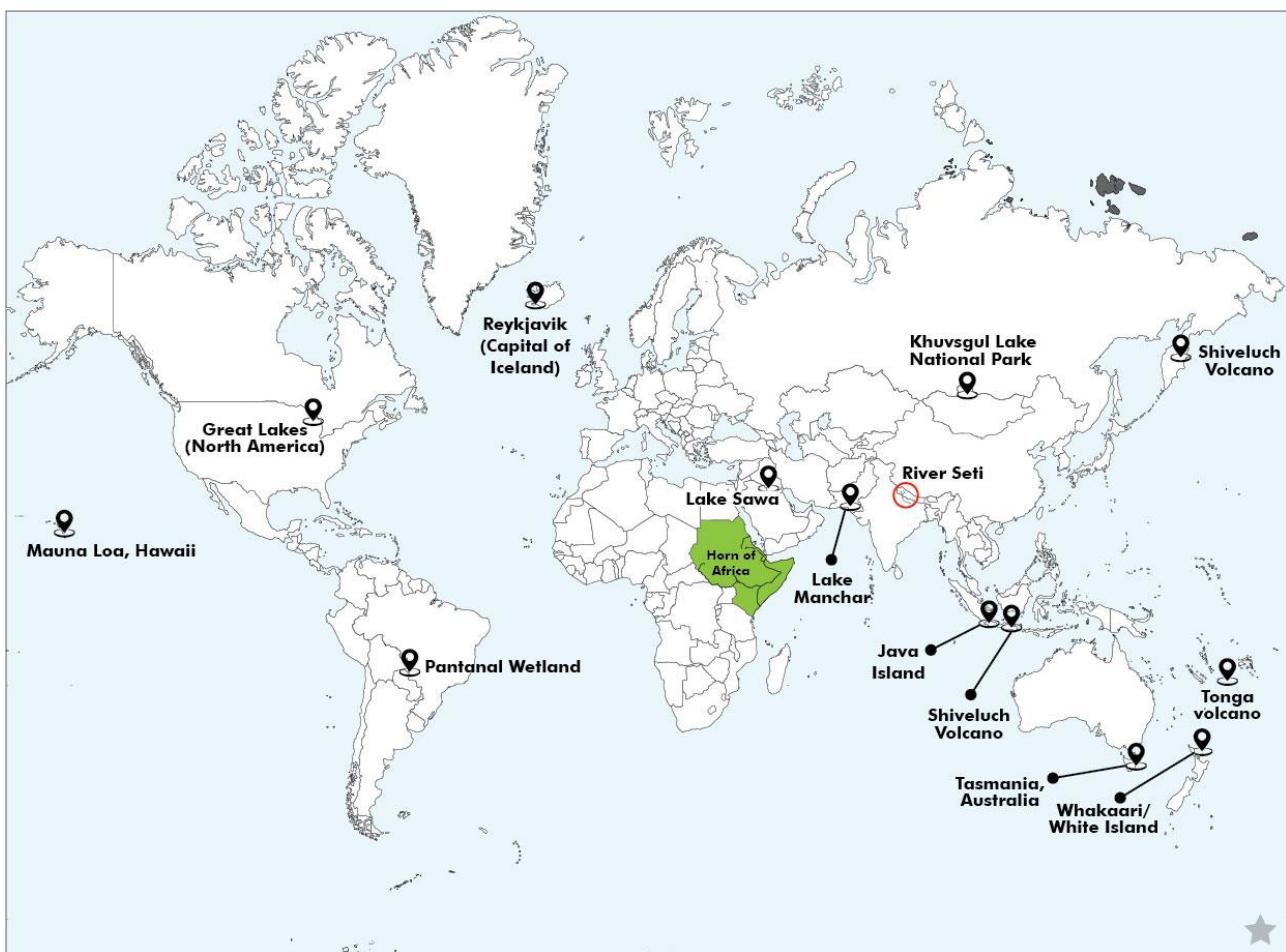
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## 6.9.2. PLACES IN NEWS: INTERNATIONAL

### 6.9.2.1. GEOGRAPHICAL FEATURES



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**6.9.2.2. COUNTRIES IN NEWS**

# — COUNTRIES IN NEWS —



## 7. APPENDIX

### 7.1. INITIATIVES LAUNCHED DURING COP27

Initiative	Launched by	Objective and other information
 <b>Agriculture and food</b>		
Agricultural Innovation Mission for Climate (AIM4C or AIM4Climate)	UAE & US  Not a Member	<ul style="list-style-type: none"> <li>Aim: To boost investment and other support for climate-smart agriculture and food systems innovation over five years (2021-25) to the tune of \$8bn.</li> </ul>
Initiative on Nutrition and Climate Change (I-CAN)	Egypt as COP27 Presidency, in partnership with WHO, FAO, other UN agencies and partners.	<ul style="list-style-type: none"> <li>Aim: To support Member States in delivering climate change adaptation and mitigation policy action which simultaneously- <ul style="list-style-type: none"> <li>improves nutrition and</li> <li>triggers transformative action to deliver healthy diets from sustainable food systems</li> </ul> </li> </ul>
International Drought Resilience Alliance (IDRA)	Spain and Senegal led 30 countries and 20 organisations.  Not a Member	<ul style="list-style-type: none"> <li>Aim: To lend support to countries exposed to the continued threat of drought by mobilising resources, transferring technology and knowledge, and fostering innovation.</li> <li>IDRA was first announced at the UN General Assembly in September 2022 by the President of Spain.</li> </ul>
Food and Agriculture for Sustainable Transformation Initiative (FAST)	FAO, in collaboration with other UN agencies.	<ul style="list-style-type: none"> <li>Aim: To implement concrete actions that would result in improving the quantity and quality of climate finance contributions to transform agriculture and food systems by 2030, to support adaptation and maintain a 1.5-degree pathway whilst supporting food and economic security.</li> </ul>
 <b>Finance</b>		
Sustainable Debt Coalition Initiative	Egypt	<ul style="list-style-type: none"> <li>Aim: <ul style="list-style-type: none"> <li>Highlight the difficult fiscal position of emerging market and developing economies and its debilitating impacts on climate action and development</li> <li>Spur Coalition partners to align on a set of new crucial commitments to alleviate the debt burden.</li> <li>Launch a new track for consultations at the intersection of debt, climate, and development.</li> </ul> </li> </ul>
Global Shield against Climate Risk	G7 and V20 ('the Vulnerable Twenty').  Not a Member	<ul style="list-style-type: none"> <li>V20 is a dedicated cooperation initiative of economies systemically vulnerable to climate change. It was established in 2015 at Lima, Peru.</li> <li>V20 Group membership stands at 58 economies.</li> <li>Aim: To provide climate risk insurance and social protection schemes in developing countries.</li> <li>The World Bank Group has announced a Global Shield Financing Facility to support the initiative.</li> </ul>
Industry Transition Programme	Climate Investment Fund (CIF)	<ul style="list-style-type: none"> <li>It is the world's first large scale dedicated finance programme for developing country industry transitions.</li> </ul>



## Forest and Land

Mangrove Alliance for Climate (MAC)	The United Arab Emirates (UAE) and Indonesia.  Member	<ul style="list-style-type: none"> <li>• Other members include Sri Lanka, Australia, Japan, and Spain.</li> <li>• Aim: To educate and spread awareness worldwide on the role of mangroves in curbing global warming and its potential as a solution for climate change.</li> </ul>
Forest and Climate Leaders' Partnership (FCLP)	The UK and world Leaders from 26 countries (India not a part) and EU launched.  Not a Member	<ul style="list-style-type: none"> <li>• Aim: To boost action to implement a commitment made by over 140 countries at COP26 in Glasgow last year to halt forest loss and land degradation by 2030 and to convert ambition into results on the ground.</li> <li>• Its action areas include: <ul style="list-style-type: none"> <li>○ Mobilizing public and donor finance to support implementation.</li> <li>○ Supporting Indigenous Peoples' and local communities' initiatives.</li> <li>○ Incentivizing conservation of high-integrity forests.</li> </ul> </li> </ul>
Enhancing Nature-based Solutions for Climate Transformation (ENACT)	COP27 Presidency, in collaboration with the IUCN and Germany	<ul style="list-style-type: none"> <li>• It will serve as a hub for Party and non-state actors working on Nature-based Solutions (NbS) to foster collaboration and bring global coherence to activities.</li> <li>• The ENACT partnership will function as an enabler and accelerator of progress towards multilaterally established global targets such as- <ul style="list-style-type: none"> <li>○ the UN Decade on Restoration,</li> <li>○ the proposed 30x30 target under the CBD Global Biodiversity Framework, and</li> <li>○ the G20 Global Initiative on Land Degradation under the UNCCD.</li> </ul> </li> </ul>



## Health and nutrition

Alliance for Transformative Action on Climate and Health (ATACH)	Co-convened by the UK and Egypt	<ul style="list-style-type: none"> <li>• Aim: To realize the ambition set at COP26 to build climate resilient and sustainable health systems</li> <li>• It will use the collective power of WHO Member States and other stakeholders to drive this agenda forward at pace and scale; and promote the integration of climate change and health nexus into respective national, regional, and global plans.</li> </ul>
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## Initiatives with focus on African region

Africa Just & Affordable Energy Transition Initiative (AJAETI)	COP27 Presidency of Egypt	<ul style="list-style-type: none"> <li>• Aim: <ul style="list-style-type: none"> <li>○ Provide all Africans with access to clean energy, whilst meeting the energy requirements for Africa's economic development.</li> <li>○ Driving economic growth and supporting job creation across Africa to build a modern, resilient, and sustainable energy systems across the continent.</li> </ul> </li> <li>• The initiative will engage the International Energy Agency (IEA) and International Renewable Energy Agency (IRENA).</li> </ul>
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Decent Life for a climate resilient Africa Rationale	President of the Arab Republic of Egypt	Aim: To improve the quality of life in 30% of the most vulnerable and poorest villages and rural areas in the continent by 2030, in a climate-sensitive manner.
African Women's Climate Adaptive Priorities	COP27 Presidency	Aim: To ramp up the inclusion of women for a climate-resilient future.
African Carbon Markets Initiative (ACMI)	The initiative was inaugurated at COP 27 in collaboration with the Global Energy Alliance for People and Planet (GEAPP), Sustainable Energy for All (SEforALL), and the UN Economic Commission for Africa.	Aim: To support the growth of carbon credit production and create jobs in Africa.
Friends of Greening National Investment Plans in Africa and Developing Countries initiative	Egypt's Ministry of Planning and Economic Development and supported by the United Nations Development Programme (UNDP)	Aim: Shaping the process of planning and designing the economic policies in a manner that factors in the impact of climate change.
Global Waste Initiative 50 by 2050	It will leverage voluntary engagements from over 180 countries.	<ul style="list-style-type: none"> <li>Aim: To treat and recycle at least 50% of the solid waste produced in Africa by 2050.</li> <li>The initiative is first of its kind global coalition that proposes a collaborative platform for all stakeholders involved in waste management to holistically address all solid waste types and contribute to an ambitious target at the scale of the African continent.</li> </ul>



## Mobility and Urban transformation

Low Carbon Transport for Urban Sustainability (LOTUS) initiative	SLOCAT and BCG (Boston Consulting Group) and developed in collaboration with the UN Environment Programme (UNEP)	Aim: To activate systemic change to improve and decarbonize the urban mobility landscape.
Accelerating to Zero (A2Z) Coalition	UK, the High-Level Champions, the International Council on Clean Transportation, The Climate Group, and the Drive Electric Campaign.	<ul style="list-style-type: none"> <li>Aim: To promote and support the transition to zero emission vehicles globally.</li> <li>It's the world's largest transportation coalition with over 200 organizations including governments, industry and civil society.</li> <li>It builds off the foundation of the "Zero Emission Vehicles Declaration" (ZEV Declaration) generated at COP26, which is the agreement that establishes the 2035 and 2040 zero-emission goal.</li> </ul>
Collective for Clean Transport Finance	It is a strategic collaboration between the High-Level Champions and the Smart Freight Center, World Bank, WBCSD, and the Nand & Jeet Khemka Foundation.	<ul style="list-style-type: none"> <li>Aim: To create the tools to change the risk profiles of investment in zero-emission transport.</li> </ul>
Zero Emission Vehicles Emerging Market Campaign (ZEV-EM-C)	USA	<ul style="list-style-type: none"> <li>Aim: It is a one-year campaign that seeks to accelerate zero-emission passenger vehicle deployment in emerging markets.</li> </ul>
Sustainable Urban Resilience for the next Generation (SURGe) initiative	COP27 Presidency, in collaboration with UN-Habitat and with the facilitation of ICLEI.	<ul style="list-style-type: none"> <li>Objective: To effectively address some of the barriers that limit urban emissions reductions, adapting urban systems to climate change, and building urban system resilience.</li> <li>It will track buildings and housing, urban water, urban mobility, urban waste and consumption, and urban energy</li> </ul>
Beat the Heat: Nature for Cool Cities Challenge	Cool Coalition	<ul style="list-style-type: none"> <li>Cities in developing countries are invited to participate in the challenge by pledging to increase nature based solutions in their urban</li> </ul>

		<p><b>areas by 2030</b> and demonstrate tangible progress by 2025.</p> <ul style="list-style-type: none"> <li>Participants will be supported via funding, technical assistance, partnership opportunities, and communications support.</li> </ul>
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## Climate Mitigation and Adaptation Targets

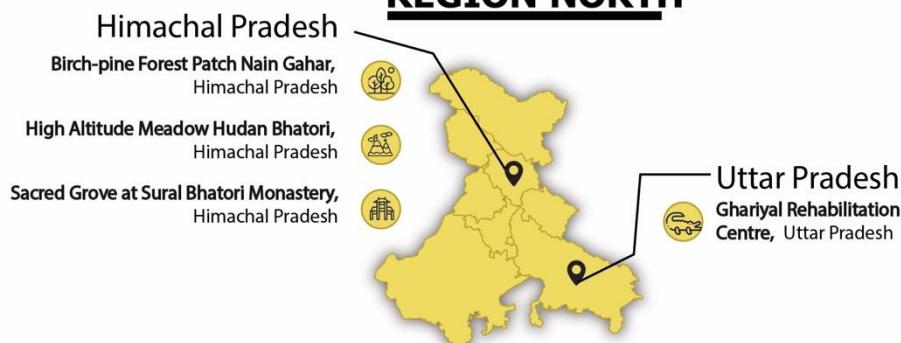
First Movers Coalition (FMC) Cement & Concrete Commitment	<b>First Movers Coalition (FMC)</b>  <b>Member</b>	<ul style="list-style-type: none"> <li>First movers pledged to <b>purchase at least 10% near zero carbon cement and concrete by 2030</b>.</li> <li>FMC is a coalition of companies using their purchasing power to create early markets for innovative clean technologies across eight hard to abate sectors.           <ul style="list-style-type: none"> <li><i>India is a Government Partner of the coalition.</i></li> </ul> </li> </ul>
LeadIT (Leadership for Industry Transition) Summit 2022	<b>Hosted by India and Sweden</b>  <b>Member</b>	<ul style="list-style-type: none"> <li>The summit concluded with the adoption of the summit statement by the members of LeadIT which <b>re-emphasized the commitment to continue pursuing the low-carbon transition of the industry</b>.</li> <li>LeadIT (Leadership for Industry Transition) initiative focuses on low carbon transition of the hard to abate industrial sector.           <ul style="list-style-type: none"> <li><b>It was launched by the governments of Sweden and India at the UN Climate Action Summit in September 2019</b> and is supported by the World Economic Forum.</li> </ul> </li> </ul>
Middle East Green Initiative (MGI) Summit 2022	<b>Saudi Arabia led regional dialogue</b> to bring together leaders from across the MENA region (Middle East/North Africa) and beyond.	<ul style="list-style-type: none"> <li><b>Aim:</b> To mitigate the impact of climate change on the region and to collaborate to meet global climate targets.</li> <li>MGI Summit 2022 was held in Sharm El Sheikh, in tandem with COP27.           <ul style="list-style-type: none"> <li>MGI is a Saudi Arabia led regional dialogue on climate launched in 2021 to bring together leaders from across the MENA region (Middle East/North Africa) and beyond.</li> <li><i>India is one of the endorsing countries.</i></li> </ul> </li> <li><b>Targets MGI:</b> <ul style="list-style-type: none"> <li>Reducing carbon emissions from regional hydrocarbon production by more than 60%.</li> <li><b>Plant 50 billion trees across the Middle East and restore an area equivalent to 200 million hectares</b> of degraded land.</li> </ul> </li> </ul>
Methane Alert and Response System (MARS)	<b>UNEP's International Methane Emissions Observatory.</b> <ul style="list-style-type: none"> <li>Initial financial support for MARS is provided by the European Commission, the U.S. Government, the Global Methane Hub, and the Bezos Earth Fund.</li> </ul>	<ul style="list-style-type: none"> <li><b>Aim:</b> To <b>accelerate implementation of the Global Methane Pledge</b> by transparently scaling up global efforts to detect and act on major methane emissions sources.</li> <li>It is <b>new satellite-based system</b> that will alert governments, companies and operators about large methane sources to foster rapid mitigation action.</li> </ul>
Climate TRACE (Tracking Real-time Atmospheric Carbon Emissions) Coalition	<b>Spearheaded by former U.S. Vice President Al Gore</b>	<ul style="list-style-type: none"> <li>Aim: To make meaningful climate action faster and easier by <b>mobilizing the global tech community to track greenhouse gas (GHG) emissions with unprecedented detail and speed</b> and provide this data freely to the public.</li> <li>It is a <b>global non-profit coalition</b>.</li> <li>It will harness <b>satellite imagery and other forms of remote sensing, artificial intelligence, and collective data science</b></li> </ul>

Action on Water, Adaptation and Resilience (AWARe)	COP27 Presidency, in partnership with World Meteorological Organization (WMO) <ul style="list-style-type: none"> <li>It is a collaboration between various stakeholders, including African Union.</li> </ul>	<ul style="list-style-type: none"> <li>It will address water security as part of climate change adaptation and will focus on three priorities:               <ul style="list-style-type: none"> <li>Decrease water losses worldwide and improve water supply.</li> <li>Promote mutually agreed, cooperative water adaptation action.</li> <li>Promote cooperation and interlinkages between water and climate action.</li> </ul> </li> </ul>
Insurance Adaptation Acceleration Campaign	Launched as a part of the <b>Race to Resilience campaign</b> , which is the UN-backed global campaign to catalyse a step-change in global ambition for climate resilience	<ul style="list-style-type: none"> <li>Aim: To mobilise 3,000 insurance companies (equal to 50% of the market) by COP28 in 2023.</li> <li>The objective is to scale the industry's ability to:               <ul style="list-style-type: none"> <li>advance meaningful climate risk reduction, and</li> <li>jointly pursue the innovative public-private partnerships that reflect a shared mission of protecting vulnerable populations from the physical ravages of climate change.</li> </ul> </li> </ul>
Sharm El-Sheikh Adaptation Agenda	<ul style="list-style-type: none"> <li>COP27 Presidency in partnership with the High-Level Champions and the Marrakech Partnership.               <ul style="list-style-type: none"> <li>Underpinned by the 2,000+ organisations spanning 131 countries in the Race to Resilience campaign.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>It outlines 30 Adaptation outcomes to enhance resilience for people living in the most climate vulnerable communities by 2030.</li> <li>The outcomes include urgent global 2030 targets related to Food Security and Agriculture, Water and Nature, Ocean and Coastal, Infrastructure Systems etc.</li> </ul>
Planning for Climate Commission	Green Hydrogen Organisation, International Hydropower Association, the Global Wind Energy Council and the Global Solar Council.	<ul style="list-style-type: none"> <li>Aim: It is a new global initiative focused on speeding up planning and approvals for the massive deployment of renewables and green hydrogen needed to address climate change and energy security.</li> </ul>
Global Renewables Alliance	International Geothermal Association, Global Wind Energy Council, Long Duration Energy Storage Council, Green Hydrogen Organisation, International Hydropower Association, and the Global Solar Council	<ul style="list-style-type: none"> <li>Aim: To position renewable energy as a pillar of sustainable development and economic growth.</li> <li>It brings together, for the first time, all the technologies required for the energy transition in order to ensure an accelerated energy transition.</li> </ul>
<b>Others</b>		
Executive Action for 2023-2027: Early Warnings for all Action Plan	World Meteorological Organisation (WMO)	<ul style="list-style-type: none"> <li>The plan identifies key areas for advancing universal disaster risk knowledge, and outlines the priority actions required to achieve this, building on the <b>Sendai Framework for Disaster Risk Reduction</b>.</li> <li>The action plan calls for a <b>targeted investment of US\$ 3.1 billion between 2023 and 2027</b> to advance four Multi-Hazard Early Warning System (MHEWS) pillars.               <ul style="list-style-type: none"> <li>The funding will cover <b>disaster risk knowledge, observations and forecasting, preparedness and response, and communication of early warnings</b>, and focus on developing countries where major gaps in early warning systems remain.</li> </ul> </li> </ul>
Climate Responses for Sustaining Peace (CRSP)	Cairo International Center for Conflict Resolution, Peacekeeping and Peacebuilding (CCCPA) in its capacity as the Secretariat of the Aswan Forum for Sustainable Peace and Development.	Aim: Ensuring that <b>integrated climate responses contribute to sustainable peace and development</b> in line with national ownership and context specificity

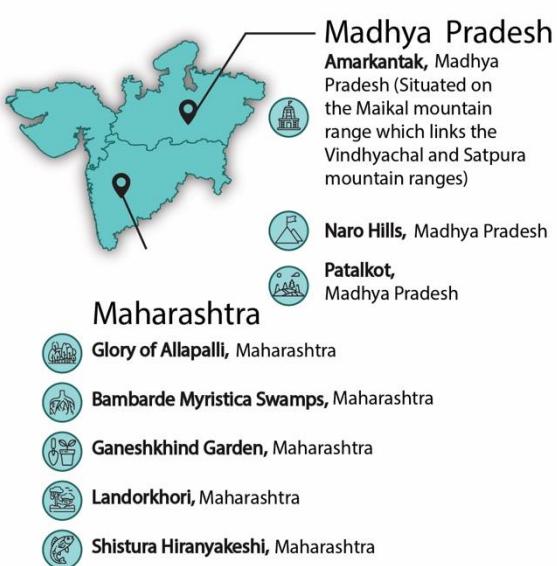
## 7.2. DECLARED BIODIVERSITY HERITAGE SITES IN INDIA

### Appendix- Declared Biodiversity Heritage Sites in India

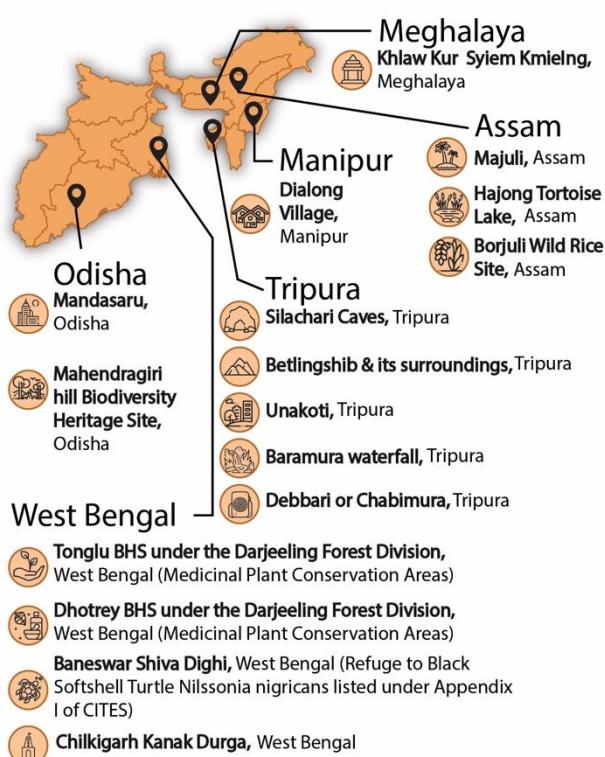
#### **REGION NORTH**



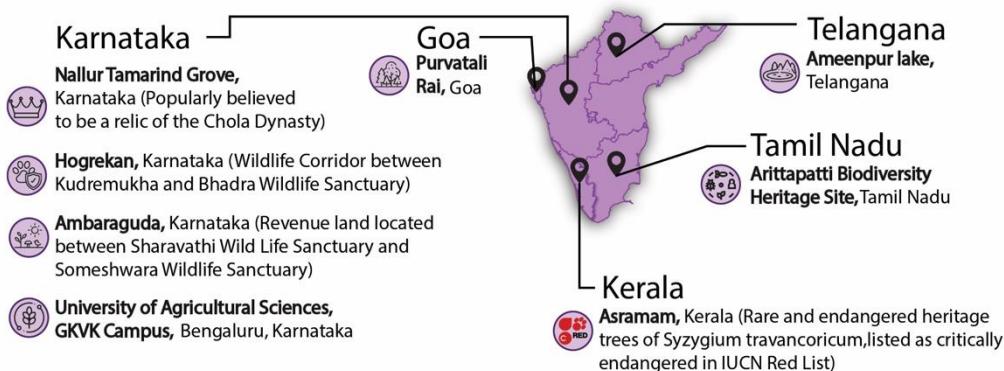
#### **REGION WEST**



#### **REGION EAST**

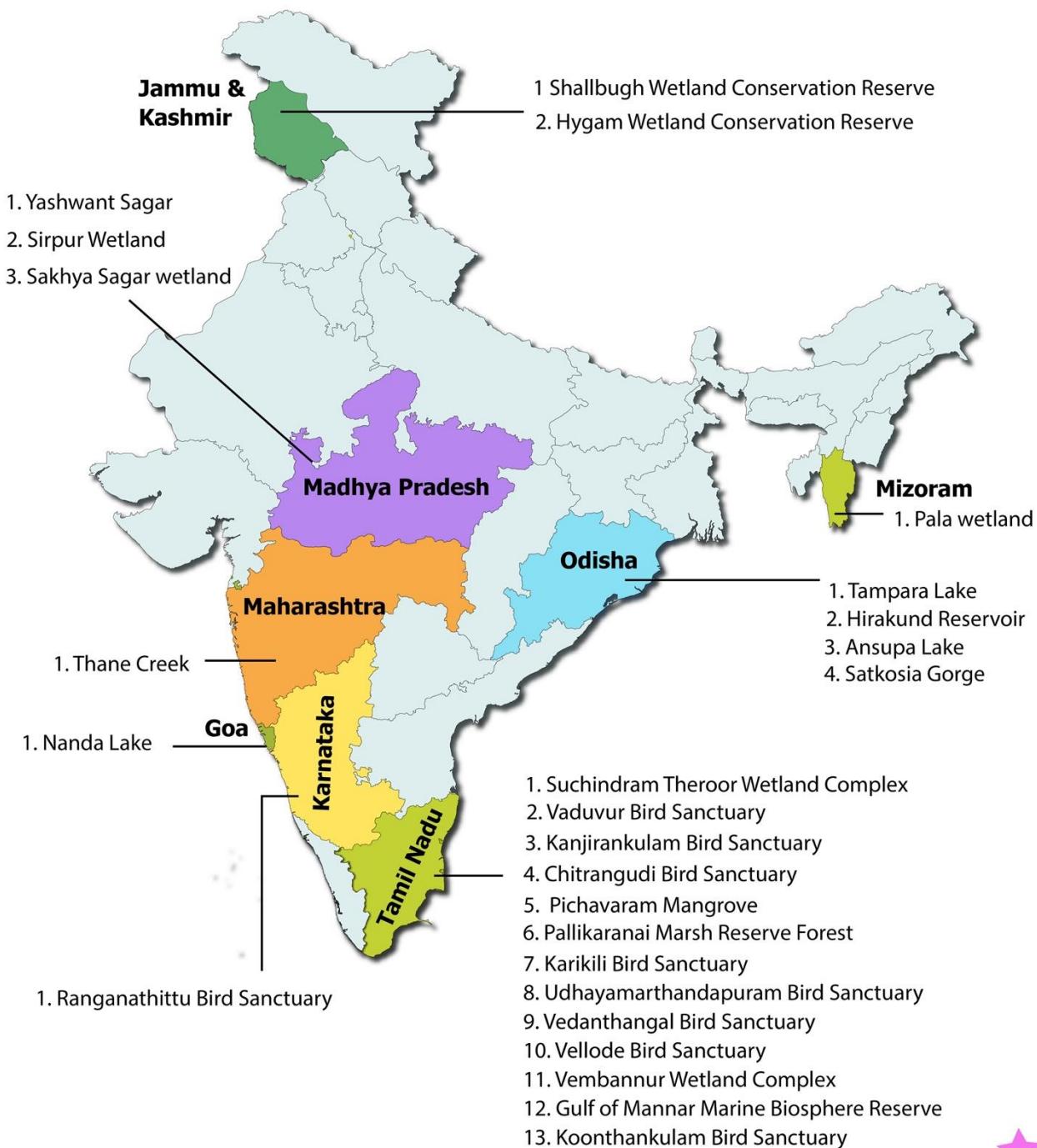


#### **REGION SOUTH**



### 7.3. LIST OF NEW RAMSAR SITES

## NEW RAMSAR SITES IN INDIA



S. N o.	Name of Wetland	Key Features
	Tamil Nadu	
1.	Karikili Bird Sanctuary	<ul style="list-style-type: none"> <li>• Man-made wetland</li> <li>• Comprises two rain-fed non-perennial irrigation tanks.</li> <li>• Site was declared a Birds Sanctuary in 1972.</li> </ul>

		<ul style="list-style-type: none"> <li><b>Important Species:</b> oriental darter, spot-billed pelican, jungle cat, bonnet macaque, jackal, python, etc.</li> </ul>
2.	<b>Pallikaranai Marsh Reserve Forest</b>	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Freshwater marsh and partly saline wetland.</li> <li>It serves as an aquatic buffer of the flood-prone Chennai and Chengalpattu districts.</li> <li><b>Important Species:</b> Russell's viper, glossy ibis, grey-headed lapwings, Pheasant-tailed jacana etc</li> </ul>
3.	<b>Pichavaram Mangrove</b>	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>One of the largest mangrove ecosystems in India, located between the prominent estuaries of the <b>Vellar and Coleroon</b> Rivers.</li> <li>Features littoral and swamp forest habitats.</li> <li>Spawning and nursing ground for <b>commercially important prawns, mainly white prawn and tiger prawn</b>.</li> <li><b>Important Species:</b> a natural hybrid species- Rhizophora annamalayana, great, white-bellied heron, spoon-billed sandpiper, spotted greenshank, olive ridley turtle etc.</li> </ul>
4.	<b>Koonthankulam Bird Sanctuary</b>	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Consists of irrigation tanks interconnected by a network of canals built a few centuries ago and fed by the <b>rivers originating from the Western Ghats mountain range</b>.</li> <li>It is the <b>largest reserve for breeding resident and migratory waterbirds in South India</b>.</li> <li>An <b>Important Bird and Biodiversity Area (IBA)</b> on the <b>Central Asian Flyway</b>.</li> <li><b>Important Species:</b> Indian pond heron, Eurasian wigeon, spot-billed pelican, oriental darter, Northern pintail etc.</li> </ul>
5.	<b>Gulf of Mannar Marine Biosphere Reserve</b>	<ul style="list-style-type: none"> <li>Natural wetland</li> <li><b>First Marine Biosphere Reserve</b> in South &amp; South-East Asia.</li> <li>Classified as Marine National Park, Important Bird Area, and UNESCO Biosphere Reserve.</li> <li>Local communities are mainly Marakeyars.</li> <li><b>Important Species:</b> Dugong, whale shark, green sea turtle, hawksbill turtle, Indo-Pacific humpback dolphin etc.</li> </ul>
6.	<b>Vembannur Wetland Complex</b>	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Forms part of an <b>Important Bird and Biodiversity Area (IBA)</b>.</li> <li>Irrigation tank believed to have been constructed in the regime of Pandyan king Veeranarayana.</li> <li>The tank and the Therrakal canal were designed to take water from River Pazhayar for irrigation purposes.</li> <li><b>Important Species:</b> Indian river tern, the spotted greenshank, the garganey, grey pelican, notable plants including Indotristicha ramosissima, Cyrtococcum longipes etc.</li> </ul>
7.	<b>Vellore Bird Sanctuary</b>	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Forms part of the Central Asian Flyway.</li> <li><b>Important Species:</b> Indian river tern, oriental darter, painted stork, plant species like Cayratia pedata, Tephrosia purpurea and Commelina tricolor etc.</li> </ul>
8.	<b>Vedanthangal Bird Sanctuary</b>	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Small irrigation tank in Vedanthangal village surrounded by rocky plains and low-ridged, denuded hillocks.</li> <li>Site is an <b>Important Bird and Biodiversity Area (IBA)</b> and one of the oldest bird protected areas in India.</li> <li><b>Important Species:</b> black-headed ibis, Eurasian spoonbill, black-crowned night heron, painted stork etc.</li> </ul>
9.	<b>Udhayamarthandapuram Bird Sanctuary</b>	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Consists of human-made irrigation tanks, interconnected by an ancient network of canals and fed by the Mettur dam through the Koraiyar canal.</li> <li>The southern part of the landscape is partly <b>Koraiyar River</b></li> <li><b>Important Species:</b> oriental darter, black-headed ibis, Eurasian wigeon, Northern pintail etc.</li> </ul>

10.	Chitrangudi Bird Sanctuary	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>A crescent shaped sanctuary which lies within the community tank embankment.</li> <li>A protected area since 1989 and declared as Bird Sanctuary, coming under the jurisdiction of Tamil Nadu Forest Department.</li> <li><b>Important Species:</b> spot-billed pelican, little egret, grey heron, large egret, open billed stork, purple, and pond herons etc.</li> </ul>
11.	Suchindram Theroor Wetland Complex	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Part of the Suchindrum-Theroor Manakudi Conservation Reserve.</li> <li>Man-made, inland Tank which is perennial.</li> <li>Declared an <b>Important Bird Area</b> and lies at the southern tip of the <b>Central Asian flyway</b> of migratory birds.</li> <li><b>Important Species:</b> Indian Cormorant, Spot-billed Duck etc.</li> </ul>
12.	Vaduvur Bird Sanctuary	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Located in the Vaduvur Lake, a large human-made irrigation tank, 25 kms from Thanjavur.</li> <li><b>Important Species:</b> Indian Pond Heron, Eurasian Wigeon, Northern Pintail, Garganey etc.</li> </ul>
13.	Kanjirankulam Bird Sanctuary	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Declared a Protected area in 1989 and qualifies as an <b>IBA</b>.</li> <li><b>Important Species:</b> babul trees, painted stork, white ibis, black ibis, little egret, great egret, forest birds like bee-eaters, bulbuls, cuckoos, starlings, barbets, etc.</li> </ul>

#### Madhya Pradesh

14.	Sakhya Sagar wetland	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Created due to damming of the <b>Manjer River</b> in 1918 by the Maharaja of Scindias.</li> <li>The reservoir lies within the Madhav National Park.</li> <li>It is a mosaic of landforms including <b>open water and surrounding marshes, plantations and a small patch of agricultural land</b>.</li> <li><b>Important Species:</b> mugger crocodile etc.</li> </ul>
15.	Sirpur Wetland	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>Constructed by Holkers, the ex-rulers of Indore kingdom.</li> <li>Has stabilized and acquired near-natural characteristics in the last two centuries,</li> <li><b>Important Species:</b> common pochard, Egyptian vulture, Indian river tern etc.</li> </ul>
16.	Yashwant Sagar	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>A dam reservoir on Gambhir river.</li> <li>One of the two <b>Important Bird Areas (IBA)</b> in the Indore region as well as one of the most important birding sites in Malwa region of Madhya Pradesh.</li> <li>Mainly used for water supply to the city of Indore.</li> <li><b>Important Species:</b> Sarus Crane etc.</li> </ul>



#### Odisha

17.	Satkoria Gorge	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Established in 1976 as a wildlife sanctuary and declared as Satkoria Tiger Reserve in 2007, comprising two adjoining wildlife sanctuaries, the Satkoria Gorge sanctuary and Baisipalli sanctuary.</li> <li>Spreads along the gorge over the <b>river Mahanadi</b>.</li> <li>Mosaic of rivers, marshes and evergreen forests at the <b>meeting point the Deccan Peninsula and the Eastern Ghats</b>.</li> <li><b>Important Species:</b> Plant species include asan, dhaura, simal, Indian thorny bamboo, Calcutta bamboo etc., animal species include red-crowned roofed turtle, Indian narrow headed softshell turtle, tiger and black-bellied tern etc.</li> </ul>
18.	Ansupa Lake	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>An <b>oxbow lake</b> formed by <b>River Mahanadi</b> and the <b>largest freshwater lake of Odisha</b>.</li> <li><b>Important Species:</b> Rynchops albicollis, Sterna acuticauda, Sterna aurantia, Clarias magur, Cyprinus carpio, Wallago attu etc.</li> </ul>
19.	Hirakud Reservoir	<ul style="list-style-type: none"> <li>Man-made wetland</li> <li>The largest earthen dam built across <b>Mahanadi river</b> in Odisha started operating in 1957.</li> <li>The reservoir is a source of- 480 MT of fish annually, around 300 MW of hydropower and irrigation of 436,000 ha of cultural command area.</li> </ul>

		<ul style="list-style-type: none"> <li><b>Important Species:</b> Common Coot, Lesser Whistling Duck, Great Crested Grebe, Red Headed Pochard etc.</li> </ul>
20.	Tampara Lake	<ul style="list-style-type: none"> <li><b>Natural Wetland</b></li> <li>One of the most prominent freshwater lakes in the State of Odisha situated in Ganjam district.</li> <li>The depression on the ground gradually filled with rainwater from catchment flow and was called “Tamp” by the British and subsequently termed “Tampra” by the locals.</li> <li><b>Important Species:</b> Cyprinus carpio, common pochard and river tern etc.</li> </ul>
<b>Jammu and Kashmir</b>		
21.	Hygam Wetland Conservation Reserve	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Falls within the <b>River Jhelum</b> basin and is recognized as an <b>Important Bird Area (IBA)</b>.</li> <li>Consequent to the high rate of siltation, the Wetland has lost its wetland characteristics to a large extent and in many places changed its profile into a landmass.</li> <li><b>Important Species:</b> Red Crested Pochards, White Eyed Pochards, Common Teal Coots, Grey Legs etc.</li> </ul>
22.	Shallbugh Wetland Conservation Reserve	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Located in the District Srinagar, UT of J&amp;K.</li> <li>The area has <b>extensive reedbeds</b> of Phragmites communis and Typha angustata, and rich growth of Nymphaea candida and N. stellata on open water.</li> <li><b>Important Species:</b> Geese, Bar Geese, White Heeled Duck, Shoveller, Red-Crested Pochard, White-Eyed Pochard, Common Teal, Pintail, Mallard, etc.</li> </ul>
<b>Maharashtra</b>		
23.	Thane Creek	<ul style="list-style-type: none"> <li>Natural wetland.</li> <li>Declared as Thane Creek Flamingo Sanctuary.</li> <li>An important part of the wetland complex of the <b>Central Asian Flyway</b> of the birds and categorized as an <b>Important Bird Area (IBA)</b>.</li> <li>There are several sources of fresh water to the creek, of which <b>Ulhas River</b> is the largest.</li> <li><b>Important Species:</b> Fringed by mangroves on both banks &amp; comprises around <b>20% of the total Indian mangrove species</b>, flamingos etc.</li> </ul>
<b>Karnataka</b>		
24.	Ranganathittu Bird Sanctuary	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Part of the Kaveri River.</li> <li>Classified as an Important Bird and Biodiversity Area (IBA).</li> <li><b>Important Species:</b> mugger crocodile, smooth-coated otter, hump-backed mahseer, painted stork, spot-billed pelican, black-headed ibis etc.</li> </ul>
<b>Mizoram</b>		
25.	Pala wetland	<ul style="list-style-type: none"> <li>Natural wetland</li> <li><b>Largest natural wetland in the state of Mizoram.</b></li> <li>Revered by the local Mara people.</li> <li><b>Important Species:</b> sambar deer, wild pig, barking deer, Hoolock gibbon, Phayre's leaf monkey, slow loris, elongated tortoise, Asian brown tortoise, and black soft-shelled turtle etc.</li> </ul>
<b>Goa</b>		
26.	Nanda Lake	<ul style="list-style-type: none"> <li>Natural wetland</li> <li>Comprises intermittent freshwater marshes that lie adjacent to one of the major tributaries of the <b>Zuari River</b>.</li> <li><b>Important Species:</b> black-headed ibis, wire-tailed swallow, common kingfisher etc.</li> </ul>

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AGARWAL

**3**  
AIR



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AIR



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VERMA

**5**  
AIR



UTKARSH  
DWIVEDI

**6**  
AIR



YAKSH  
CHAUDHARY

CIVIL SERVICES  
EXAMINATION 2020

**1**  
AIR



SHUBHAM KUMAR

**7**  
AIR



SAMYAK  
S JAIN

**8**  
AIR



ISHITA  
RATHI

**9**  
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