

ENVIRONMENT

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1. CLIMATE CHANGE

1.1. GLOBAL SCENARIO

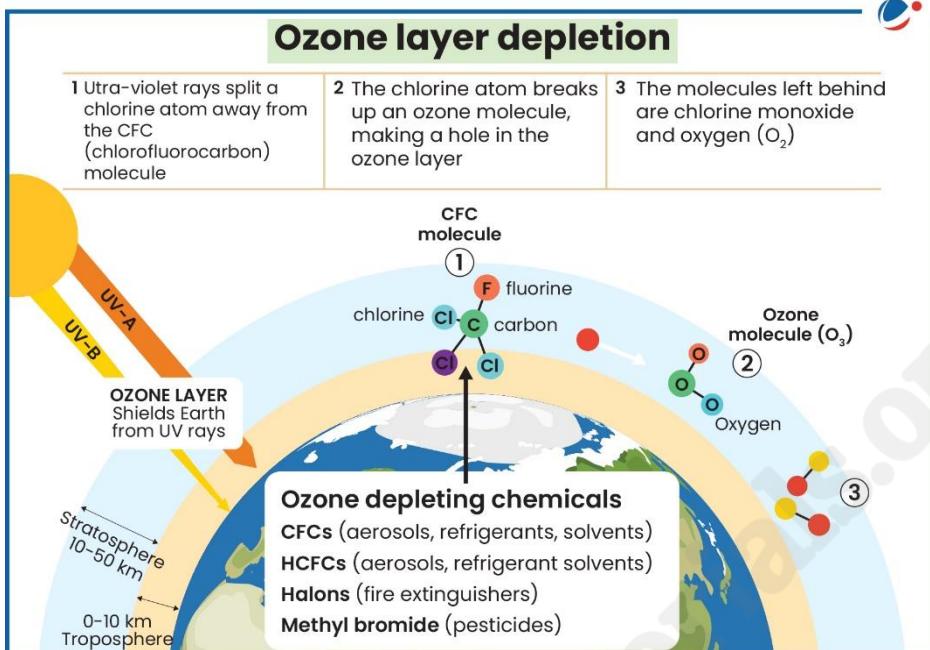
1.1.1. OZONE HOLE

Why in the News?

As per a recent study, from 2020-22, ozone hole has grown larger and thinner over Antarctica.

About Ozone layer and Ozone Hole

- Thin shield of gas in Earth's Stratosphere
- Absorbs the sun's ultraviolet rays.
- Nearly 90% of Earth's ozone resides in the stratosphere.
- Ozone hole: Region of exceptionally depleted ozone in the stratosphere over the Antarctic and Arctic.
 - Denotes areas where ozone levels drop below 220 Dobson Units.
 - Average thickness of ozone layer over Earth: 300 Dobson Units
- Ozone-depleting substances (ODSs)
 - Human-made gases that reach stratosphere and repeatedly break apart ozone molecules.
 - A process known as catalytic cycles (a sequence of chemical reactions in the form of a loop) resulting in destruction of ozone.
- Major ODSs: Chlorine, bromine, CFCs, carbon tetrachloride, halons etc.
- Status: Ozone layer on track to recover within 4 decades (United Nations Environment Programme).



Potential drivers of ozone hole over Antarctica

- Changes in Antarctic polar vortex
 - Polar Vortex are stratospheric wind patterns with a vast swirl of low pressure and very cold air, more pronounced over the South Poles and leads to formation of **Polar Stratospheric Clouds (PSCs)**.
 - PSCs, also known as **nacreous clouds or mother of pearl**, are formed **only below -78C**, and trap **outgoing longwave radiation**.
 - Can destroy ozone by
 - Providing a surface that converts benign forms of **chlorine into reactive, ozone-destroying forms**.
 - Removing **nitrogen compounds** that moderates the destructive impact of chlorine.
- Changes in solar cycle.
- Increased atmospheric abundance of Chlorofluorocarbons (CFCs).

Related News: Impact of Volcanic eruptions on Ozone layer

- As per recent study, eruption of Hunga Tonga-Hunga Ha'apai Volcano may have potentially impacted ozone layer.
- Hunga Tonga-Hunga Ha'apai is a submarine volcano in the **Tongan archipelago** located in the **southern Pacific Ocean**, that erupted in January 2022.

- Earlier, **1991** eruption of **Mt. Pinatubo** in the Philippines potentially led to significant ozone loss in stratosphere.

Impact of volcanic eruptions on ozone layer



Triggers massive stratospheric water vapor plume.



Inject large quantities of sulphur dioxide (facilitates chemical conversion of chlorine making it more reactive)



Contribute atmospheric bromine, and hydrogen chloride



Eruption particles provide surfaces for chemical reactions for ODS.

1.1.1.1. MONTREAL PROTOCOL

Why in the News?

India surpassed Montreal protocol targets, says report by Ministry of Environment and United Nations Development Programme (UNDP).

About India's achievement under Montreal Protocol

- Exceeded the 35% HCFC (Hydrochlorofluorocarbons) phase-out goal.**
 - 44% reduction achieved from the **2020 baseline**.
- Eliminated HCFC 141b.**
 - HCFCs are employed as **refrigerants** in production of new equipment.
 - HCFC **141b**, is used as a **blowing agent** in production of rigid polyurethane foam.
- Will also phase out use of **HCFCs in new equipment manufacturing completely by December 2024**
 - Ahead of the Montreal Protocol schedule (2030).
- Other achievements of India in the implementation of Montreal Protocol**
 - Phased out CFC**, Carbon tetrachloride, Halons, etc. for controlled uses.
 - HFCs Phase-out Management Plan (HPMP)** Stage- II is currently under implementation from 2017 (till 2024).
 - India Cooling Action Plan (ICAP)** aims at **reducing cooling demand, refrigerant transition, enhancing energy efficiency and adopting better technology options by 2037-38.**

About Montreal Protocol (1987)

- Implemented under the **Vienna Convention (adopted in 1985)**.
- A **global environmental treaty to eliminate the production and use of Ozone Depleting Substances (ODS)**.
- Signatories:** 1st universally ratified Treaty of UN.

- World Ozone Day **celebrated (16th September)** each year to **commemorate its signing**.
- **Kigali Amendment** to Montreal Protocol was **adopted** in 2016 (entered into force 2019), to phase **down** production and **consumption** of **Hydrofluorocarbons (HFCs)**.
 - HFCs are **non-ODS alternatives to CFCs and HCFCs**, but their global warming potential is **thousands of times** that of carbon dioxide.
 - It divides nations into **3 groups** with a **four-step path to achieve 80% reduction in HFCs consumption by 2047**.
- **India and Montreal protocol**
 - Became **Party to the Vienna Convention (in 1991)** and the **Montreal Protocol (in 1992)**.
 - **Implementing agency:** Ministry of Environment, Forest and Climate Change (MoEF&CC)
 - **Ratified Kigali Amendment in 2021.**
 - ✓ Under it, India will complete its phase down of HFCs in **4 steps from 2032 onwards** with cumulative reduction of 10% in 2032, 20% in 2037, 30% in 2042 and 85% in 2047.

1.1.2. STATE OF THE CRYOSPHERE 2023

Why in the News?

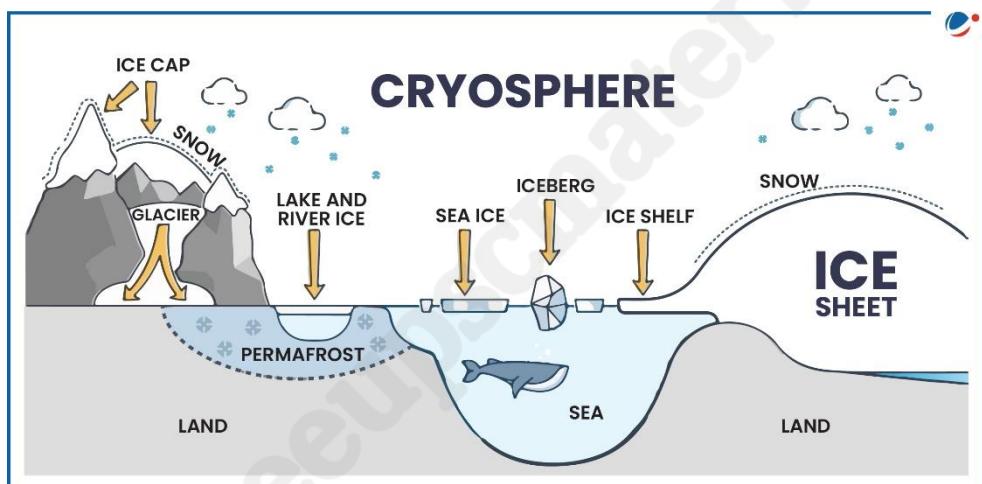
The State of the Cryosphere 2023 – Two Degrees is Too High report was released by the International Cryosphere Climate Initiative (ICCI).

About ICCI

- A **network of experts and researchers** working with **governments and organizations** to preserve Earth's cryosphere.
- ICCI programs targets the **climate dynamics of cryosphere, focuses on the global implications of cryosphere warming**.

Highlights of the report

- **Nearly all tropical glaciers, most mid-latitude glaciers, and polar regions** will disappear even if the temperature rises by 2° Celsius.
- Himalayas expected to lose **50 % of today's ice** if global average temperatures touch 2°C.
- The last decade witnessed the **7 worst years of ice loss**.



About Cryosphere

- Frozen part of the planet.
- **Cryosphere's Role in Global Climate**
 - **Help to regulate Earth's temperature:** due to high Albedo.
 - ✓ Albedo is the fraction of light that a surface reflects.
 - **Store Carbon:** Permafrost has trapped tonnes of carbon inside its soil.
 - **Water availability:** Contains 80% of the world's fresh water in the form of glaciers, ice sheets, etc.
- Ice melt in cryosphere causes **extreme Weather Events and sea level rise**.
- **India's Initiatives to protect cryosphere:** National Mission for Sustaining the Himalayan Ecosystem; established a Centre for Himalayan Glaciology in Wadia Institute, etc.

1.1.2.1. ICE MELT IN WEST ANTARCTICA

Why in the News?

Accelerated ice melt was noticed in West Antarctica through various studies and computer simulations.

More on the news

- West Antarctic ice sheet, if completely lost, could contribute to sea level rise of up to 5 meters.
- Ocean-driven melting of floating ice shelves in the Amundsen Sea is the main process contributing to sea-level rise.
 - The Amundsen Sea is located off the coast of West Antarctica.

Sequence of ice melt-

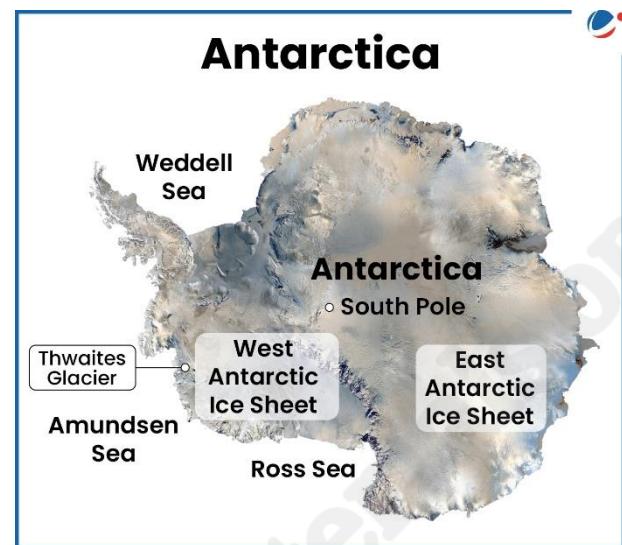
- Melting causes the retreat of the grounding line (i.e. the line where the ice first goes afloat).
- It reduces the resistance to ice flowing across the grounding line.
- Faster flow near the grounding line causes more horizontal stretching leading to thinning.
- It creates steeper surface slopes which increases the stress that drives the ice forward,
- The faster flow inland causes thinning to propagate even further into the interior of the ice sheet, increasing the contribution to sea level rise.

Global efforts to safeguard Antarctica

- Antarctic Treaty, signed in 1959, with the objectives to demilitarize Antarctica, promote international scientific cooperation etc. (India is a member).
- Convention for the Conservation of Antarctic Seals, 1972
- Convention on the Conservation of Antarctic Marine Living Resources, 1982 (ratified by India)
- Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol), 1991 (signed by India)

India

- Indian Antarctic program, which began in 1981, built three research base stations in Antarctica, named Dakshin Gangotri (1983), Maitri (1988) and Bharati (2012).
 - As of today, Maitri and Bharati are fully operational.
- The Antarctic Act, 2022: Enacted by India to give effect to Antarctic Treaty, Convention on the Conservation of Antarctic Marine Living Resources, and Protocol on Environmental Protection to the Antarctic Treaty and for matters connected.
 - Key provisions: Establishment of Committee on Antarctic Governance and Environmental Protection; Permit system; Constitution of Antarctic fund; Stringent penalties; Designated court to try punishable offences etc.



1.1.2.2. ARCTIC AMPLIFICATION

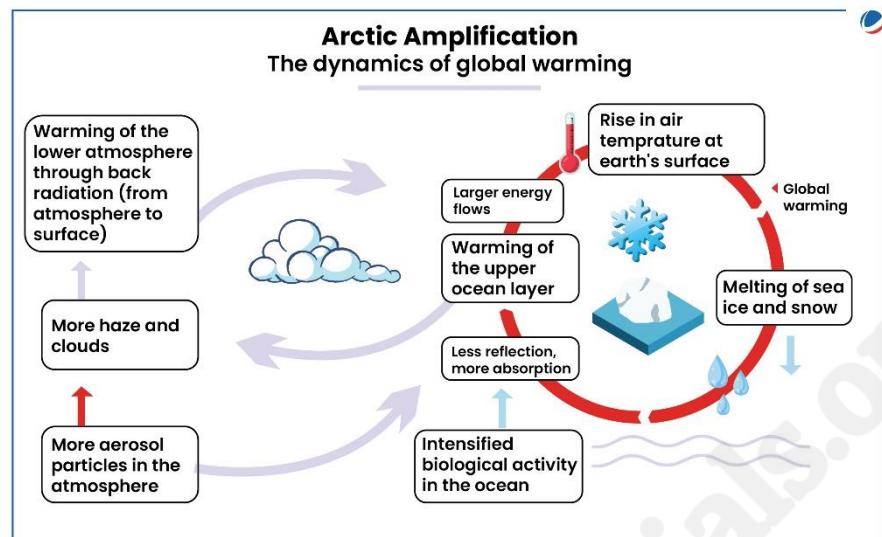
Why in the News?

World Metrological Organisation (WMO) study highlighted that Arctic has warmed twice as much as world average.

About Artic Amplification

- Refers to warming differential between the poles and the tropics.
- As per some other studies, Arctic has warmed nearly 4 times faster than the rest of the world over 1979–2021.

- Reasons for faster warming of Arctic region**
 - Polar amplification is much stronger in the Arctic than in Antarctica as it is an ocean covered by sea ice, while Antarctica is an elevated continent with permanent ice and snow.
 - Melting of the ice cover in the Arctic exposes more land/water to the Sun, leading to more absorption of sunlight.
 - Prevailing systems of air circulations transfer heat from the tropics to the poles.
- Summer Arctic sea ice extent is shrinking by 12.6% per decade as a result of global warming.
- Importance of Arctic sea ice**
 - Role in keeping polar regions cool and maintaining earth's energy balance.
 - Keeps the air cool by forming a barrier between cold air above and relatively warmer water below.
 - Changes in sea ice can affect biodiversity and impact mammals such as polar bears and walruses.
 - Affects traditional subsistence hunting lifestyle of indigenous populations such as Yup'ik, Inupiat, and Inuit.
- Reduced ice can open up shipping lanes and increase access to natural resources in Arctic region.



Related concept: Blue Ocean event

- Refers to a situation in which the Arctic Ocean's ice area drops below 1 Million Sq.Km leading to the change of arctic surface colour from white to blue.
- Process reduces the amount of sunlight reflected into space, leading to further warming and ice loss.

1.2. INTERNATIONAL CONFERENCES, CONVENTIONS AND INITIATIVES

1.2.1. 28TH CONFERENCE OF THE PARTIES (COP28)

Why in the news?

28th COP28 of the United Nations Framework Convention on Climate Change (UNFCCC) was held in Dubai, UAE.

About COP

- Annual conferences of UNFCCC to discuss on ways to address climate crisis.
 - Meetings review of the Nationally Determined Contributions (NDCs), submitted by member countries under Paris Agreement (2015).
- Final document called UAE Consensus adopted during COP28.
- Azerbaijan and Brazil to host COP29 (2024) and COP30 (2025), respectively.

Key outcomes of COP28

Pillars of COP28	Key outcomes
Fixing climate finance	<ul style="list-style-type: none"> Operationalized Loss and Damage (L&D) Fund <ul style="list-style-type: none"> First announced during COP27 in Sharm el-Sheikh (Egypt) in 2022 Meant to compensate countries already dealing with climate change. <ul style="list-style-type: none"> L&D refers to the negative consequences arising from the unavoidable risks of climate change, like rising sea levels, heatwaves, crop failures, etc.

	<ul style="list-style-type: none"> ✓ Warsaw International Mechanism (WIM) for L&D was established at COP19 in 2013 in Warsaw (Poland) to address L&D associated with climate change in developing countries. ○ Will be administered by the World Bank as a World Bank-hosted Financial Intermediary Fund for an interim period of four years. <ul style="list-style-type: none"> ✓ But managed by an independent secretariat. ○ Countries including UAE, Germany, UK, Japan, etc., pledged money to the fund. ● Mobilization of \$83.9 billion to climate finance in the Green Climate Fund, Adaptation Fund, Least Developed Countries Fund, and Special Climate Change Fund. ● Declaration on a Global Climate Finance Framework (India part of the declaration).
Focusing on people, lives and livelihoods	<ul style="list-style-type: none"> ● First implementation report of Sharm el-Sheikh Adaptation Agenda (SAA) was released. ● COP28 UAE Declaration on Agriculture, Food, & Climate ● COP28 UAE Declaration on Climate and Health <ul style="list-style-type: none"> ○ Released by United Arab Emirates (UAE) in partnership with the World Health Organization (WHO) ○ Signed by over 120 countries including US, UK, Brazil etc. <ul style="list-style-type: none"> ✓ India has not signed yet. ● COP28 UAE Declaration on Climate Relief, Recovery & Peace ● Adoption of Global Goal on Adaptation-UAE Framework for Global Climate Resilience. <ul style="list-style-type: none"> ○ Guides long-term adaptation efforts, in the context of the temperature goal referred to in Article 2 of the Paris Agreement. ○ Global Goal on Adaptation is a collective commitment under Article 7.1 of the Paris Agreement aimed at enhancing world's adaptive capacity, strengthening resilience and reducing vulnerability to climate change.
Underpinning everything with full inclusivity	<ul style="list-style-type: none"> ● Launch of the COP 28 Gender-Responsive Just Transitions and Climate Action Partnership. ● Appointment of the Youth Climate Champion to serve as the missing bridge between the COP Presidency and youth stakeholders.

Reports released at COP28

Report	Details
Report on climate finance	<ul style="list-style-type: none"> ● Released by: Independent High-Level Expert Group on Climate Finance (IHLEG) <ul style="list-style-type: none"> ○ Formed by COP26 Presidency, to develop policy options and recommendations to promote investment for UNFCCC Paris Agreement. ● Key findings <ul style="list-style-type: none"> ○ Global climate finance committed more than tripled over last decade but still too low. ○ Climate finance concentrated in developed economies and China, and in mitigation rather than adaptation.
An eye on methane Report	<ul style="list-style-type: none"> ● Released by: International Methane Emissions Observatory (IMEO) <ul style="list-style-type: none"> ○ IMEO works under the UN Environment Programme (UNEP). ○ Launched at the G20 Leaders' Summit (2021). ● Provides decision-makers a framework, to track and monitor methane emissions, to plan targeted and ambitious actions for their mitigation.

About UNFCCC

- An **international environmental treaty** seeking to reduce greenhouse gases to prevent global warming.
- **Genesis:** Signed in 1992 at **United Nations Conference on Environment and Development** also known as the Earth Summit and is Headquartered in **Bonn (Germany)**.
- **Secretariat:** Bonn, Germany
- **Members:** 197 parties (including India)
- **Key Agreements:**
 - **Paris Agreement**
 - ✓ **Adopted in 2015 (legally binding)**
 - ✓ **Goal:** To keep the global **average temperature increase well below 2°C above pre-industrial levels**, with efforts to limit the rise to 1.5°C.
 - Kyoto Protocol (Adopted in 1997, entered into force in 2005)
 - ✓ **Committed industrialized countries and economies** in transition to limit and reduce GHG emissions in accordance with agreed individual targets.
 - ✓ Commitments **ended in 2020**.
- **Initiatives: Momentum for Change Climate Neutral Now** (launched by UNFCC Secretariat)
 - It urges Individuals, Companies and Governments to achieve Climate neutrality through three steps namely; Measuring the climate footprint, Reducing and Offsetting the emissions.

Reports released by UNFCCC

Reports	Details
Global stocktake (GST) technical synthesis report	<ul style="list-style-type: none"> • Global stocktake is a process for countries to see whether they are collectively making progress towards meeting the goals of the Paris Agreement once every 5 years. • Global Stocktake (GST) calls on Parties to the Paris Agreement, to follow 8 steps- • The draft framework for Global stocktake was released during the Bonn climate meet.
Paris Agreement Synthesis Report	<ul style="list-style-type: none"> • Implementing latest NDCs will increase emissions by approximately 8.8% by 2030, relative to 2010 levels. • 40% of Parties outlined the roles of local communities and rights of Indigenous Peoples in adaptation components of NDCs.

1.2.1.1. KEY INITIATIVES LAUNCHED IN COP28

Initiative	Launched/Initiated	Features
Global Green Credit Initiative (GGCI)	By India	<ul style="list-style-type: none"> Serve as the international platform for dialogue, collaboration, and the exchange of innovative environmental programs and instruments. <ul style="list-style-type: none"> Also referred as Global Platform for Nature's Ecological Transformation. Key Purposes: <ul style="list-style-type: none"> Sharing of global technical know-how and experiences. Shaping green credit policy instruments. Supporting implementation (practice component) by Creating one common value chain. Features of GGCI <ul style="list-style-type: none"> 'Green Credit' system, envisages a fully digital and tradable instrument for environmental sustainability. 'Green Credit Portal,' a repository documenting plantations and environmental projects working to shape global demand for future policies. Aligned with the principles of the Green Credit program (GCP). "Green credits" focus on voluntary environmental actions involving the community, private industry and individuals.
Global Renewables and Energy Efficiency Pledge	<ul style="list-style-type: none"> Signed by 118 countries on the sidelines of COP28 India not a Signatory 	<ul style="list-style-type: none"> Aim: <ul style="list-style-type: none"> Triple the global installed renewable energy capacity to at least 11,000 GW and Double the global energy efficiency improvement rate to more than 4% by 2030. Phase down unabated coal.
The Global Cooling Pledge	<ul style="list-style-type: none"> Initiated by UAE India not a Signatory 	<ul style="list-style-type: none"> Aim: <ul style="list-style-type: none"> Commits the countries to reduce their cooling emissions by at least 68% by 2050. To increase access to sustainable cooling by 2030. To increase the global average efficiency of new air conditioners by 50%. Emission targets draw on the modelling from the UNEP Cool Coalition report Global Cooling Watch 2023 Keeping it Chill.
Fossil Fuel, Oil and Gas Decarbonization Charter (OGDC)	Signed by 50 companies, representing more than 40% of global oil production	<ul style="list-style-type: none"> A global industry Charter dedicated to speeding up climate action and achieving high-scale impact across the oil and gas sectors. Key initiative under Global Decarbonization Accelerator (GDA), launched at World Climate Action Summit recently. <ul style="list-style-type: none"> GDA is focused on three key pillars: <ul style="list-style-type: none"> ✓ Scaling energy system of tomorrow; ✓ Decarbonizing energy system of today; and ✓ Targeting methane and other non-CO₂ greenhouse gases.
Africa Green Industrialisation Initiative (AGII)	African leaders launched at COP28	<ul style="list-style-type: none"> Aims to accelerate green growth of industries in Africa and attract finance and investment opportunities.

G7 climate club	<ul style="list-style-type: none"> Led by Germany and Chile, along with 36 member countries including Kenya, the European Union, Switzerland and others. India is not a member 	<ul style="list-style-type: none"> An open, cooperative, and inclusive forum of climate-ambitious countries with the goal of supporting the effective implementation of the Paris Agreement and decisions thereunder. Aim: To support accelerating climate action and increasing ambition to achieve global net-zero greenhouse gas emissions by or around mid-century, with a particular focus on decarbonising industry. First proposed by Germany during a G7 summit meeting (2022). Interim Secretariat: Economic Cooperation and Development (OECD) and International Energy Agency (IEA).
Allied Climate Partners (ACP) Platform	Initial funders include Arnold Ventures, Ballmer Group, Bezos Earth Fund, Anita and Josh Bekenstein, the Children's Investment Fund Foundation (CIFF), etc.	<ul style="list-style-type: none"> ACP is a philanthropic investment organisation. Aim: To increase the number of climate-related projects and businesses in emerging economies. Initial focus regions are Southeast Asia, the Caribbean and Central America, Africa, and India. Will invest in Southeast Asia Clean Energy Facility (SEACEF). ACP and International Finance corporation (IFC) aims to generate \$ 11 billion for climate investment in developing countries. <ul style="list-style-type: none"> IFC is the private sector arm of the World Bank that encourages private investment in developing countries.
ALTERRA fund	Announced by UAE	<ul style="list-style-type: none"> A \$30 billion climate fund Vision: <ul style="list-style-type: none"> To become the world's largest private investment vehicle for climate change action Mobilise \$250 billion globally by 2030 to create a fairer climate finance system. Focus Areas: Energy Transition; Industrial decarbonization; Sustainable living; and Climate technologies

1.2.2. INDIA AT COP 28

Why in the News?

India voiced the concerns of the Global South and reiterated the urgency of making climate finance available to the developing countries in COP28.

India's role at COP28

Role	Details
Co-launched the Leadership Group for Industry Transition (LeadIT 2.0)	<ul style="list-style-type: none"> LeadIT 2.0 will focus on inclusive & just industry transition, development and transfer of low-carbon technology, and financial support to emerging economies for industry transition. LeadIT was launched by India and Sweden at the UN Climate Action Summit in 2019.
Co-hosted (India and UAE) event on 'Green Credits Programme' at COP-28	<ul style="list-style-type: none"> Green Credit Initiative focuses on voluntary environmental actions involving the community, private industry and individuals.
India participated at Mangrove Alliance for	<ul style="list-style-type: none"> MAC seeks to scale up, accelerate conservation, restoration and growing plantation efforts of mangrove ecosystems globally.

Climate (MAC) Ministerial Meeting at COP-28	<ul style="list-style-type: none"> It was initiated by the UAE and Indonesia, during COP 27. India is also a member.
India-led Global River Cities Alliance (GRCA) launched	<ul style="list-style-type: none"> National Mission for Clean Ganga (NMCG) signed a Memorandum of Common Purpose (MoCP) with Mississippi River Cities and Towns Initiative (MRCTI). This led to launch of GRCA, as the current River Cities Alliance (RCA) has now expanded its strength to membership of 267 global river-cities including India, USA and Denmark. <ul style="list-style-type: none"> RCA is a joint initiative of Ministry of Jal Shakti (MoJS) & Ministry of Housing and Urban Affairs (MoHUA) to connect river cities and focus on sustainable river centric development, started in 2021 GRCA's secretarial role would be served by NMCG under Ministry of Jal Shakti (MoJS) and National Institute for Urban Affairs (NIUA) under Ministry of Housing and Urban Affairs (MoHUA).

1.2.3. NATIONALLY DETERMINED CONTRIBUTIONS (NDC)

Why in the News?

UNFCCC secretariat has released **NDC Synthesis report 2023** under the **Paris Agreement**.

Key findings of the report

- World is off track to Paris Agreement goals**
 - Implementing latest NDCs will **increase emissions** by approximately **8.8% by 2030, relative to 2010 levels**.
- 40% of Parties outlined the **roles of local communities and rights of Indigenous Peoples** in adaptation components of NDCs.

About 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-
 - The **actions they will take to reduce their GHG emissions** in order to reach the goals of the Paris Agreement.
 - Actions they will take to build resilience** to adapt to the impacts of rising temperatures.
- Submitted every 5 years** to the UNFCCC Secretariat.

India and its NDCs

- First NDC published in 2015 and **updated in August 2022**.
- Achievement:** Achieved **2 of its previous NDCs** well ahead of its target.
 - Reduced the emission intensity vis-à-vis its GDP by 33% between 2005 and 2019.
 - Achieved 40% of electric installed capacity through non-fossil fuel sources (9 years ahead of target for 2030).

Related concept: India's Panchamrit

- India committed five climate actions as 'Panchamrit' in CoP26 held at Glasgow
 - Reach **500 GW Non-fossil energy capacity** by 2030.
 - Meet 50%** of its energy requirements from **renewable energy** by 2030.
 - Reduction of total projected carbon emissions by **one billion tonnes** from now to 2030.
 - Reduction of the carbon intensity** of the economy by **45% by 2030**, over 2005 levels.
 - Achieving the target of **net zero emissions by 2070**.

INDIA'S NATIONALLY DETERMINED CONTRIBUTION (NDC)



QUANTITATIVE TARGETS

Targets for 2030	Previous NDC, 2015	Updated NDC, 2022	Progress
 Reduce the emissions intensity of its GDP	Reduced by 33% between 2005 and 2019	By 45% by 2030 from 2005 level.	Reduced by 33% between 2005 and 2019
 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%	43.81% (31st October, 2023)
 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
 Put forward and further propagate a healthy and sustainable way of living 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 the Environment ' as a key to combating climate change.
 Adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.	Same as earlier
 Better adapt to climate change 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
 Mobilize domestic and new & additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.	Same as earlier
 Build capacities, create domestic framework and inter-national architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies.	Same as earlier

1.2.4. GUIDANCE ON CHILDREN'S RIGHTS AND ENVIRONMENT

Why in the News?

UN Committee on the Rights of the Child (CRC) issued the Guidance on Children's rights and environment.

About the Guidance

- Formally known as **General Comment No. 26.**
 - Has Extended the magnitude of **triple planetary crisis** - climate emergency, the collapse of biodiversity and pervasive pollution as systematic threat to Children's rights.
- Has affirmed children's right to live in a clean, healthy and sustainable environment.
- Provides a **comprehensive interpretation of State obligations** under the **UN Convention on the Rights of the Child (UNCRC)**.
- Aims to address the adverse effects of **environmental degradation and climate change** on the **enjoyment of children's rights**.



About UN Convention on the Rights of the Child (UNCRC)

- UNCRC, adopted in **1989**, outlines children's rights, including to life, health, clean drinking water, and survival and development.
 - Ratified by **196 state parties (including India)**.
- CRC (**body of 18 independent experts**) monitors implementation of the UNCRC by its States parties.

1.2.5. OTHER INITIATIVES IN NEWS

Initiative	Details
Global Greenhouse Gas Watch (GGGW)	<ul style="list-style-type: none"> The World Meteorological Congress has approved a new GHG monitoring initiative 'Global Greenhouse Gas Watch (GGGW)' to aid urgent action in reducing heat-trapping gases. Aims to bring all space-based and surface-based observing systems, as well as modelling and data assimilation capabilities, under one roof. <ul style="list-style-type: none"> To be built on WMO's Global Atmosphere Watch established in 1989 and its Integrated Global Greenhouse Gas Information System. Will consist of 4 main components <ul style="list-style-type: none"> A comprehensive, sustained, global set of surface-based and satellite-based observations of CO₂, CH₄ and N₂O concentrations. Prior estimates of the GHG emissions; A set of global high-resolution Earth System models representing GHG cycles; Associated with the models, data assimilation systems to generate products of higher accuracy.
First movers' coalition (FMC)	<ul style="list-style-type: none"> India participated in the First Movers Coalition (FMC) Leadership Meeting FMC: Led by the World Economic Forum and the US government. Launched at COP26 as a flagship public-private partnership to clean up the most carbon-intensive sectors. India is a member.
Major Economies Forum (MEF) on Energy and Climate	<ul style="list-style-type: none"> USA aims to catalyse global climate action through its MEF on Energy and Climate. Launched in 2009, it aims at facilitating candid dialogue among major emitting countries to garner the political leadership needed to advance efforts against climate change.

	<ul style="list-style-type: none"> MEF economies account for roughly 80% of global GDP and global greenhouse gas (GHG) emissions. <ul style="list-style-type: none"> Represents 20 major economies including India, Australia, Brazil, China, UK, UAE etc. MEF leaders deliberated on International Energy Agency's (IEA's) "Credible Pathways to 1.5°C", which identified need for efforts in four key areas- <ul style="list-style-type: none"> Decarbonizing Energy Reducing deforestation to net zero by 2030 Tackling potent, non-CO2 climate pollutants Advancing Carbon Management
Enhancing Nature-based Solutions for an Accelerated Climate Transformation (ENACT) Partnership	<ul style="list-style-type: none"> Six new countries and UN Environment Programme have joined ENACT Partnership recently. <ul style="list-style-type: none"> India not a part. Launched by: Germany and Egypt along with the IUCN at COP 27, which took place at Sharm el-Sheikh, Egypt in 2022. Aims to coordinate global efforts to address climate change, land and ecosystem degradation, and biodiversity loss through Nature-based Solutions (NbS).
Global Research Alliance on Agricultural Greenhouse Gases (GRA)	<ul style="list-style-type: none"> New Zealand Minister recently invited India to join the GRA for sharing researches on mitigation of climate change impacts on agriculture. Launched in 2009 to promote international cooperation and investment in research to mitigate the effect of agricultural greenhouse gas emissions. Aims to deepen and broaden mitigation research efforts across the agricultural sub-sectors of paddy rice, cropping, and livestock. Currently has 67 member countries (excluding India).
Kampala Ministerial Declaration	<ul style="list-style-type: none"> Around 48 African countries have agreed to adopt Kampala declaration on Migration, Environment and Climate Change (KDMECC). Aims to address the nexus of human mobility and climate change in the continent. Declaration calls for enhanced cooperation to address five areas concern: <ul style="list-style-type: none"> Progressive desertification and land degradation Unsustainable use of ecosystems Unplanned migration of people due to climate change and disasters Paucity of data and statistics on the impact of climate change Limitations of partnerships and financing to respond to the climate crisis
Data in Climate Resilient Agriculture (DiCRA)	<ul style="list-style-type: none"> The United Nations Development Programme (UNDP) and the National Bank for Agriculture and Rural Development (NABARD) have signed an MoU to co-create data-driven digital public good, which includes DiCRA. DiCRA is a collaborative digital public good that provides open access to key geospatial datasets pertinent to climate-resilient agriculture. <ul style="list-style-type: none"> Curated by UNDP and partner organizations to inform public investments in agriculture.
Cool Coalition	<ul style="list-style-type: none"> UNEP led Cool Coalition has released a Global Cooling Watch report 2023 named "Keeping it Chill: How to meet cooling demands while cutting emissions". <ul style="list-style-type: none"> Released to support the Global Cooling Pledge and the Cool Coalition. About Cool Coalition <ul style="list-style-type: none"> Launched by: UNEP at the First Global Conference on Synergies between the 2030 Agenda for Sustainable Development Goals and the Paris Agreement. A global network of partners working to provide efficient, climate-friendly cooling for all.

	<ul style="list-style-type: none"> ○ International Solar Alliance (India) is a partner.
FAO Action Plan (2022-25)	<ul style="list-style-type: none"> ● Food and Agriculture Organization (FAO) Launched Action Plan (2022-25) for Implementation of FAO Strategy on Climate Change (2022–2031). ● The Strategy envisages agrifood systems as sustainable, inclusive, resilient and adaptive to climate change. <ul style="list-style-type: none"> ○ Currently, Global agrifood systems are responsible for about a third of total greenhouse gas emissions. ● FAO Action Plan is based on three pillars: Strengthening global and regional climate policy and governance; Developing countries' capacities for climate action and Scaling up climate action on ground.
Climate Change Performance Index (CCPI) 2024	<ul style="list-style-type: none"> ● India this year further improved its global CCPI ranking by securing 7th position (last year it was 8th). ● About CCPI <ul style="list-style-type: none"> ○ Released by Germanwatch. ○ Independent monitoring tool for tracking climate protection performance. ○ Assesses countries performance in four categories: <ul style="list-style-type: none"> ✓ GHG emissions (40% of the overall score) ✓ Renewable energy (20%), ✓ Energy use (20%) , ✓ Climate policy (20%). ○ Top three places i.e. 1-3 are vacant in CCPI. ● Germanwatch also releases The Global Climate Risk Index.
Nairobi declaration	<ul style="list-style-type: none"> ● The first Africa Climate Summit 2023 ends with the 'Nairobi Declaration'. ● Called for an annual climate finance pledge of \$100bn and reforms to multilateral financial systems
Addis Ababa Declaration	<ul style="list-style-type: none"> ● The 19th African Ministerial Conference on the Environment (AMCEN) 2023, held in Addis Ababa, Ethiopia ended with the declaration. ● Prioritizes wide-ranging actions related to climate change, plastics pollution, marine protection, land degradation, and natural capital. ● Signed by 54 African Nations.
C40	<ul style="list-style-type: none"> ● Bengaluru Climate Action Plan was unveiled in line with the city's commitment to C40 Cities and Delhi's City of Lakes Project and 3i model were discussed during its meet. <ul style="list-style-type: none"> ○ Delhi's breakthrough initiatives in fighting climate change ○ Delhi's 3i model is designed for Electric Vehicles and focuses on Inclusion, incentivization, and Innovation. ● C40 is a global network of nearly 100 mayors of the world's leading cities that are united in action to confront the climate crisis. <ul style="list-style-type: none"> ○ 6 Indian Cities namely Delhi NCT, Mumbai, Chennai, Kolkata, Bengaluru, and Ahmedabad are parties to it.
Global Greenhouse Gas Monitoring Infrastructure (GGMI)	<ul style="list-style-type: none"> ● Launched by: WMO ● Aim: To provide better ways of measuring planet-warming pollution and help inform policy choices. ● Will integrate space-based and surface-based observing systems, and seek to clarify uncertainties about where greenhouse gas emissions end up. ● It is embodied by WMO's 60-year-old World Weather Watch and its acclaimed Global Atmosphere Watch.

1.3. CLIMATE MITIGATION AND ADAPTATION

1.3.1. CARBON CREDITS TRADING SCHEME (CCTS)

Why in the News?

Ministry Of Power (MoP) announces reforms in Carbon Credits Trading Scheme (CCTS) launched in 2023.

About CCTS

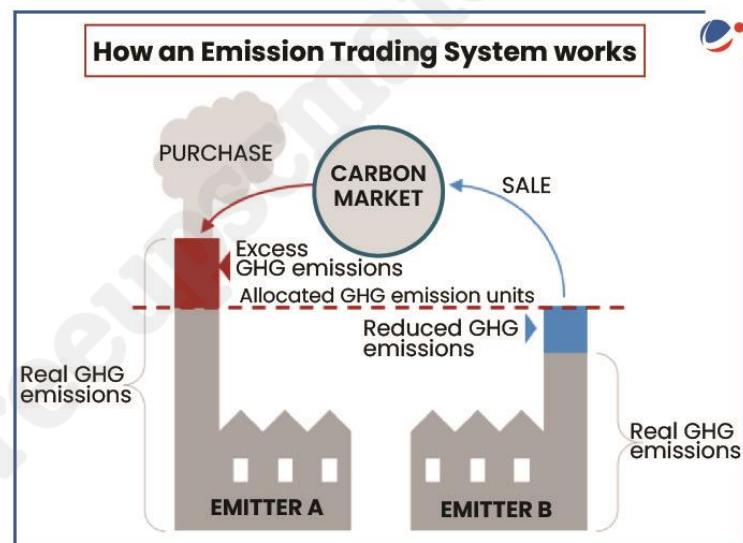
- Sets up a carbon credit trading market.
- First announced under Energy Conservation Act 2001, amended by Energy Conservation (Amendment) Bill 2022.
- Key highlights of CCTS
 - Sets up National Steering Committee (NSC), aka Indian Carbon Market Governing Board (ICMGB), headed by power and environment secretaries, to govern and oversee the functions of the Indian Carbon Market (ICM).
 - Bureau of Energy Efficiency (BEE) would be the administrator for the carbon market and set targets for reduction in emissions, issue carbon credit certificates, and accredit carbon verification agencies.
 - Central Electricity Regulatory Commission (CERC) will regulate all trading activities.
 - Grid Controller of India will be the registry of ICM.

Major reforms announced by MoP

- The Bureau of Energy Efficiency (BEE) to develop the standards and register the project under an offset mechanism.
- BEE would “validate” carbon credits, as opposed to only “verification” in the original framework.
- Allowed ‘non-obligated entities’ (Non-OEs) (purchase the carbon credit certificates voluntarily) to also register decarbonization projects and generate carbon credits.

About Carbon Markets

- Trading systems in which carbon credits are sold and bought.
- Companies or individuals can use carbon markets to compensate for their GHG emissions by purchasing carbon credits from entities that remove or reduce greenhouse gas emissions.
- One tradable carbon credit equals one tonne of carbon dioxide or the equivalent amount of a different greenhouse gas reduced, sequestered or avoided.
- Carbon trading introduced by Kyoto Protocol in 1997.



Related News: National Carbon Registry

- Launched by: United Nations Development Programme (UNDP)
- An open-source software that allows countries to effectively manage national data and processes for trading carbon credits.
 - Has been accredited as a digital public good (DPG)
 - Can be integrated with national measurement, reporting and verification (MRV) systems to meet international reporting requirements.

- National carbon Registry **will promote development of Carbon Market** by facilitating trading of carbon credits.
- **Article 6 of Paris Agreement** allows countries to voluntarily **cooperate with each other to achieve emission reduction targets** set out in their Nationally Determined Contributions (NDCs).

1.3.2. MISSION LIFE

Why in news?

Meri LiFE App was launched by the Ministry of Environment Forest and Climate Change.

More on news

- Aims to **empower youngsters and encourage their participation** in tackling climate change through simple actions in daily life
- It **provides participative experience in a series of LiFE-related tasks** under **five themes** namely Save Energy, Save Water, Reduce Single Use Plastic, Adopt Sustainable Food Systems, and Adopt Healthy Lifestyle.

About Mission LiFE (Lifestyle for Environment)

- An **India-led global mass movement** to nudge individual and community action to protect and preserve environment.
- **Launched by India at UN Climate Change Conference (UNFCCC COP26) in 2021.**
- **Nodal Ministry:** MoEFCC for national level coordination and implementation.
- **Objectives:**
 - To translate vision of LiFE into **measurable impact**.
 - Mobilise at least **one 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** are aimed to become environment-friendly by 2028.
 - Nudge individuals and communities to practise sustainable **lifestyle**.
 - ✓ Those who practice such a lifestyle are recognised as '**Pro Planet People**'.
- **7 themes of LiFE:** Save Energy; Save Water; Say No to Single Use Plastic; Adopt Sustainable Lifestyle; Reduce Waste; Adopt Healthy Lifestyles and Reduce E-Waste.
- **Implementation Mechanism:**
 - Coordinated and concerted **actions by Ministries/Departments**.
 - Compiling a **comprehensive and non-exhaustive list of 75 LiFE actions** for individuals, communities and institutions.
 - Identification of **Key Performance Indicators (KPIs) and impact of LiFE actions**
 - Creation of **LiFE Dashboard**

LiFE acknowledged by various international foras-	
	IPCC Climate Change 2022
	Mitigation of Climate Change Working Group III Report, 2022
	Cover decision of Sharm el-Sheikh Implementation Plan, 2022
	G7 Communique adopted in Sapporo, Japan, 2023
	Shanghai Cooperation Organisation Communiqué, 2023
	G20 Leaders' Declaration, 2023
	9 th G20 Parliamentary Speakers Summit (P20) and Parliamentary Forum, 2023

Related News: Environmental Information, Awareness Capacity Building and Livelihood Programme (EIACP)

- EIACP Programme Centre at Raipur has created a **world record by taking a LiFE (Lifestyle for Environment) pledge of over 12.38 lakh by people to conserve environment**.
- **About EIACP**
 - A project funded by MoEF&CC, to **facilitate collection, analysis and dissemination of information** on various facets of environment.

- One of the 3 **Central Sector sub- scheme** under **Environment Education, Awareness, Research and Skill Development (EEARSD)**.
 - ✓ **Other 2 components of EEARSD-** Environmental Education Programme (EEP) and Environmental Research and Development Program (ERDP).
- Replaced **Environmental Information System (ENVIS)** as a plan programme.
 - ✓ ENVIS Scheme was subsumed within revamped scheme of **EEARSD** (approved for 2021-22 to 2025-26) in 2022.

1.3.2.1. RIGHT TO REPAIR

Why in news?

Ministry of Electronics and Information Technology (MeitY) launched pilot project on **ERSO**.

Electronics Repair Services Outsourcing (ERSO)

- The initiative aims to make India the **Repair Capital of the World**.
- ERSO involves **outsourcing defective/damaged electronic items to Indian repair service organizations** for repair, refurbishment, and calibration to achieve optimal functionality.

About Right to repair

- Notion that consumers should have the right to repair their lawfully purchased products directly, or by selecting a repair service of their choice.

Initiatives in India

- **Department of Consumer Affairs (DCA) set up committee on the Right to Repair** to emphasize on the LiFE (Lifestyle for the Environment) movement through sustainable consumption.
 - Key sectors identified for this framework include Farming Equipment, Mobile Phones/ Tablets, Consumer Durables and Automobiles & Automobile Equipment.
- **Ministry of Consumer Affairs, Food and Public Distribution unveiled ‘right to repair’ portal.**
 - 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.

1.3.3. CARBON BORDER ADJUSTMENT MECHANISM (CBAM)

Why in the News?

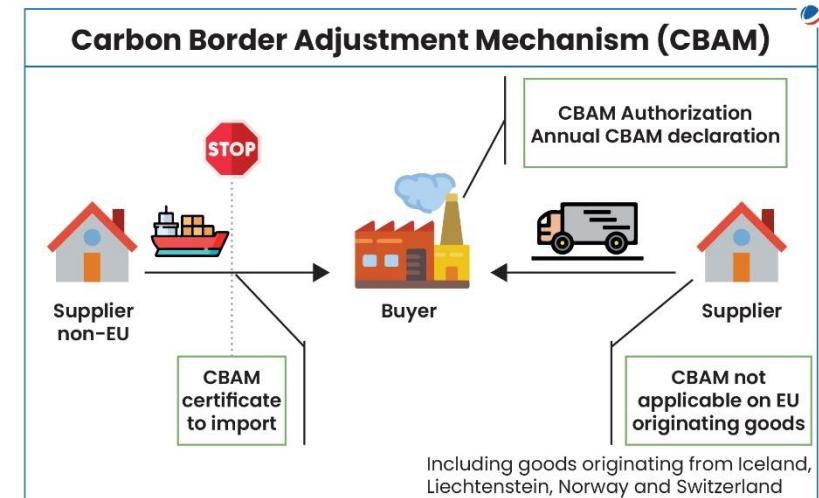
India aims to utilise green energy to help industries deal with EU's CBAM.

About CBAM

- Policy instrument to put **a fair price on the carbon emitted during the production of carbon-intensive goods** that are entering the EU and to encourage cleaner industrial production in non-EU countries.
 - Under this, **importers must purchase carbon certificates equivalent** to the EU's carbon pricing rules.
 - EU importers can **claim CBAM liability deductions** if non-EU producers have already paid emissions fees in their respective countries.
- Reporting under it **started from 1 October 2023**.
- Becomes operational in its definitive phase on 1 January 2026.
- **Designed to be compatible with WTO rules.**
- Its like a **non-tariff barrier (NTB)** for Indian exports.
 - An NTB is any measure, other than a customs tariff, that acts as a barrier to international trade.
- **Goods covered by CBAM:** Iron, steel, cement, aluminium, fertilisers, electricity and hydrogen etc.
- Adopted as a part of the EU's **Fit for 55 package**.

About Fit for 55 package

- Refers to the EU's target of reducing net greenhouse gas emissions by **at least 55% by 2030 from 1990 levels** and achieve net zero emissions by 2050.
- Other Carbon Market reforms adopted by EU**
 - Social Climate Fund**, to support people in Europe with the costs of transitions.
 - Reforming Emission Trading System (ETS)**: European industries and energy companies should cut emissions by 62 % by 2030 compared to 2005 levels, compared to previous target of 43%.



Related News: Green Deal Industrial Plan

- The European Union unveils its '**Green Deal Industrial Plan**'.
- The proposal involves building a **simpler regulatory framework, faster access to funds, enhancing skills, and improving the EU's trade network**.
- Key Features:**
 - Seeks to formulate a "**Net-Zero Industry Act**" to speed up the issuance of permits for green projects.
 - Aims to establish "**Net-Zero Industry Academies**" to provide up-skilling and reskilling programs in strategic industries.

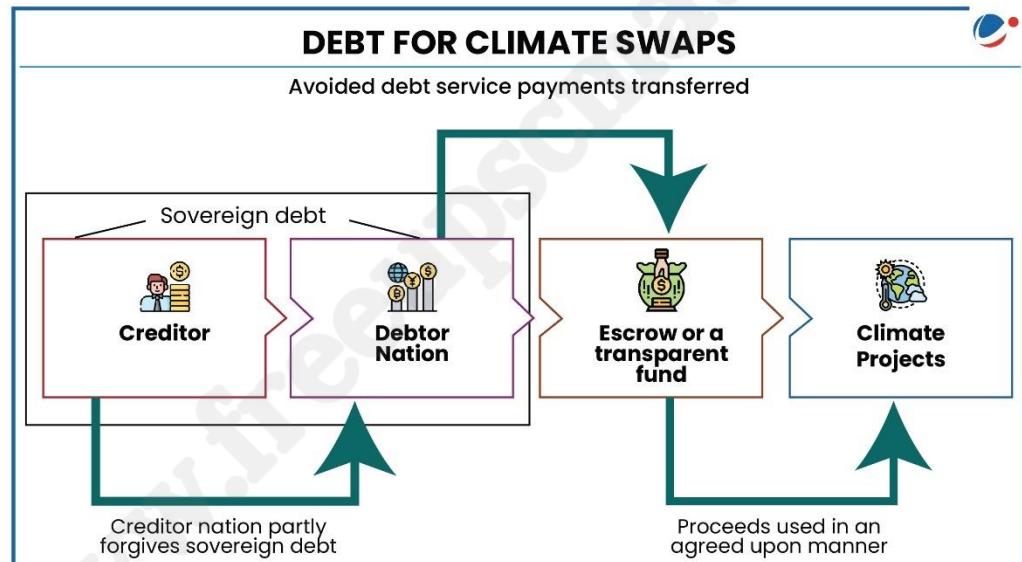
1.3.4. DEBT FOR CLIMATE SWAPS

Why in the News?

Gabon announced Africa's largest debt for nature swap valued at \$500 million.

About Debt for Climate Swaps

- A type of debt swap in which the **debtor nation, instead of continuing to make external debt payments in a foreign currency, makes payments in local currency** to finance climate projects domestically on agreed upon terms.



- First used in the 1980s in Latin America.
- The world's first and largest debt swap to conserve oceans was **signed by Ecuador in 2023**.
- India is not involved in any such debt for nature swaps till date.**
- Other countries involved in such swaps: Brazil, Madagascar, Philippines etc.

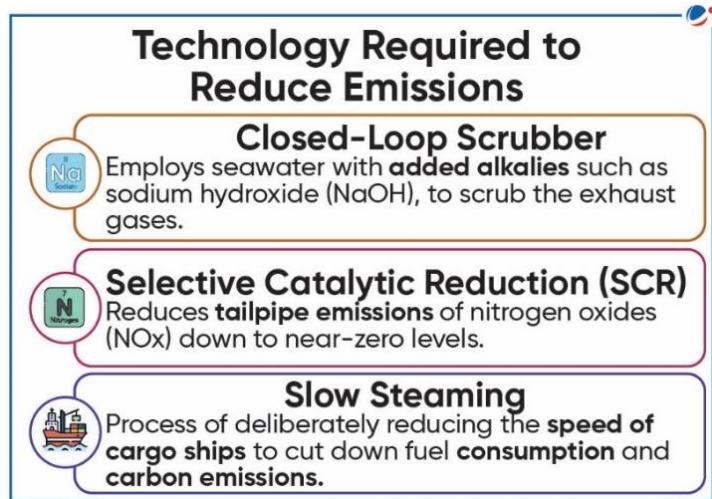
1.3.5. REDUCTION OF GREENHOUSE (GHG) EMISSIONS FROM SHIPS

Why in the news?

International Maritime Organization (IMO) has adopted a **Strategy on the Reduction of GHG Emissions from Ships**.

About the Strategy

- **Adopted by Marine Environment Protection Committee (MEPC 80)**, an important committee of IMO.
- **GHG by Shipping Industry**: Accounts for 2.89% of anthropogenic GHG emissions.
 - Includes carbon dioxide (CO₂), black carbon (BC), nitrogen oxides (NOx) and nitrous oxide (N₂O).



Key Provisions of Strategy

- **Reduction of Emissions**:
 - Reduce CO₂ emissions by at least 40% by 2030, compared to 2008.
 - Reach net-zero GHG emissions by or around 2050.
- **Technology adoption**: Uptake of technologies to reduce:
 - at least 5%, striving for 10%, of the **energy used** by international shipping by 2030.
- **Periodic Review**: Five-yearly review, first review due in 2028.

Other Efforts for Reducing Emissions from Ships

India

- Ministry of Ports, Shipping & Waterways has released 'Harit Sagar' Green Port Guidelines 2023.
- India has been selected as the first country under IMO's Green Voyage 2050 project.
- Maritime Vision 2030 provides for a sustainable maritime sector.
- Certain Ports to be developed as Hydrogen Hubs (capable of handling, storing, and generation of green hydrogen by 2030).
- Centre has set 2030 as target for India to become global hub for green shipping.
- Ministry of Ports, Shipping and Waterways has launched the Green Tug Transition Programme (GTTP).

Global

- Clydebank Declaration for Green Shipping Corridors (India is not signatory).
- Financing Sustainable Maritime Transport (FIN-SMART) Roundtable initiative (IMO-EBRD-World Bank)
- Global Maritime Technologies Cooperation Centres (MTCC) Network (GMN) (European Union and IMO)
- IMO CARES (Coordinated Actions to Reduce Emissions from Shipping) Foundation Project (2022-2024)
- International Code for ships operating in polar water or polar code: An international regime adopted by the International Maritime Organisation in 2014.

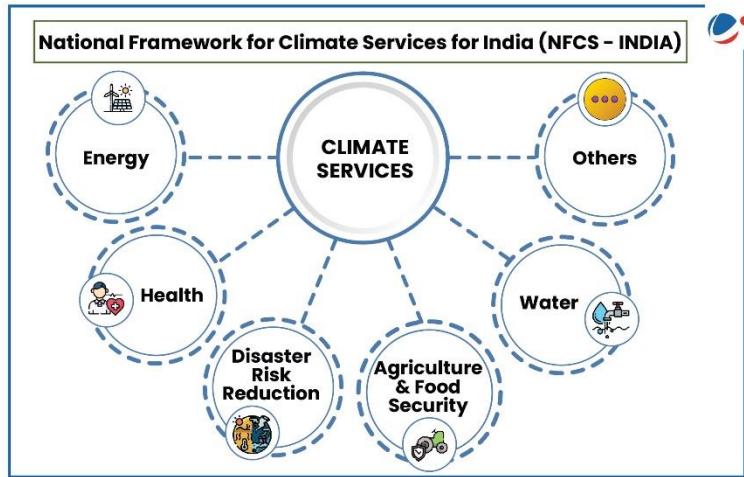
1.3.6. NATIONAL FRAMEWORK FOR CLIMATE SERVICES (NFCS)

Why in the news?

India Meteorological Department (IMD) and Christ University signed an MoU to collaborate on climate research during a Workshop on NFCS in India.

About NFCS

- NFCS - India proposed under **Global Framework for Climate Services (GFCS)**.
- Since 2009, Switzerland, China, Germany and UK have also launched the NFCS.
- **Aim:** Strengthening the production, availability, delivery and application of science-based climate monitoring and prediction services (refer to infographics).
- **Nodal agency:** IMD



About GFCS

- Launched at **World Climate Conference-3 in 2009** and coordinated by **World Meteorological Organization (WMO)**.
- Global **partnership of governments** (India is a founding Member) **and organisations**.
- **Aim:** To achieve a **climate-smart society**.

1.4. OTHER CLIMATE RELATED TERMS AND NEWS

News	Details
India Climate Energy Dashboard (ICED) 3.0	<ul style="list-style-type: none"> • NITI Aayog released ICED 3.0. • ICED: One-stop platform for near real-time data on the energy sector, climate, and related economic datasets based on government-published sources. <ul style="list-style-type: none"> ◦ Useful in monitoring the progress of India's clean energy transition journey.
UN Climate Change High-Level Champions	<ul style="list-style-type: none"> • To connect the work of governments with the many voluntary and collaborative actions taken by cities, regions, businesses and investors, nations decided to appoint two High-Level Champions. • H.E. Ms. Razan Al Mubarak and H.E. Ms. Nigar Arpadarai are the UN Climate Change High-Level Champions for COP28 and COP29.
The Energy Transition Advisory Committee (ETAC)	<ul style="list-style-type: none"> • The Green Shift: The Low Carbon Transition of India's Oil & Gas Sector' report was submitted by ETAC to the Government. <ul style="list-style-type: none"> ◦ The report focuses on increasing adoption of clean energy solutions such as hydrogen, biofuel, nuclear, geothermal, tidal in India's energy mix. • About ETAC <ul style="list-style-type: none"> ◦ Established in 2021 by the Ministry of Petroleum & Natural Gas (MoP&NG). ◦ Formed to draw an energy transition pathway for Oil & Gas Public Sector Undertakings (PSUs) in the country.
Short-lived halogens	<ul style="list-style-type: none"> • As per a recent study, oceans cool the planet by releasing short-lived halogens that contribute 8-10 per cent of cooling. • SLH (lifetime of less than six months) are gases that contain the halogen elements chlorine, bromine, or iodine. • Source: Marine phytoplankton and algae, abiotic sources from ocean and tropospheric chemistry. • Impact: Reduces warming by depleting ozone and reduce the formation of cooling aerosols. <ul style="list-style-type: none"> ◦ SLH increase methane's lifetime in the atmosphere and increase the levels of water vapour.
Decarbonisation	<ul style="list-style-type: none"> • Recently, NITI Aayog released "Towards Decarbonising Transport 2023: A Stocktake on Sectoral Ambition in G20" report.

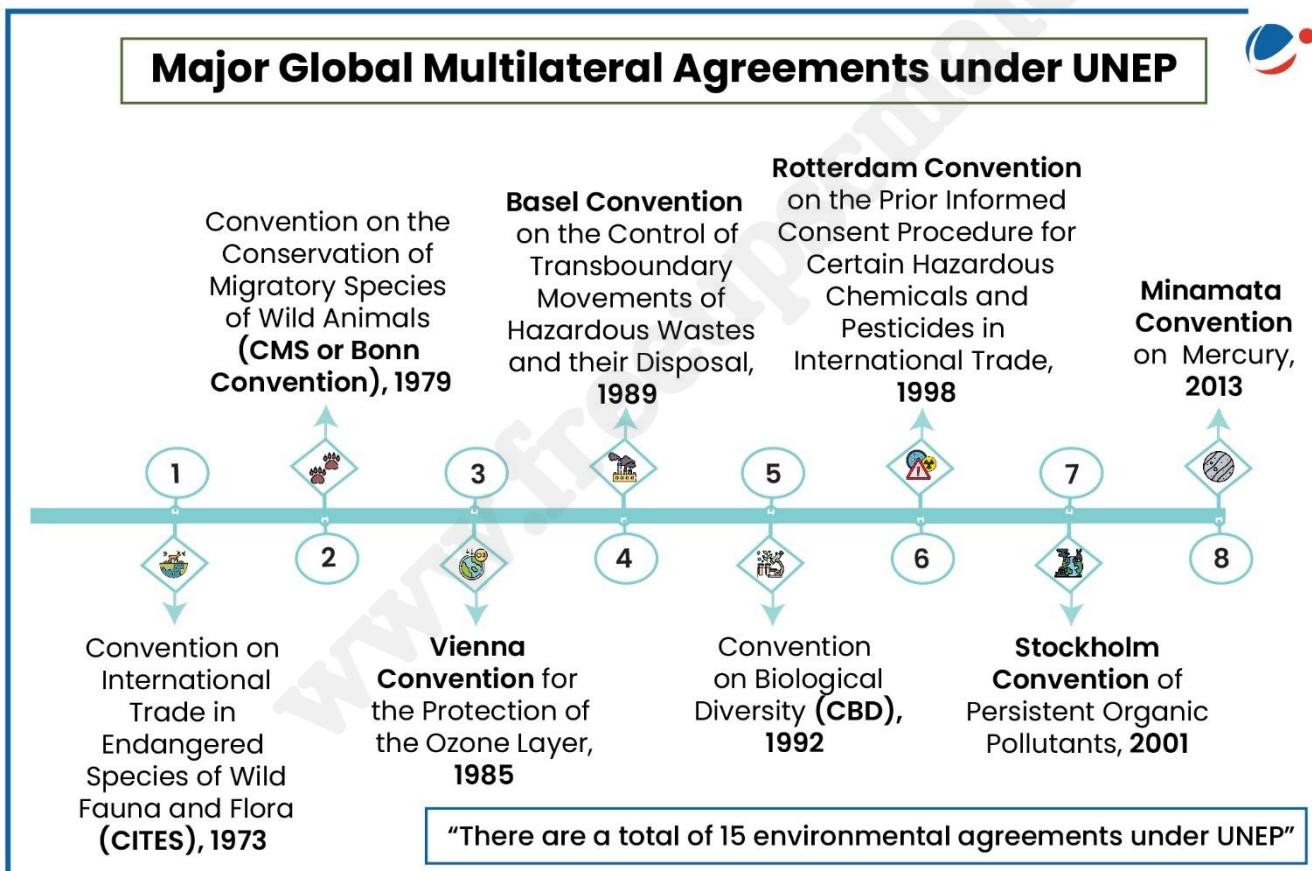
	<ul style="list-style-type: none"> As per the report, India's total CO₂ emissions: From fuel combustion grew by 330% between 1990 and 2019. Decarbonisation Refers to removal or reduction of carbon dioxide output in atmosphere. G20 is responsible for more than 80% of current global CO₂ emissions and almost 70% of global transport emissions.
Coupled Model Intercomparison Project-6 (CMIP6) experiments	<ul style="list-style-type: none"> Scientists used Earth system models (ESMs) and high-resolution simulated precipitation from Coupled Model Intercomparison Project-6 (CMIP6) experiments. <ul style="list-style-type: none"> ESMs are a complex integration of environmental variables (atmosphere, ocean, land, ice, and biosphere) used for understanding our planet. CMIP: Project of World Climate Research Programme which is sponsored by International Science Council, World Meteorological Organization, and Intergovernmental Oceanographic Commission of UNESCO. Study is supported under Climate Change Program of the Department of Science & Technology (DST). Other Climate change programme under DST <ul style="list-style-type: none"> Coordinates National Mission for Sustaining Himalayan Ecosystem and National Mission on Strategic Knowledge for Climate Change. Both part of the 8 missions under the National Action Plan on Climate Change (NAPCC). NAPCC outlines a national strategy to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path <ul style="list-style-type: none"> Other 6 missions under NAPCC: Missions for enhanced energy efficiency, sustainable habitat, green initiatives, agriculture, solar, and water.
Methylotuvimicrobium Buryatense 5GB1C	<ul style="list-style-type: none"> Methylotuvimicrobium buryatense 5GB1C is a methanotroph (methane-eating microorganism) bacterial strain. Can potentially remove methane from major emission sites like landfills, paddy fields, and oil and gas wells. <ul style="list-style-type: none"> Bacteria produce biomass after consuming methane, which can be used as feed in aquaculture.
Framework for climate resilient and low carbon health systems	<ul style="list-style-type: none"> WHO has released a Framework for Climate resilient and low carbon health systems. Aims to enhance the resilience of health systems while simultaneously reducing greenhouse gas emissions to help safeguard the health of communities worldwide. Important to implement the Alliance for Transformative Action on Climate and Health (ATACH) goals. <ul style="list-style-type: none"> ATACH, a WHO initiative, established in 2022, is an informal voluntary network which works to realize the ambition set at COP26 to build climate resilient and sustainable health systems.
Just Energy Transition Partnership (JET-P)	<ul style="list-style-type: none"> A New 2.5 billion Euro JET-P deal was announced for Senegal to increase renewable share in energy mix. About JETP: A financing mechanism that aims to support developing countries in their transition from fossil fuel-based energy systems to clean and renewable energy sources. Launched at the COP26 in Glasgow (2021) Senegal has become the fourth country after South Africa, Indonesia and Vietnam to sign the JET-P deal (India not a Signatory) The donor pool consists of countries like Japan, the USA, Canada, Denmark, France, Germany, Italy, Norway, the EU, and the UK.

Climate Policy Initiative	<ul style="list-style-type: none"> The Global Landscape of Climate Finance 2023 report was released by Climate Policy Initiative. CPI: An analysis and advisory organization with expertise in finance and policy. Mission: To help governments, businesses and financial institutions to drive economic growth while addressing climate change. Has six offices around the world in Brazil, India, Indonesia, the United Kingdom, and the United States.
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1.5. INSTITUTIONS/ORGANIZATIONS IN NEWS

1.5.1. UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

- An **international environmental authority** engaged in **establishing a global environmental agenda** and promoting the efficient implementation of the Sustainable Development Programme.
- Genesis:** Established in 1972, following **UN Conference on the Human Environment**.
- Headquarters:** Nairobi (Kenya)
- Members:** 193 UN Member States (**including India**)
 - Approve the programme of work and budget.
- Funding:** Relies on voluntary contributions for over 95% of funding needs.
 - Environment Fund is UNEP's core fund.
- Hosts the secretariats of various conventions (see infographic) and Entities:**
 - Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
 - Intergovernmental Panel on Climate Change (IPCC)** – hosted jointly by UNEP and the World Meteorological Organization (WMO)
- '**Common Carbon Metric**', supported by UNEP, has been developed for assessing the carbon footprint of building operations around the world.



Recent reports Released by UNEP

Reports	Key Highlights
Adaptation Gap Report 2023	<ul style="list-style-type: none"> Adaptation gap is the difference between implemented adaptation and societally set goals. Key Findings <ul style="list-style-type: none"> Adaptation finance needs are 10-18 times higher than current public flows. Adaptation finance gap is expanding, now at US\$194-366 billion annually. Action plan on loss and damage has overlooked non-economic losses like cultural heritage and indigenous knowledge.
Emission Gap Report 2023	<ul style="list-style-type: none"> Tracks the gap between where global emissions are heading with current country commitments and where they ought to be to limit warming to 1.5°C. Key Findings <ul style="list-style-type: none"> Global GHG emissions increased by 1.2 % from 2021 to 2022 with fossil fuel combustion and industrial processes being main contributors. Highly unequal distribution of current and historical emissions: Globally, the 10% of the population with the highest income accounted for 48% of emissions. Global warming is estimated to be limited to 3°C if the current policies continue.
Other reports	<ul style="list-style-type: none"> Turning off the Tap How the world can end plastic pollution and create a circular economy Building Materials and The Climate: Constructing A New Future What's Cooking: UNEP's Special Edition Frontiers Report 2023 Invest into Healthy Planet, Wastewater -Turning Problem to Solution (developed jointly by UNEP's Global Wastewater Initiative and GRID-Arendal,) Global Environment Outlook Global Climate Litigation Report

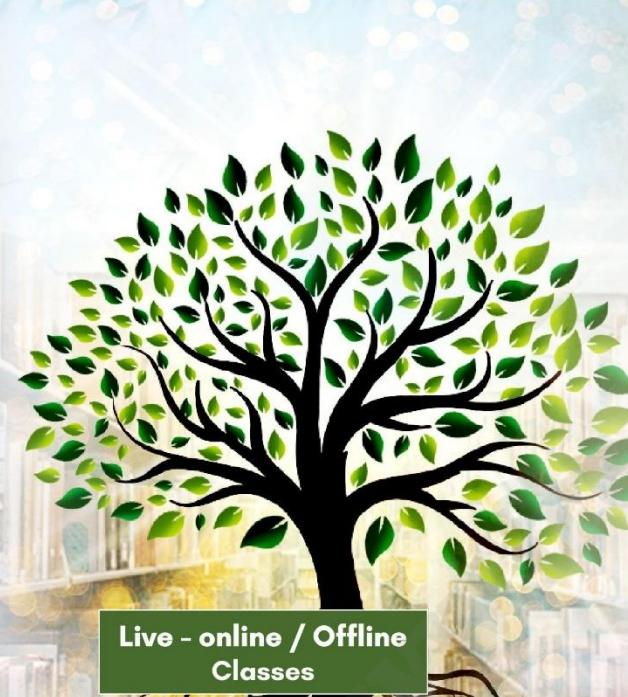
1.5.2. WORLD METEOROLOGICAL ORGANIZATION (WMO)

- A **Specialised agency of UN** and UN's authoritative **voice on the state of Earth's atmosphere, its interaction with the oceans and the climate**.
- Genesis:** Established in **1950**, replaced the then **International Meteorological Organization (1873)**
- Headquarter:** Geneva (Switzerland)
- Members:** 193 members (Including **India**)

Recent reports Released by WMO

Reports	Key Highlights
The State of the Global Climate 2022 report	<ul style="list-style-type: none"> Global mean temperature in 2022 was 1.15°C above the 1850–1900 average. Years 2015 to 2022 were eight warmest on record. Concentrations of three main greenhouse gases – carbon dioxide, methane and nitrous oxide – reached record highs in 2021. Overall, 58% of ocean surface experienced at least one marine heatwaves during 2022 and the rate of global mean sea level rise has doubled
Greenhouse Gas Bulletin	<ul style="list-style-type: none"> Global average CO₂ concentrations in 2022 represent a 150% increase from pre-industrial levels. Methane (CH₄) and Nitrous Oxide (N₂O) concentrations increased by 264% and 124% respectively from pre-industrial levels in 2022. From 1990 to 2022, radiative forcing by long-lived GHGs increased by 49%, with CO₂ accounting for about 78% of this increase. <ul style="list-style-type: none"> Radiative forcing represents the amount of energy per unit area that is added or removed from the climate system

State of Global Water Resources 2022	<ul style="list-style-type: none"> Over 50% of global catchments and reservoirs showed deviations, mostly drier than usual. Anomalies in soil moisture and evapotranspiration also matched the deviations noted in river discharge conditions. Asian Water Tower (AWT): From 2000 to 2018, total glacier mass in region decreased by approximately 4.3%. <ul style="list-style-type: none"> AWT includes Tibetan Plateau, Himalayas, Karakorum, Hindu Kush, the Pamirs, and Tien Shan Mountains- collectively called the Third Pole.
Other reports	<ul style="list-style-type: none"> Global Climate 2011-2020 Report State of Climate Services Report 2023 Global atmosphere Watch Air Quality and Climate Bulletin Global Annual to Decadal Climate Update 2023-2027



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Strategic Use of PYQs and Mock Tests: Use past year papers to understand the exam pattern, important topics, and question trends. Regularly practicing and assessing progress with mock tests improves preparation and time management.



Systematic Current Affairs Preparation: Keep abreast with Current affairs through newspapers, magazines and integrating this knowledge with static subjects to improve understanding and retention.



Smart Learning: Focus on understanding concepts rather than rote learning, use mnemonics, infographics, and other effective learning tools for better retention.



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2. POLLUTION

2.1. AIR POLLUTION

2.1.1. EMISSION NORMS FOR COAL BASED THERMAL POWER PLANTS

Why in the news?

Only 77 coal-based electricity generation units have installed Flue-gas desulfurization (FGD) or circulating fluidized bed combustion (CFBC), which is less than 8% of the total coal-based electricity generation capacity.

Emission Norms for TPPs

- Environmental emission standards for controlling SO₂, NO_x & Mercury emissions from coal-based Thermal Power Plants (TPPs).
 - First introduced in 2015 by MoEFCC, under the Environment (Protection) Act, 1986.
- Timelines were extended for majority of coal-based power plants in India in 2021 and 2022.

Key Highlights of the Norms

- 3 Categories with 3 different deadlines

Category	Location/area	Changed Deadlines
Category A	Within a 10-km radius of Delhi-NCR and cities population more than 10 Lakh	December 31, 2022 to December 31, 2024.
Category B	10-km radius of critically-polluted areas or non-attainment cities (those cities failed to meet the National Ambient Air Quality Standards)	December 31, 2023 to December 31, 2025.
Category C	For all other power plants	December 31, 2024 to December 31, 2026.

- Power plant units declared to retire before December 31, 2027 will not be required to meet the specified norms for SO_x.
- Use of beneficiated coal: To minimize flyash generation.
 - Coal beneficiation: Process through which combustion attribute of the coal is enhanced by separating the inorganic impurities (volatile matter or ash) from raw coal.
 - Each TPPs generating station should achieve 100% utilisation of total ash generated at plant.

Pollution Control Technologies (PCTs) at different stages of a power plant's operations		
Pre-combustion	In-combustion	Post-combustion
Coal washing and blending	<ul style="list-style-type: none">Low NO_x Burner (LNB) and Over-Fire Air (OFA) in boiler for NO_x.Limestone injection into the furnace for SO_x reduction.CFBC boilers: Highly fuel flexible<ul style="list-style-type: none">Environment friendly technology to utilize low grade, high moisture lignite.	<p>Technologies available for</p> <ul style="list-style-type: none">SO_x emission: Flue-gas desulfurization (FGD)NO_x Emission: Selective Catalytic or Non-Catalytic Reduction (SCR/SNCR)Particulate Matter (PM) Emission: Electrostatic Precipitators (for large PM) or fabric filters.

2.1.2. GRADED RESPONSE ACTION PLAN (GRAP)

Why in the news?

Commission for Air Quality Management in NCR & Adjoining Areas (CAQMA) announced a revision in the existing GRAP to abate air pollution in the region.

About Graded Response Action Plan

- An **emergency response mechanism** based on Delhi's Air Quality Index level.
- Prepared in pursuant to the **Supreme Court's** order of **2016** in the matter of **M. C. Mehta vs Union of India** regarding air quality in the **National Capital Region of Delhi**.
- First notified under **Environment (Protection) Act of 1986** in **January 2017** by the MoEFCC.
 - Implementing the GRAP fell on the now-dissolved Environment Pollution (Prevention and Control) Authority for the NCR.
- From **2021** onwards, **GRAP is being implemented by the CAQM**.
- Since October 2022, **GRAP has been enforced based on the AQI**.
 - **Older version of the GRAP** was enforced based only on the concentration of **PM2.5 and PM10**.
- Classified under **4 different stages of adverse air quality in Delhi**. (Shown in Table)

Revised Graded Response Action Plan

Stages	Delhi AQI	Actions
Stage I - 'Poor' Air Quality	201-300	<ul style="list-style-type: none"> • Strictly enforce NGT / SC's order on over aged diesel / petrol vehicles and as per extant statutes. • Ensure hotels, restaurants and open eateries use only electricity / clean fuel gas based appliances (Shifted from Stage-II to Stage I) • New Additions: <ul style="list-style-type: none"> ○ Citizen charter: Prefer hybrid vehicles or EVs to control vehicular pollution. ○ Do not drive/ply end of life/ 10/15 years old Diesel/Petrol vehicles.
Stage II - 'Very Poor' Air Quality	301-400	<ul style="list-style-type: none"> • Schedule for regulated operations of DG sets across all sectors in the NCR including Industrial, Commercial, Residential and Office establishments etc. • New Additions: <ul style="list-style-type: none"> ○ Ensure focused and targeted action on the predominant sector(s) contributing to adverse air quality in all identified hotspots in NCR.
Stage III – 'Severe' Air Quality	401-450	<ul style="list-style-type: none"> • NCR state governments/Government of National Capital Territory of Delhi (GNCTD): To impose strict restrictions on plying of BS III petrol and BS IV diesel LMVs (4 wheelers). • New Additions: <ul style="list-style-type: none"> ○ NCR State Governments/GNCTD may take a decision on discontinuing physical classes in schools for children up to Class V.
Stage IV – 'Severe +' Air Quality	450+	<ul style="list-style-type: none"> • New Additions: <ul style="list-style-type: none"> ○ Do not permit LCVs registered outside Delhi, other than EVs /CNG/BS-VI diesel, except those carrying essential commodities/providing essential services. ○ NCR State Governments/GNCTD may take a decision on discontinuing physical classes even for classes VI – IX, class XI and conduct lessons in an online mode.

About Commission for Air Quality Management (CAQM)

- A **statutory body constituted** under 'CAQM in the National Capital Region and Adjoining Areas Act, 2021'.
- **Primary goal:** To enhance coordination, conduct research, and identify and address issues related to air quality in the NCR and its neighboring regions including Punjab, Haryana, Uttar Pradesh, and Rajasthan
- Releases **Statutory Directions for environmental pollution** to the **state government**.

Related concept: National Air Quality Index (NAQI)

- Released by **Central Pollution Control Board (CPCB)**.
- Includes 8 pollutants-**PM10, PM2.5, NO₂, Ozone, SO₂, CO, NH₃ and lead (Pb)**.
- AQI communicates air quality status using **six categories** (ranging from **Good to Severe**).

About Central Pollution Control Board (CPCB)

- A statutory organisation constituted under the **Water (Prevention and Control of Pollution) Act, 1974.**
- Later, was entrusted with the powers and functions under the **Air (Prevention and Control of Pollution) Act, 1981.**
- CPCB along with State Pollution Control Boards (SPCBs) are responsible for **implementation of legislations relating to prevention and control of environmental pollution.**
- **Major Initiatives:**
 - **National Air Quality Monitoring Programme (NAMP):** A nation-wide programme of ambient air quality monitoring:
 - Under NAMP, 4 air pollutants identified for regular monitoring at all the locations:
 - ✓ Sulphur Dioxide (SO₂)
 - ✓ Oxides of Nitrogen as NO₂
 - ✓ Respirable Suspended Particulate Matter (RSPM / PM10)
 - ✓ Fine Particulate Matter (PM2.5)
 - **Portal for Regulation of Air-pollution in Non-Attainment cities (PRANA) portal** for monitoring of the **implementation of the National Clean Air Programme (NCAP)** in 131 cities & disseminating information on air quality to the public.

Categorization of Air Quality under AQI

AQI	Remark	Color Code	Possible Health Impacts
0-50	Good		Minimal impact
51-100	Satisfactory		Minor breathing discomfort to sensitive people.
101-200	Moderate		Breathing discomfort to the people with lungs, asthma and heart diseases.
201-300	poor		Breathing discomfort to most people on prolonged exposure.
301-400	Very Poor		Respiratory illness on prolonged exposure.
401-500	Severe		Affects healthy people and seriously impacts those with existing diseases.

2.1.3. REGULATION ON FIRECRACKERS

Why in the News?

The Supreme Court (SC) has directed to **apply the regulations on Firecrackers to all the states.**

More about the news

- SC clarified that its **2021 directions against use of barium and banned chemicals in firecrackers** are now applicable across country.
- **Green crackers** are permissible following the directions issued by Supreme Court in 2018.

Hazardous & toxic nature of ingredients used in firecrackers

Compound	Effects
Aluminium	Contact dermatitis, bioaccumulation
Sulfur Dioxide	Acid rain from sulphuric acid affects water sources, vegetation & causes property damage.
Potassium Nitrate	Toxic dusts, carcinogenic sulfur-coal compounds
Perchlorate-Ammonium & Potassium	Can contaminate ground & surface waters, can cause thyroid problems in humans & animals
Barium Nitrate	Poisonous. Fumes can irritate respiratory tract.
Copper compounds	Polychlorinated dioxins and di-benzofurans. Can bio-accumulate. Cancer risk.
Antimony sulfide	Toxic smoke, possible carcinogen
Lead Dioxide / Nitrate / Chloride	Bio-accumulation, developmental danger for kids & unborn babies, may remain airborne for days, poisonous to plants & animals
Lithium compounds	Toxic and irritating fumes when burned
Mercury (Mercurous chloride)	Toxic heavy metal. Can bio-accumulate.
Arsenic compounds	Toxic ash can cause lung cancer, skin irritation and wart formation.
Strontium compounds	Can replace calcium in body. Strontium chloride is slightly toxic.

About Green Crackers

- **Don't contain hazardous elements** like barium nitrate.
- **Cause 30%** reduction in particulate matter using Potassium Nitrate (KNO₃) as oxidant.
- **Council of Scientific and Industrial Research-National Environmental and Engineering Research Institute (NEERI)** developed green crackers
 - **SWAS (safe water releaser)** suppresses dust released by releasing water vapour in air.
 - **STAR (safe thermite cracker)** does **not comprise potassium nitrate and sulphur**, emits reduced particulate matter disposal and reduced sound intensity.
 - **SAFAL** has **minimum usage of aluminium** and **used magnesium** instead.
- NEERI, Nagpur is mandated to conduct **research and developmental studies in environmental science and engineering**.

Related Concept: E-crackers

- **CSIR-Central Electronics Engineering Research Institute (CSIR-CEERI)**, an electronics laboratory, is developing safe and pollution free technology of electronic crackers (E-crackers) to meet latent social aspiration of enjoying fireworks.
- It includes various products like **E-Ladi, E-Anar, system for E-cracker show etc.**
- At present CSIR-CEERI is ready with the **laboratory level prototype of E-Ladi**.
 - E-Ladi is based on **high-voltage electrostatic discharge** to generate light/sound effect.

2.1.4. REVISED CROP RESIDUE MANAGEMENT GUIDELINES

Why in the news?

Ministry of Agriculture & Farmers Welfare **revised Crop Residue Management Guidelines**.

More about the news

- Guidelines will **enable efficient ex-situ management of paddy straw** generated in Punjab, Haryana, UP and Delhi and prevent stubble burning.
- **Key features of guidelines**
 - **Techno-commercial pilot projects** for Paddy Straw Supply Chain **to be established** between Beneficiary/Aggregator (Farmers, rural entrepreneurs, FPOs etc) and Industries.
 - Government to provide **financial assistance on capital cost of machinery and equipment**.
 - ✓ **Government** (jointly by Central and State Governments) **to provide financial support of @ 65% of project cost**.
 - ✓ **Industry will contribute 25%** and **Farmers**, rural entrepreneurs, FPOs etc. will contribute the **balance 10%**.
 - **State Governments to approve projects** through project sanctioning committee.
 - **Financial assistance to be extended for machines and equipments** such as Higher HP Tractor, Cutters, Tedder etc.

About stubble burning

- A **process of setting on fire the straw stubble**, left after the harvesting of grains, like paddy, wheat, etc.
- **Impact:** Emission of gases such as CH₄, CO, N₂O and NO_x; **Particulate matters; Loss of plant nutrients;** and adverse **affect on environment and soil health**.
- **Reason for stubble burning**
 - **Farmers use less labour-intensive methods**, such as the combine harvester, leaving behind rice stubble.
 - **10 days gap between rice harvesting season and sowing of wheat**.
 - **Tradition and Conventional Practice**.

Emissions from Stubble Burning	
One tonne of straw, on being burnt, releases	
3 kg	Particulate matter
60 kg	Carbon Monoxide
1,460 kg	Carbon Dioxide
199 kg	Ash
2 kg	Sulphur dioxide

- Can help in Pest and Disease Management.
- **Options for Ex-situ management of crop residue**
 - Biomass pellets as a fuel substitution in thermal power plants.
 - Production of compressed bio-gas / bio-CNG from paddy straw
 - Alcohol production from paddy straw.

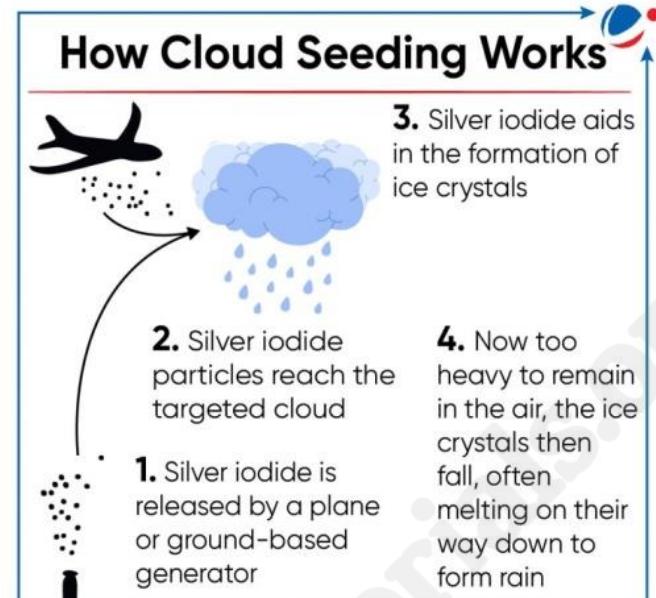
2.1.5. CLOUD SEEDING

Why in the news?

Researchers discussed the possibility of using cloud seeding to tackle Delhi's air pollution.

About Cloud Seeding

- **A weather modification technique** to enhance precipitation by dispersing substances into the air that help to saturate the clouds.
- **Chemicals used:** Salts such as silver iodide (Agl), potassium iodide, sodium chloride, or dry ice (solid carbon dioxide)
- **Conditions required for cloud seeding to be effective:**
 - Clouds need to be **deep enough** and have a **suitable temperature**, typically between -10 and -12 degrees Celsius.
 - Clouds should **cover at least 50% of the target area**.
 - Clouds do not form at wind **speeds above a certain level**.
 - **Less effective when relative humidity is less than 75%**.
 - **Cold enough clouds needed** to contain supercooled liquid water.



Types of cloud seeding

- **Hygroscopic cloud seeding:** Disperses salts through flares or explosives in the lower portions of clouds.
- **Dynamic cloud seeding:** Boosts vertical air currents encouraging more water to pass through the clouds.
- **Static cloud seeding:** Involves spreading a chemical like Agl into moisture-laden clouds.

2.1.6. SWACHH VAYU SARVEKSHAN

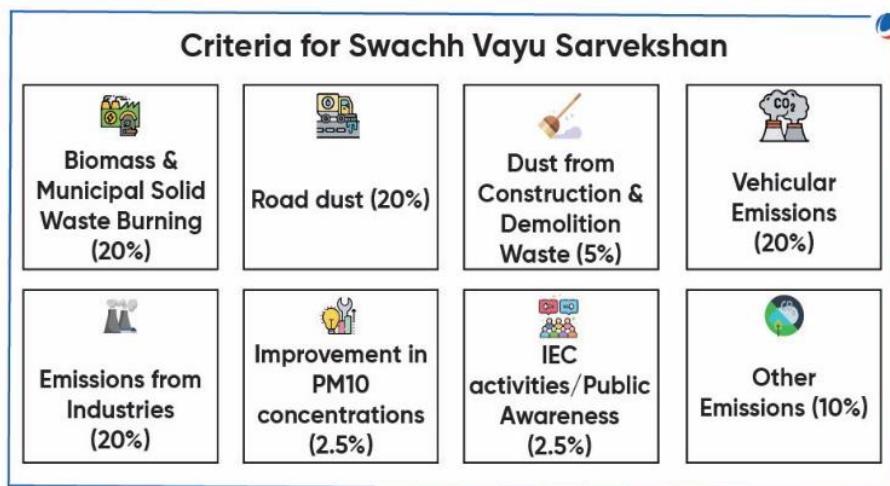
Why in the News?

The Swachh Vayu Sarvekshan 2023 (Clean Air Survey) awards were announced.

About Swachh Vayu Sarvekshan

- An initiative by the MoEFCC under the National Clean Air Programme (NCAP).
 - NCAP launched by MoEFCC as a **comprehensive initiative** in partnership with various Ministries and States to **improve air quality at city, regional and national level**.
- **Objectives of Swachh Vayu Sarvekshan**
 - **To create awareness** among all sections of the society
 - **Inform citizens about the health impacts** related to exposure.
 - **Comparing air quality conditions** at different locations/cities
 - **To achieve NCAP goal 'Clean Air for All'**
- All 131 cities covered under NCAP are **required to do the self-assessment as per the framework provided on the PRANA online portal** (Dashboard to capture the progress of the NCAP programme).
 - 131 cities are **categorized into three groups based on population**.

- Better performing cities i.e., the **top 3 cities in each category**, are rewarded with a cash prize, trophy and Certificate.
- Reports and documents further vetted by respective **Air Quality Monitoring Committee (AQMC)**, chaired by Principal Secretary Environment.
 - Further **examined and evaluated by CPCB** for ranking, on the basis of assessment framework given in MoEF&CC guideline.
- Results of Swachh Vayu Sarvekshan 2023
 - **Indore (Madhya Pradesh)** ranked first in **1st category** (million plus population)
 - **Amravati (Maharashtra)** ranked first in **2nd category** (3-10 lakhs population)
 - **Parwanoo (Himachal Pradesh)** ranked first in the **3rd Category** (less than 3 lakhs population)



2.2. WATER POLLUTION AND CONSERVATION

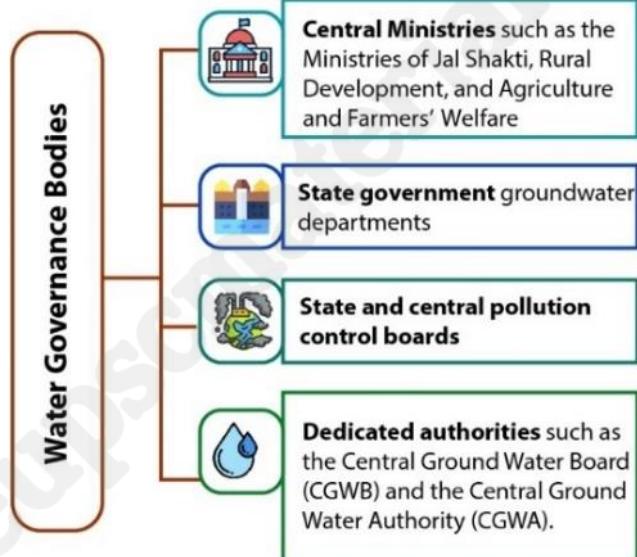
2.2.1. GROUND WATER IN INDIA

Why in news?

Union Minister for Jal Shakti released **Dynamic Ground Water Resource Assessment Report** for the country for year 2023.

Key highlights of the report

- Carried out jointly by **Central Ground Water Board (CGWB) and States/UTs**
- Such joint assessments carried out from 1980 onwards.
 - From 2022, the **exercise carried out annually**.



Indicator	Findings
Total annual groundwater (GW) recharge in the country	<ul style="list-style-type: none"> • 449.08 billion cubic meters (bcm) (Increased from 437.6 bcm in 2022). • Major increase noticed in West Bengal, Assam, Telangana, Chhattisgarh, Karnataka, Gujarat and Bihar.
'Over-exploited' units (indicating GW extraction exceeding annually replenishable GW recharge)	<ul style="list-style-type: none"> • 11.23% of total assessment units in various States/ UTs. (Decreased from 14.2% in 2022) • Accounts for 17 % of total recharge worthy area of the country. • Over-exploited' Units mostly concentrated in: <ul style="list-style-type: none"> ○ North west, including parts of Punjab, Haryana, Delhi and Western Uttar Pradesh (due to indiscriminate withdrawals of GW). ○ Western part, in parts of Rajasthan and Gujarat (Arid climate) ○ Southern part, including parts of Karnataka, Tamil Nadu Telangana and Andhra Pradesh (GW availability low in crystalline aquifers).

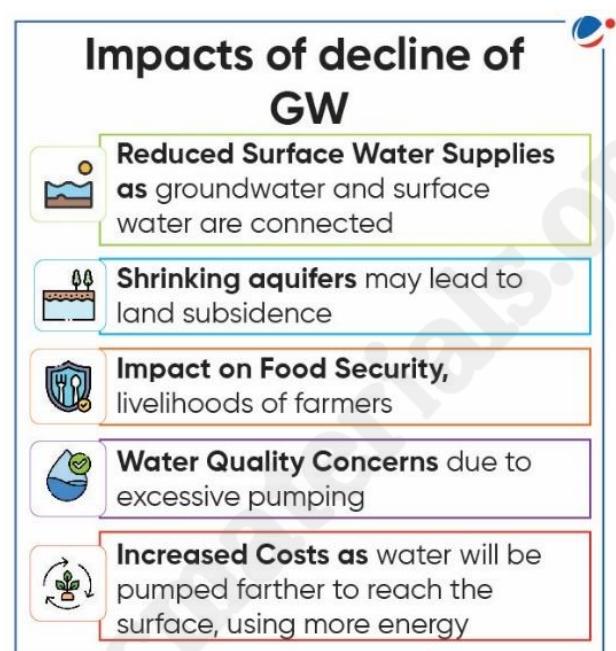
‘Critical’ units (GW extraction between 90-100%)	<ul style="list-style-type: none"> • 3.04 % assessment units • Accounts for 3 % of total recharge worthy area of the country.
“Semi-critical” units (GW extraction between 70 % and 90 %)	<ul style="list-style-type: none"> • 10.65 % assessment units • Accounts for 12 % of total recharge worthy area of the country.
‘Safe’ units (GW extraction is less than 70 %)	<ul style="list-style-type: none"> • 73.14 % assessment units. (Increased from 67.4% in 2022) • Accounts for 66 % of total recharge worthy area of the country.

GW scenario in India

- **World’s largest user of groundwater**, exceeding the use of the United States and China combined.
- Water level in more than 60% of wells monitored by CGWB **registered a declining trend** in the last one decade.
- **Interconnected Disaster Risks Report 2023**, published by **United Nations University – Institute for Environment and Human Security**-
 - Some areas in **Indo-Gangetic basin in India already passed the groundwater depletion tipping point**.
 - ✓ When the water table in a given aquifer drops consistently below the well depth.
 - Entire north-western region is predicted to experience **critically low groundwater availability by 2025**.

About Central Ground Water Board (CGWB)

- **HQ:** Faridabad, Haryana.
- **Genesis:** Established in 1970 by renaming Exploratory Tube wells Organization.
 - Merged with the Ground Water Wing of Geological Survey of India during 1972.
- **Ministry:** Ministry of Jal Shakti.
- **Mandate:** National Apex Agency entrusted with the responsibilities of providing scientific inputs for management, exploration, monitoring, assessment, augmentation and regulation of GW resources.



2.2.2. WATER TRADING

Why in the news?

NITI Aayog released a document on **water trading mechanisms to promote the reuse of treated wastewater**.

About Water Trading Mechanism

- **A water market mechanism** that considers **water as a commodity** rather than a public good.
 - Can be traded amongst users according to their needs.
- **Mechanism: A Water company**, rather than creating its own water source, can **buy the water** from a **third party** and sell it to the users.
- **Enabling elements for Water Trading**
 - **Ownership of water** - should be indisputable.
 - **Water entitlements**- could be transferred.
 - **Water Reuse Certificates (WRCs)** - as tradable permits.
 - ✓ Under the WRC trading system, water users across sectors, including **municipal/residential, industrial and agricultural sectors**, shall be registered and get individual targets for water reuse.

- ✓ Water users having WRCs may sell them in the open market, allowing other water users to bridge the gap between their wastewater reuse targets.
- Water.org started the initiative of WaterCredit loan program to address the barrier of affordable financing for safe water and sanitation.
 - It is a global nonprofit organization working to bring water and sanitation to the world.

2.2.3. OTHER WATER RELATED NEWS

News	Details
National Water Awards	<ul style="list-style-type: none"> President of India conferred 4th National Water Awards, 2022. Prominent winners are Madhya Pradesh (Best State), Ganjam in Odisha (Best District). National Water Awards: Launched in 2018 by Department of Water Resources, River Development & Ganga Rejuvenation. <ul style="list-style-type: none"> ○ 2nd and 3rd editions given for the years 2019 and 2020. ○ Awards not given in the year 2021 due to COVID pandemic. Objective: To encourage various stakeholders towards adopting a holistic approach towards water resources management in the country.
Water Quality Standard (WQS)	<ul style="list-style-type: none"> High-Level Committee for rejuvenation of the Yamuna has noted improvements in WQS of Yamuna. Commonly used WQS are Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). BOD: Amount of Dissolved Oxygen (DO) needed by aerobic organisms to break down organic matter present in water. <ul style="list-style-type: none"> ○ Higher BOD indicates low DO and high pollution. COD: Amount of DO required to break down the organic material via oxidation in water. <ul style="list-style-type: none"> ○ Value of COD is always greater than BOD. ○ Higher values of COD indicate pollution.
Central Water Commission (CWC)	<ul style="list-style-type: none"> According to CWC, in 2023, the water level in reservoirs of India's southern states are low. About CWC <ul style="list-style-type: none"> ○ A premier Technical Organization of India in the field of Water Resources. ○ Presently functioning as an attached office of the Ministry of Jal Shakti. ○ Purpose: Initiating, coordinating and furthering, in consultation with State Governments concerned, schemes for control, conservation and utilization of water resources throughout country. ○ Introduced FloodWatch App: Offers real-time updates on flood situations across the country, along with forecasts for the benefit of the general public.
Jal Diwali - "Women for Water, Water for Women Campaign"	<ul style="list-style-type: none"> Ministry of Housing and Urban Affairs (MoHUA) launched the Campaign under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) in partnership with National Urban Livelihood Mission (NULM). Phase I shall witness participation from all States/ UTs, except for Chhattisgarh, Mizoram, Madhya Pradesh, Rajasthan and Telangana. About the Campaign: Aims to provide a platform for inclusion of women in water governance. About AMRUT <ul style="list-style-type: none"> ○ Launched by MoHUA in 2015 in 500 cities and towns for developing basic infrastructure in water supply sectors; storm water drainage; green spaces and parks etc. ○ AMRUT 2.0 (2021-22 to 2025-26) provides universal coverage of water supply through functional taps in all households.

2.3. PLASTIC POLLUTION

2.3.1. PLASTIC OVERSHOOT DAY

Why in the news?

The **2023 Plastic Overshoot Day Report** was released by Swiss-based research consultancy **Earth Action (EA)**.

About Plastic Overshoot Day

- Refers to the day when the **amount of plastic waste surpasses the capability of waste management systems** to effectively manage.
 - Based on **country's Mismanaged Waste Index (MWI)** i.e., the **ratio of the mismanaged waste and the total waste**.
- On **July 28, 2023**, the Earth saw its first Plastic Overshoot Day.
- **Findings related to India**
 - India saw its Plastic Overshoot Day on **6th January 2023**.
 - India is among the 12 countries responsible for **52% of the world's mismanaged plastic waste**.
 - Categorized as '**The Waste Sponges**' referring to a **low consumption yet a high level of plastic pollution**.

Emerging Tools in Cutting Plastic Pollution

- **Plastic credits:** Form of tradable credits that can be bought and sold by companies in order to offset their plastic waste.
- **Plastic offsetting:** Based on the idea that companies and consumers can compensate for their plastic consumption by purchasing plastic credits.
- **Plastic neutrality:** Claimed when a company has purchased enough plastic credits to offset its entire plastic footprint for a set period of time.

Data Bank

- **3.4 Million tonnes** of plastic waste per year (as per Central Pollution Control Board).
- **12.3%** plastic waste recycled in India (as per Centre for Science and Environment).
- **98.55%** of generated waste being mismanaged in India (as per Earth Action).

Initiatives to curb Plastic Pollution

India

- **Plastic Waste Management (Amendment) Rules, 2021**
 - Prohibited the manufacture, import, stocking, distribution, sale and use of **single-use plastics**.
 - The thickness of plastic carry bags increased from 50 to 75 microns from 30th September 2021 and to 120 microns with effect from 31st December 2022.
- **Extended Producer Responsibility guidelines** made applicable to plastic producers.
 - **Plastic Waste Management (Amendment) Rules, 2022:** Introduced the **Guidelines on Extended Producer Responsibility (EPR)** for plastic packaging and stipulated mandatory targets on EPR, recycling and reuse of plastic packaging.
- **Private sector collaborations:** India Plastics Pact (IPP), Un-Plastic Collective (UPC) etc.
- A flagship document on '**National Circular Economy Roadmap (NCER) for reduction of Plastic waste in India**' was released.
 - The roadmap mentions **seven elements (refer image)** in framework for achieving circular economy for plastics.
- **The Un-plastic Collective (UPC)** co-founded by the Confederation of Indian Industry (CII), the United Nations Environment Programme (UNEP), and WWF-India.
- **'Prakriti' & Green Initiatives for Effective Plastic Waste Management**

Global

- **UNEA's Resolution to "End Plastic Pollution."**
 - 175 countries have endorsed the UN Environment Assembly (UNEA-5) resolution in Nairobi to End Plastic Pollution and **forge an international legally binding agreement by 2024.**
 - Countries will be expected to develop, implement and update national action plans.
- **The Global Partnership on Plastic Pollution and Marine Litter (GPML)** launched at the United Nations Conference on Sustainable Development (Rio+20).
- **GloLitter:** Project between the Government of Norway, IMO, and FAO aiming to reduce sea-based marine plastic litter.
- "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", the "London Convention".

Elements of the Framework



2.3.2. ZERO DRAFT OF GLOBAL TREATY TO END PLASTIC POLLUTION

Why in news?

UNEP's Intergovernmental Negotiating Committee (INC) released the Zero draft of **international legally binding instrument on plastic pollution**.

Key highlights of zero draft

- **Global bans on the highest-risk plastics.** Items may **not need to be single-use** to be banned, draft mentions '**short-lived**' plastics, too.
- Each nation should **develop and implement a national plan** for its **contribution to the Treaty** (similar to Paris Agreement on climate change).

About INC

- **Formed by UNEP**, INC is tasked with **developing an international legally binding instrument on plastic pollution**, including in marine environments.
- In June 2023 in Paris, INC-2 ended with a **mandate to prepare a zero draft of global treaty on plastic pollution, ahead of next session in Nairobi** (Kenya) in November 2023.
- Aim: To complete negotiations by the end of 2024 and create a **global, legally binding plastics treaty**.

2.4. LAND DEGRADATION

2.4.1. UNCCD DATA DASHBOARD

Why in the News?

UN Convention to Combat Desertification (UNCCD) launched its **first-ever Data Dashboard** compiling figures from 126 countries.

Key findings

- Between 2015- 2019, at least 100 million hectares of healthy and productive land were degraded every year.
- India's 9.45 percent reported land area is degraded.
- Between 2016- 2019, 50.49 percent of global reported land area and 36.8 percent of India's land area is affected by drought.
- Eastern and Central Asia, and Latin America and Caribbean regions experience the most severe degradation.

About Land degradation

- Deterioration or loss of productive capacity of the soils for present and future.
- 109 countries have set voluntary Land Degradation Neutrality (LDN) targets for 2030.
 - LDN is a state whereby the amount and quality of land resources necessary to support ecosystem functions and services to enhance food security remain stable, or increase, within specified ecosystems.

About UN Convention to Combat Desertification

- Only legally binding framework set up to address desertification and effects of drought.
- Genesis: Established in 1994.
- Members: 197 Parties to Convention (196 country including India and European Union).
 - MoEFCC: Nodal Ministry that oversees implementation of Convention in country.
- Global Drought Snapshot Report released in line with the COP28.
- UNCCD has released a 2018–2030 Strategic Framework that focuses on:
 - Mitigate, adapt and manage land degradation.
 - Mobilize financial and nonfinancial resources.
 - Improve the condition of land degradation- through participation



2.4.2. SAND AND DUST STORMS (SDS)

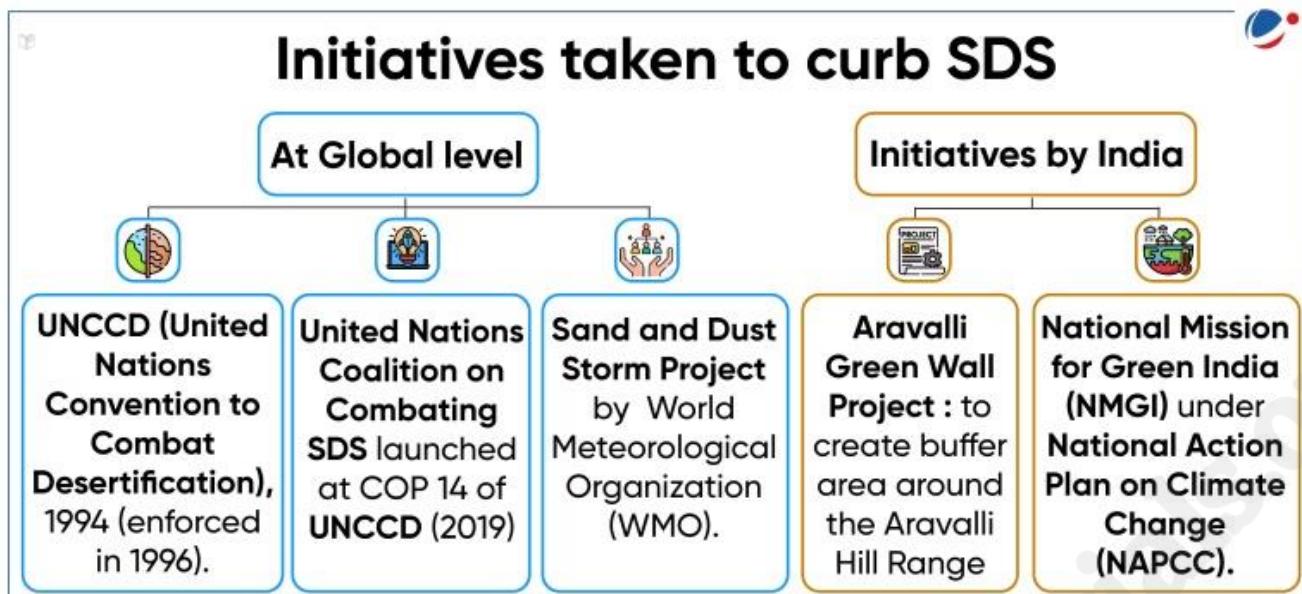
Why in the news?

A report titled 'Sand and Dust Storms (SDS): A Guide to Mitigation, Adaptation, Policy, and Risk Management Measures in Agriculture' was released by Food and Agriculture Organization (FAO).

About Sand and Dust Storms (SDS)

- Occurs when strong, turbulent winds erode small particles from dryland surfaces with little or no vegetation cover.
 - 75% of global dust comes from natural sources and 25% from anthropogenic sources.

- ✓ Major anthropogenic factors responsible for SDS include **land-use change, agriculture** and deforestation.
- **Implications of SDS:**
 - Deposition of dust on **glaciers** induces a **warming effect** and increases the **melting of ice**.
 - Reduces agricultural yield due to **sandblasting** (damage plants by impact, burial, and exposure of plant roots).



2.5. OTHER IMPORTANT NEWS

News	Details
Ground-level ozone (O₃)	<ul style="list-style-type: none"> According to Central Pollution Control Board (CPCB), Ground-level ozone (O₃) has started to emerge as Delhi's lead pollutant. Ozone formed in the Troposphere called 'bad ozone'. It's a "secondary" pollutant produced when two primary pollutants (nitrogen oxides and volatile organic compounds) react in sunlight and stagnant air. Sources: Emissions from cars, power plants, industrial boilers, refineries, and chemical plants, etc. Effects: <ul style="list-style-type: none"> ○ Cause coughing and shortness of breath. ○ Damage vegetation and ecosystems.
Champions of the Earth Award	<ul style="list-style-type: none"> United Nations Environment Programme (UNEP) announced 2023 Champions of the Earth Award. Champions of the Earth award honour individuals, groups, and organizations whose actions have transformative impact on environment. <ul style="list-style-type: none"> ○ Awarded annually since its inception in 2005. ○ UN's highest environmental honour which recognizes outstanding leaders from government, civil society and private sector. To eliminate plastic pollution, 2023 award given in 4 categories to <ul style="list-style-type: none"> ○ Policy leadership category: Mayor Josefina Belmonte of Quezon City (Philippines) to ban single-use plastics, a trade-in programme for plastic pollution etc. ○ Inspiration and Action category: Ellen MacArthur Foundation (United Kingdom) in mainstreaming lifecycle approach, including for plastics. ○ Entrepreneurial Vision category:

	<ul style="list-style-type: none"> ✓ Blue Circle (China) uses blockchain technology and internet of things to track and monitor full lifecycle of plastic pollution. ✓ José Manuel Moller (Chile) is founder social enterprise (Algramo) dedicated to providing refill services that reduce plastic pollution and lower everyday essentials costs. ○ Science and Innovation category: Council for Scientific and Industrial Research (South Africa) uses cutting-edge technology and multidisciplinary research to develop innovations to tackle plastic pollution.
Ethylene Oxide	<ul style="list-style-type: none"> ● European commission classified ethylene oxide as a pesticide residue (earlier classified as fumigant). ● This means agricultural products being exported to European Union will now be mandatorily tested. ● Ethylene oxide: Used primarily to produce other chemicals, including antifreeze. <ul style="list-style-type: none"> ○ A flammable colorless gas with a sweet odour. ○ In smaller amounts, ethylene oxide is used as a pesticide and a sterilizing agent. ○ Classified as carcinogenic and mutagenic.
Endosulfan	<ul style="list-style-type: none"> ● National Green Tribunal's has issued notice to Union Government, Karnataka and Kerala governments on dumping endosulfan in hilly area of Minchinpadavu in Kasaragod district of Kerala. ● Endosulfan: An Organochlorine Pesticide used to control variety of insects and mites crops like soy, rice, wheat, vegetables, fruits, nuts, coffee, tobacco and cotton. <ul style="list-style-type: none"> ○ Listed under both Rotterdam Convention on the Prior Informed Consent and Stockholm Convention on Persistent Organic Pollutants. ● Harmful effects: Chronic exposure can lead to reproductive problems, neurological, damage etc.
Petroleum Coke or Pet Coke	<ul style="list-style-type: none"> ● Supreme Court has asked Commission for Air Quality Management (CAQM) to consider issues related to distribution of highly polluting pet coke. ● Pet coke: A carbon-rich solid material derived from final cracking process of crude-oil refining. <ul style="list-style-type: none"> ○ Used as a replacement of coal due to its higher calorific value. ○ Hydrophobic, less volatile and produces low ash residue. ○ Used in Cement manufacturing, lime kilns, industrial boilers, Aluminum Anodes, etc.
Polyethylene Terephthalate degrading enzyme (PET46)	<ul style="list-style-type: none"> ● Researchers have identified a PET46 from a deep-sea microorganism for the first time. <ul style="list-style-type: none"> ○ PET is a lightweight plastic that is widely used for packaging foods and beverages e.g., soft drinks, water etc. ● PET46 enzyme unique is in its ability to degrade both long-chain and short-chain PET molecules, enabling continuous degradation. ● Other PET degrading enzymes - PETase, MHETase, THC_Cut1 etc
Great Pacific Garbage Patch (GPGP)	<ul style="list-style-type: none"> ● In a recent study, Scientists have found that many coastal lifeforms have colonised plastic items in GPGP. ● GPGP: A collection of marine debris in the North Pacific Ocean. <ul style="list-style-type: none"> ○ Also known as Pacific trash vortex, the garbage patch is actually two distinct collections of debris bounded by the massive North Pacific Subtropical Gyre.
E-waste in India	<ul style="list-style-type: none"> ● Refers to all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use. <ul style="list-style-type: none"> ○ India is 3rd largest Electronic waste producer in the world after China and the United States. ● Impact of E-waste: Health Hazard, Environment impact, Social Impact.

	<ul style="list-style-type: none"> • E-waste regulated under E-Waste (Management) Rules, 2022 <ul style="list-style-type: none"> ◦ Applies to every manufacturer, producer, refurbisher, dismantler, and recycler. ◦ Launched a new Extended Producer Responsibility (EPR) regime. <ul style="list-style-type: none"> ✓ EPR was introduced by E-waste (Management and Handling) Rules, 2011. • EPR means the responsibility of a producer for the environmentally sound management of the product until the end of its life. • Impact of E-waste: Contains hazardous substances such as lead, mercury, cadmium, and flame retardants.
Invisible e-waste	<ul style="list-style-type: none"> • “Invisible” e-waste was the key focus of this year’s International E-Waste Day. • The day is an annual awareness raising campaign initiated by the not-for-profit association Waste Electrical and Electronic Equipment (WEEE) Forum. • Invisible e-waste: Electronic items that often go unrecognized and aren’t properly recycled within the appropriate waste stream are known as invisible e-waste. • E.g., vapes, LED accessories, USB cables, power tools, smoke detectors, etc.
One-stop Centres for Zero Waste	<ul style="list-style-type: none"> • Government will launch one-stop centres called Reduce, Recycle and Reuse which will serve as one-stop solution for citizens, commercial enterprises, etc. to deposit unused or used plastic items, clothes, shoes, footwear, books, and toys. • About the Centres <ul style="list-style-type: none"> ◦ Items will then be given to different stakeholders to be refurbished for reuse or would be made into new products contributing to a circular economy, ◦ These ‘RRR’ centres would be set up as part of a nationwide campaign ‘Meri LiFE, Mera Swachh Shehar’ (‘My Life, My Clean City’) under aegis of Swacch Bharat Mission – Urban 2.0 (SBM-U 2.0).
International Day of Zero Waste (IDZW)	<ul style="list-style-type: none"> • For the first time, IDZW has been observed to encourage everyone to prevent and minimize waste and promotes a societal shift towards a circular economy (CE). • 30th March is announced as IDZW by United Nations General Assembly (UNGA) in 2022. • Jointly facilitated by the UN Environment Programme (UNEP) and the UN Human Settlements Programme (UN-Habitat).

2.6. INTERNATIONAL CONVENTIONS, TREATIES AND INITIATIVES

2.6.1. MINAMATA CONVENTION ON MERCURY

Why in news?

The **fifth meeting of the Conference** of the Parties to the Minamata Convention (COP-5), was held in Geneva.

More on the news

- Parties **amended annexes to the Convention** with new phase-out dates for certain batteries, switches, relays and fluorescent lamps.
- A new requirement was agreed to advance the **phase-down of dental amalgam** and, as of 2025, no mercury level will be allowed in cosmetics.

About Minamata Convention on Mercury

- Adopted in 2013 at Geneva, came **into force in 2017.**
- **1st global legally binding treaty to protect human health and environment** from adverse effects of mercury.
- Named after the **city in Japan that became the epicentre of Minamata disease**, a neurological disease caused by severe mercury poisoning, in 1950s.
- 144 Parties and 128 Signatories to it.

- **India ratified it in 2018** with **flexibility for continued use of mercury-based products** and processes involving mercury compounds **up to 2025**.
- **Minamata Convention requires that party nations**
 - **Reduce and where feasible eliminate use and release of mercury** from Artisanal and Small-Scale Gold Mining.
 - **Control mercury air emissions** from coal fired power plants, coal-fired industrial boilers etc.
 - **Phase-out or reduce mercury use** in products like **batteries, switches, lights, cosmetics, pesticides, dental amalgam**.
 - **Addresses supply and trade of mercury**; safer storage and disposal, and strategies to address contaminated sites.

About Mercury

- A **naturally occurring element** found in air, water and soil.
- **Other sources:** Gold mining, coal-based thermal power plant etc.
- May have toxic effects on **nervous system, thyroid, kidneys, lungs, immune system, eyes, gums and skin**.
- Considered by WHO as **one of the top ten chemicals of major public health concern**.
- There is **no known safe level of exposure**.

2.6.2. UN GLOBAL FRAMEWORK ON CHEMICALS

Why in the news?

New UN framework to protect environment from harmful chemicals was agreed at the fifth **International Conference on Chemicals Management (ICCM)** in Bonn, Germany.

About “Global Framework on Chemicals – For a planet free of harm from chemicals and waste”

- Based around **28 targets** to **improve responsible management of chemicals and waste**.
- **Objectives of Global Framework on Chemicals**
 - **Prevention of illegal trade and trafficking** of chemicals and waste.
 - **Phase out highly hazardous pesticides** in agriculture by **2025**.
 - Setting up **policies and regulations** aimed at **reducing chemical pollution by 2030** and promoting alternative.
- In addition to Global Framework, ICCM5 also adopted the **Bonn Declaration**.
 - Declaration aims to **prevent exposure to harmful chemicals**, and **phase out the most harmful ones**, where appropriate, and enhance the safe management.

About ICCM

- ICCM adopted the **Strategic Approach to International Chemicals Management (SAICM)** in **2006**, a policy framework to foster the sound management of chemicals.
 - SAICM is a global multi-sectoral, multi-stakeholder, and voluntary policy framework to address challenges related to the adoption of national policies to manage chemicals.
- **Other Conventions that deal with Hazardous chemicals**
 - **Basel Convention, 1989:** Control of Transboundary Movements of Hazardous Wastes and their Disposal.
 - **Rotterdam Convention, 1998:** Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade.
 - **Stockholm Convention, 2001:** on Persistent Organic Pollutants (POPs)
 - **Waigani Convention, 1995:** Convention to ban the Importation of Hazardous and Radioactive Wastes into Forum Island Countries and to Control the Transboundary Movement and Management of Hazardous Waste within the South Pacific Region.

2.6.3. INCIDENT AND TRAFFICKING DATABASE (ITDB)

Why in the News?

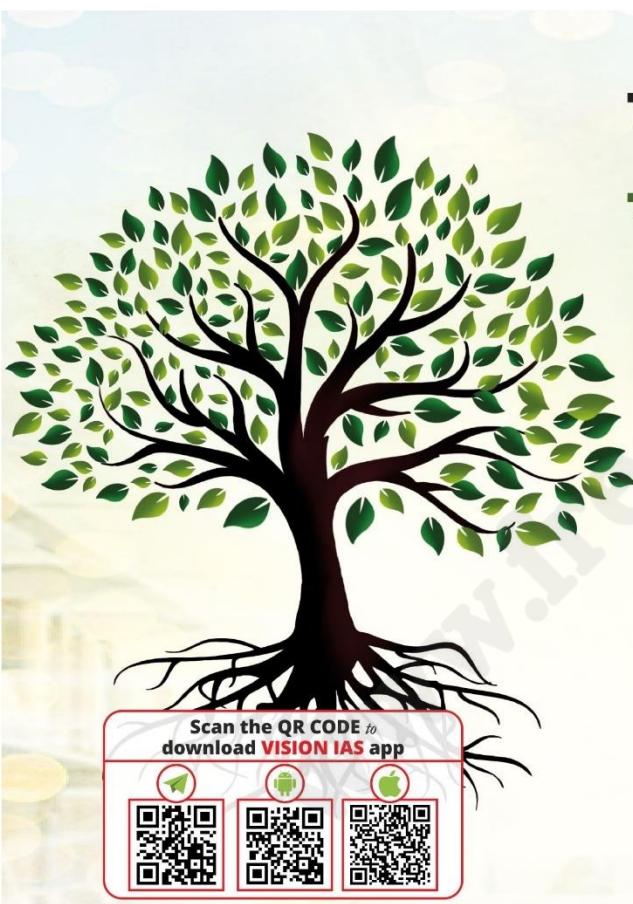
Latest data from IAEA's Incident and Trafficking Database (ITDB) found that radioactive contamination is increasingly found in scraps for recycling as per International Atomic Energy Agency (IAEA) study.

More about the news

- Other Findings:
 - **Radioactive-laced waste products** — including vehicles like ships — **are being increasingly recycled without taking care of the hazard management.**
 - **Most common source of contamination is feed material** (often obtained from metal recycling industry) from which the product had been manufactured.

About ITDB

- **Established by IAEA Secretariat in 1995 to:**
 - **Assist States on incidents involving illicit trafficking** and other related unauthorized activities involving nuclear and other radioactive materials.
 - **Maintain and analyze reported information** to identifying common threats, trends, and patterns.
- **Part of the IAEA's Nuclear Security Plan** that aims to
 - **Assist States in establishing, maintaining, and sustaining** national nuclear security regimes.
 - **Contribute to global efforts to achieve effective nuclear security.**
 - **Facilitate international cooperation and increasing awareness** on nuclear security.



**फाउंडेशन कोर्स
सामान्य अध्ययन 2025**

इनोवेटिव कलासर्कम प्रोग्राम

- प्रारंभिक परीक्षा, मुख्य परीक्षा और निवंध के लिए महत्वपूर्ण सभी टॉपिक का विस्तृत कवरेज
- मौलिक अवधारणाओं की समझ के विकास एवं विश्लेषणात्मक क्षमता निर्माण पर विशेष ध्यान
- एनीमेशन, पॉवर प्लाइट, बीडियो जैसी तकनीकी सुविधाओं का प्रयोग
- अंतर - विषयक समझ विकसित करने का प्रयास
- योजनाबद्द तैयारी हेतु करेंट ओरिएंटेड अप्रोच
- नियमित कलास टेस्ट एवं व्यक्तिगत मूल्यांकन
- सीसैट कक्षाएं
- PT 365 कक्षाएं
- MAINS 365 कक्षाएं
- PT टेस्ट सीरीज
- मुख्य परीक्षा टेस्ट सीरीज
- निवंध टेस्ट सीरीज
- सीसैट टेस्ट सीरीज
- निवंध लेखन - शैली की कक्षाएं
- करेंट अफेयर्स मैगजीन

नोट: ऑनलाइन भाग्र हमारे पाठ्यक्रम की लाइव वीडियो कक्षाएं अपने घर पर ऑनलाइन लेटफॉर्म पर देख सकते हैं। भाग्र लाइव पैट विकल्प के माध्यम से कक्षा के दौरान अपने संदेह और विषय संबंधी प्रश्न पूछ सकते हैं। वे अपने संदेह और प्रश्न नोट भी संहीन करके मैले में हमारे कक्षा सलाहकार को बता सकते हैं और हम फोन/मेल के माध्यम से प्रश्नों का उत्तर देंगे।

DELHI: 5 मार्च, 1 PM | 20 फरवरी, 1 PM **BHOPAL: 11 जून**

LUCKNOW: 5 जून **JODHPUR: 7 मार्च** **JAIPUR: 21 फरवरी**

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- ④ **Segments:** It covers primary News of the day, Also in News and special focus on Personalities and Places in News in 4 pages.
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3. BIODIVERSITY

3.1. INTERNATIONAL CONVENTIONS, TREATIES AND INITIATIVES

3.1.1. GLOBAL BIODIVERSITY FRAMEWORK FUND (GBFF)

Why in the news?

GBFF was recently **ratified and launched at the Seventh Assembly** of the Global Environment Facility.

About GBFF

- Purpose:** To finance the implementation of the **Kunming-Montreal Global Biodiversity Framework (KMGBF)**.
- Governance:** **GBFF Council** is represented by the following members,
 - 16 from developing countries;
 - 14 from developed countries;
 - 2 Members from the countries of central and eastern Europe and the former Soviet Union.
- Decisions of the Council** are to be taken by **consensus**.
- Financial management:** The **World Bank** will serve as the Trustee.
 - Will be similar to the **Capacity-Building Initiative for Transparency Trust Fund**, Special Climate Change Fund, etc.
- Fund allocations:**
 - 20% of the funds** would support Indigenous-led initiatives to protect and conserve biodiversity.
 - Prioritise support for Small Island Developing States and LDCs**
Funding Sources are governments, philanthropy, the private sector, international financial institutions, etc.

Goals and Targets of KMGBF	
 4 overarching goals to be achieved by 2050 focus on	<ol style="list-style-type: none">To halt human-induced species extinctionEquitable sharing of benefitsSustainable use of biodiversityClosing the biodiversity finance gap of \$700 billion per year
 23 action-oriented global targets for urgent action over the decade to 2030	<p>Key targets</p> <ul style="list-style-type: none">30% of land, inland water, marine and coastal ecosystems will be protected by 2030 (30x30 Deal).Reducing the rate of introduction of invasive alien species by 2050.Cutting global food waste by half.Reducing the loss of areas of high biodiversity importance to zero.Reducing by \$500 billion annual harmful government subsidies.Mobilizing investment close to the biodiversity funding gap by \$200 billion in year.

About Kunming-Montreal Global Biodiversity Framework (KMGBF)

- Adopted in 2022 at COP 15 (held in Montreal)** to the **UN Convention on Biological Diversity**.
- Replaced the **Aichi Biodiversity Targets** that **expired in 2020**.
- Not legally binding**.
- Sets out **4 goals for 2050 and 23 targets for 2030**.

3.1.2. GLOBAL ENVIRONMENT FACILITY

Why in the news?

The GEF Council approved the disbursement of **\$1.4 billion** to accelerate efforts to **tackle the climate, biodiversity, and pollution crises**.

About GEF

- Genesis:** Established in 1991 as a **multilateral environmental fund** to achieve global environmental benefits.

- **Objective:** Provides grant funds to developing countries for projects covering 4 focal areas: **climate change, biodiversity, international waters and ozone depletion.**
- **Implementing agencies:** World Bank, the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).
- **Membership:** 186 members (including India).
- **Other key information:**
 - Operates **Least Developed Countries Fund (LDCF)** and **Special Climate Change Fund (SCCF)**.
 - International Day for Biological Diversity (IDB) (May 22) commemorates the adoption of the text of the Convention.
 - **Serves as "financial mechanism" to 5 conventions-**
 - ✓ Convention on Biological Diversity (CBD)
 - ✓ United Nations Framework Convention on Climate Change (UNFCCC)
 - ✓ Stockholm Convention on Persistent Organic Pollutants (POPs)
 - ✓ UN Convention to Combat Desertification (UNCCD)
 - ✓ Minamata Convention on Mercury.
 - Although not linked formally to the Montreal Protocol, supports implementation of the Montreal Protocol in Countries with Economies in Transition.

Reports released by GEF

Report	Details
Inclusive Conservation Initiative (ICI)	<ul style="list-style-type: none"> • Released along with Conservation International. • Key highlights <ul style="list-style-type: none"> ○ Indigenous peoples own 40% of terrestrial protected areas and 37% of ecologically intact landscapes. ○ Less than 1% of climate change mitigation and adaptation funding is directed to IPLC (indigenous people and local communities) • About ICI <ul style="list-style-type: none"> ○ Endorsed by GEF in 2022 ○ Aim: To support ILPC to secure and enhance their stewardship over landscapes, seascapes and territories with high biodiversity and irreplaceable ecosystems. ○ 4 components <ul style="list-style-type: none"> ✓ Local Action to deliver Global Environmental Benefits ✓ Global IPLC Capacity Building ✓ IPLC Leadership in International Environmental Policy ✓ Inclusive Conservation Knowledge to Action

3.1.3. GLOBAL DECLARATION OF RIVER DOLPHINS

Why in the News?

11 Countries signed first-of-its-kind **Global declaration of River Dolphins by 2030** in Bogota, Colombia.

About the Declaration

- Adopted by River dolphin range states- **Bangladesh, Bolivia, Brazil, Cambodia, Colombia, Ecuador, India, Nepal, Pakistan, Peru and Venezuela.**
- **Aims to**
 - **Halt and reverse the decline of all river dolphin species in both Asia and South America.**
 - **To safeguard remaining river dolphin species** by developing and funding measures.
 - **Enhance the health of rivers,**

About River Dolphins

Top predators in some of the world's greatest river systems and important indicators of river's health.

Surviving species of River Dolphin	
Amazon (aka pink river dolphin or boto)	<ul style="list-style-type: none"> • Lives only in freshwater. • IUCN Status: Endangered
Ganges (commonly known as susu) (National Aquatic Animal)	<ul style="list-style-type: none"> • Found mainly in Ganges and Brahmaputra river systems in India and Bangladesh. • IUCN Status: Endangered • Threats: Construction of dams and barrages, Poaching, fishing, synthetic fertilisers used in agriculture etc.
Indus (aka bhulan)	<ul style="list-style-type: none"> • Found in Pakistan and River Beas, a tributary of Indus River in Punjab. • IUCN Status: Endangered
Tucuxi freshwater dolphin	<ul style="list-style-type: none"> • Species that lives in Amazon River system in Brazil, Colombia, Ecuador and Peru. • IUCN Status: Endangered
Irrawaddy	<ul style="list-style-type: none"> • Found in coastal areas in South and Southeast Asia, and in three river i.e. Ayeyarwady (Myanmar), Mahakam (Indonesian Borneo) and Mekong. • IUCN Status: Endangered

3.1.4. PROTECTION OF PLANT VARIETIES AND FARMERS' RIGHTS (PPVFR)

Why in the news?

Recently, Delhi High Court dismissed an appeal filed by PepsiCo India Holdings (PIH) against a 2021 order revoking **PIH's registration of a potato variety FL-2027.**

Background of the Issue

- **FL-2027 variety of potatoes** (commercial name FC-5) **was introduced by Pepsi in 2009** through a contract farming arrangement.
 - It was registered under the **Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act 2016.**
- In 2019, **Pepsico sued some farmers in Gujarat** for illegally growing its registered potato variety and violating its IPR under the Act.
- In 2021, **the registration of FL-2027 was revoked on the grounds** of furnishing incorrect information and infringing farmers' rights.

About the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act 2001

- **Enacted:** In 2001 under Article 27(3) (b) of the **Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).**
 - Conforms with **International Union for the Protection of New Varieties of Plants (UPOV), 1978.**
- **World's only IPR legislation** that grants **intellectual property rights** not only to the **plant breeders but also to the farmers.**
 - Unlike UPOV, facilitates the protection of **not only new** but even existing varieties.
- **Objective:** To recognise **and protect farmers' rights regarding plant genetic resources.**
- **Protection period:**
 - **Trees and vines:** 18 years.
 - **For other crops:** 15 years.
 - **For extant varieties:** 15 years
- **Institutions/Authorities:**
 - **Protection of Plant Varieties and Farmers' Rights Authority (PPV&FR Authority):** Established by the Department of Agriculture and Cooperation, Ministry of Agriculture for implementation.
 - **Functions:** Registration of new plant varieties, Facilitating the development and commercialization of new varieties, etc
 - **Plant Varieties Protection Appellate Tribunal (PVPAT)**

- ✓ To dispose of the appeal within one year.
- ✓ Decision can be challenged in the High Court.

Rights under the Act

- **Breeders' Rights:** Exclusive rights to produce, sell, market, distribute, import, or export the protected variety.
- **Researchers' Rights:**
 - Can use any of the registered varieties under the Act for conducting experiments or research.
 - Can also use a variety as an initial source of variety for the purpose of developing another variety.
- **Farmers' Rights:**
 - Entitled to register and protect a new variety.
 - Can save, use, sow, re-sow, exchange, share or sell his farm produce including seeds of a variety protected under the PPV&FR Act, 2001.
 - Not entitled to sell branded seed of a variety protected under the PPV&FR Act, 2001.
 - In the case of non-performance of variety, the farmer shall be compensated.

About International Union for the Protection of New Varieties of Plants

- An intergovernmental organization.
- **Genesis:** Established by the International Convention for the protection of New Varieties of Plants (Adopted in 1961)
- **HQ:** Geneva (Switzerland)
- **Objective:** Promotes an effective system of plant varieties of plants for the benefits of society.
- **India is not a member**

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

Why in the News?

Global Symposium on Farmers' Rights (GSFR) adopted the Delhi Framework on Farmers' Rights.

About GSFR

- **Organized by:** Secretariat of International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) of Food and Agriculture Organization (FAO).
- PGRFA are the raw material that form basis of all crop varieties and include seeds and all other plant genetic material.
- **Key highlights of Delhi Framework:**
 - Creating functional synergy across different UN instruments (ITPGRFA, CBD, United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) etc.) for realization of farmers' rights.
 - Establish/support farmer-managed seed system for traditional varieties and create self-sustaining production and marketing value chain.
 - Building farmer-centric partnership opportunities.

About ITPGRFA (also known as seed treaty)

- An international agreement to conserve, use and manage PGRFA around the world.
- A legally binding agreement that was adopted in 2001 and entered into force in 2004 (India is a party).
- Makes it possible to share plant genetic resources across borders through a unique Multilateral System of Access and Benefit-sharing (MLS).
- Became the guidance for establishment of Svalbard Global Seed Vault.
 - The Seed Vault marked its 15th anniversary in 2023.
 - It was established and fully funded by Government of Norway.

3.1.6. OTHER INTERNATIONAL CONVENTIONS AND INITIATIVES

News	Detail
World Heritage Convention	<ul style="list-style-type: none"> According to new research, the World Heritage Sites (WHS's) make up less than 1 % of the Earth's surface, but they harbour more than 20 % of the planet's biodiversity. <p>About World Heritage Sites</p> <ul style="list-style-type: none"> Have outstanding universal value under the World Heritage Convention of 1972. Sites are selected under three categories i.e. cultural, natural, and mixed. 42 World Heritage Sites in India. <ul style="list-style-type: none"> 34 are cultural, 7 are natural, and one is of mixed type. Principle: Recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. Parties and Implementing Agency: 195 State parties including India and World Heritage Committee. Strategic Objectives (Five Cs): Credibility, Conservation, Capacity-building, Communication and Communities. <p>The map shows the outlines of India and its states. Seven specific areas are highlighted with colored boxes and labeled: Keoladeo National Park (yellow), Great Himalayan National Park Conservation Area (green), Nanda Devi and Valley of Flowers National Parks (purple), Kaziranga National Park (blue), Manas Wildlife Sanctuary (light blue), Sundarbans National Park (dark blue), and Western Ghats (grey).</p>
Brazzaville Summit or Summit of the Three Basins	<ul style="list-style-type: none"> The summit was recently held in Brazzaville (the Capital of Congo) for the preservation and restoration of the planet's three ecological lungs. Three basins: <ul style="list-style-type: none"> Congo basin: Spans across Cameroon, Central African Republic, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea, and Gabon. Amazon Basin: Extends over 9 countries in South America. Borneo-Mekong-Southeast Asia Basin. These 3 global ecosystems account for 80% of the world's tropical forests and 2/3 of the earth's biodiversity.
Safety Across Asia For Global Environment (SAFE)	<ul style="list-style-type: none"> Launched by the United Nations and coordinated by UN Office on Drugs and Crime. Aims to explore the link between wildlife trafficking and zoonotic diseases to prevent future pandemics.

	<ul style="list-style-type: none"> China, Thailand, Vietnam, and Laos were the initial countries selected for the project's survey.
Belem Declaration	<ul style="list-style-type: none"> Member countries of Amazon Cooperation Treaty Organization (ACTO) signed the Belém Declaration in the Brazilian city of Belém. <ul style="list-style-type: none"> ACTO is an intergovernmental socio-environmental block formed by signing of the Amazon Cooperation Treaty. Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, and Venezuela are its members. Belém Declaration calls for ensuring the participation of Indigenous Peoples in decision-making <ul style="list-style-type: none"> Also commits to launching the Amazon Alliance to Fight Deforestation.
World Organisation for Animal Health	<ul style="list-style-type: none"> 33rd Conference on World Animal Health was organised by World Organisation for Animal Health (WOAH) Regional Commission for Asia and Pacific in Delhi. About: Intergovernmental organisation working across borders to improve the health of animals Genesis: founded in 1924, in response to the Rinderpest cattle plague. HQ: Paris Objective: To disseminate information on animal diseases and establish international standards for controlling them, including zoonoses. Members: 183 (including India)
International Whaling Commission (IWC)	<ul style="list-style-type: none"> IWC issued its first 'extinction alert' for the Vaquita Porpoise whales. <ul style="list-style-type: none"> These whales are Critically Endangered and found only in northern Gulf of California. About IWC <ul style="list-style-type: none"> Set up as an inter-governmental organisation under the International Convention for the Regulation of Whaling (1946). Mandate: Provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry. Membership: 88 countries including India.

3.2. WILDLIFE AND CONSERVATION

3.2.1. BIOLOGICAL DIVERSITY (AMENDMENT) ACT, 2023

Why in the news?

Recently, Parliament passed the Biological Diversity (Amendment) Act, 2023, amending the **Biological Diversity Act of 2002**.

Biological Diversity Act 2002

- Enacted to help India to meet the objectives of the **UN Convention on Biological Diversity (CBD) 1992**.
- Provides for a decentralized three-tiered mechanism** for regulation.
 - National Biodiversity Authority (NBA)** at the national level,
 - State Biodiversity Boards (SSB)** at the state level, and
 - Biodiversity Management Committees (BMC)** at the local body level.
- Provides for sharing benefits with biodiversity conservers** and holders and creators of associated knowledge.
 - Benefits may be shared in various forms, such as **monetary compensation**, sharing of **intellectual property rights**, or **technology transfer**.



Key changes made in the Biodiversity Amendment Act

Provision	Biological Diversity Act 2002	Biological Diversity (Amendment) Bill 2023
Extension of Exemptions	<ul style="list-style-type: none"> Requires prior approval or intimation to the regulatory authority for accessing biological resources. 	<ul style="list-style-type: none"> Exempts AYUSH registered practitioners, local people and communities of the area, including growers and cultivators of biodiversity, from giving prior intimation to SBB for accessing biological resources for commercial utilization.
Approval for Intellectual Property Rights (IPR)	<ul style="list-style-type: none"> Specifies that approval of NBA is required before applying for IPR involving biological resources obtained from India. 	<ul style="list-style-type: none"> Changes the requirement and now the approval will be required before the actual grant of the IPR and not before the application.
Benefit Sharing	<ul style="list-style-type: none"> Requires users of biological resources and associated knowledge to share benefits with local communities. 	<ul style="list-style-type: none"> Exempts users of "codified traditional knowledge" from this requirement.
Offences and Penalties	<ul style="list-style-type: none"> Offences like failure to take approvals from the authorities for various activities which were punishable up to 5 years or a fine or both. 	<ul style="list-style-type: none"> Decriminalises the offences and makes offences punishable with a penalty between Rs 1 lakh and Rs 50 lakh. Continuing contravention may attract an additional penalty of up to 1 crore rupees (Here, the adjudicating officer should not be below the rank of Joint Secretary).
Expansion of NBA	<ul style="list-style-type: none"> Requires NBA to have 10 ex-officio members apart from the Chairman. 5 non-official members to be appointed from amongst specialists (including legal) and scientists. 	<ul style="list-style-type: none"> 16 ex officio members representing the Ministries like Tribal Affairs, Biotechnology etc. 4 representatives from SSB. 5 non-official members amongst specialists (including legal) and scientists. 1 Member-Secretary (must have experience in biodiversity conservation), who will be the chief coordinating officer of the NBA.

About the United Nations Convention on Biological Diversity (CBD)

- About:** An internationally legally binding multilateral treaty
- Objective:** Drafted in 1992 with 3 goals
 - Conservation of biological diversity.
 - Sustainable use of its components
 - Fair and equitable sharing of benefits arising from genetic resources.
- Membership:** 196 parties including India.
- Core agreements:** India has ratified all 3 protocols

- Nagoya protocol on benefit sharing
- Cartegena protocol on biosafety.
- Nagoya Kuala Lumpur supplementary protocol on liability
- Other key information: CBD's governing body is Conference of Parties, Convention cover biodiversity at all levels.

Related News: People's Biodiversity Register (PBR)

- The National Campaign for Updation and Verification of People's Biodiversity Register (PBR) was launched by the Union Ministry of Environment, Forest and Climate Change in Goa
- PBR: A document which contains comprehensive information on locally available Bio-resources including landscape and demography of a particular area.
 - Its provisions are derived from Biological Diversity Act, 2002.
- The National Biodiversity Authority and State Biodiversity Boards shall provide guidance and technical support to the Biodiversity Management Committees (BMC) for preparing PBRs.
- About BMC
 - Consists of a Chairperson, and six persons nominated by local bodies, including 1/3rd women and 18% SC/ST.
 - Function of BMC: Determining access and benefit sharing, including the power to levy collection fees on the access of biological resources within its jurisdiction.

3.2.2. THE WILD LIFE (PROTECTION) AMENDMENT ACT, 2022

Why in the News?

Ministry of Environment, Forest and Climate Change notified rules under the Wild life (Protection) Amendment Act (WPA), 2022.

Notified rules

Rules	Details
Wild Life Disposal of Wild Animal Article Rules, 2023	<ul style="list-style-type: none"> ● Specifies manner of disposal of wild animal article, trophy etc., which is a State Government or Central Government property. ● Director, Wild Life Preservation or Chief Wild Life Warden or Officer authorized by Central/State Government, to direct incineration of such Government property by order. ● Incineration to be conducted in presence of a Committee constituted by Chief Wild Life Warden.
Breeders of Species Licence Rules, 2023	<ul style="list-style-type: none"> ● Specifies procedures, fee, registration etc. for filing of applications for Licence for person engaged in breeding in captivity or artificially propagating a scheduled specimen listed in Appendix I of Schedule IV of the Wildlife Protection Act 2022 ● Application for licence within a period of 90 days of commencement of Wild Life (Protection) Amendment Act, 2022 to the Chief Wild Life Warden. ● Chief Wild Life Warden grants the final license and can also pass order for cancellation.

Other key provisions in WPA, 2022

- Reduces number of schedules from 6 to 4 (see image)
 - Removed the earlier schedule for vermin species and inserted a new schedule for specimens listed for extinction under CITES.
- Wild animals to be declared as Vermin by Central Government by the way of notification (any area and for a specified period).

New Schedules			
	Schedule-I Animal Species with highest level of protection.		Schedule-II Animal Species with lesser level of protection.
	Schedule-III Protected plant species.		Schedule-IV Specimens listed in the Appendices under CITES.

- **New Chapter VB for implementation of CITES.**
- **Seeks to empower the Centre to regulate plant or animal species** not native to India - invasive alien species.
- **Permitted the use of elephants for 'religious or any other purposes'.**
- Central Government to form a **Managing Authority and a Scientific Authority** to regulate the import and export of specimens of species.
- **Entrusts the Chief Wildlife Warden** to control, manage, and maintain all sanctuaries in a state.

3.2.3. TIGER CONVERSATION IN INDIA

3.2.3.1. PROJECT TIGER

Why in News?

PM inaugurated the programme '**Commemoration of 50 years of Project Tiger**' in Mysuru, Karnataka.

More about the news

- **The International Big Cats Alliance (IBCA)** was also launched by India during the event.
- **IBCA** was first proposed by India at an **international group against poaching and illegal wildlife trade** in **2019**.
 - **Aim:** Conservation of seven **big cats** namely **Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar and Puma.**
 - Will provide assured support over **5 years** with guaranteed funding of over Rs. 800 crores.

About Project Tiger

- **Centrally Sponsored scheme**, 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.
- **Ministry:** MoEFCC
- **Objective:** To ensure the maintenance of a **viable population of tigers** in India.
- **Implementing Agency: National Tiger Conservation Authority (NTCA).**
 - 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 recurring items respectively.
 - North-eastern and Himalayan States are provided 90% central assistance in both cases.
- The Centre has merged **Project Tiger and Project Elephant**.
 - A **new division named 'Project Tiger and Elephant Division' (PT&E) created under the MoEF&CC.**
 - The staff and divisional heads of Project Elephant (PE) will report to the additional director general of forests (ADGF), Project Tiger (PT), who has **now been designated as ADGF (PT&E).**
- **Activities undertaken under Project Tiger**
 - **Establishment and development of new Tiger Reserves** (55 in total).
 - **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 banned new construction in tiger reserves' core areas.
 - Assessment using application **M-STRIPES**.
 - **Independent monitoring/evaluation** of tiger reserve by developing **Management Effectiveness Evaluation (MEE)** Framework.
 - **Special Tiger Protection Force (STPF)** deployed in several TRs for focused anti-poaching operations.
 - **E-Bird project** uses Unmanned Aerial Vehicles (UAV) for Surveillance and Monitoring.

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

- Declared as the **National Animal of India**.
- **Habitat:** Largest population is in India, smaller groups in Bangladesh, Nepal, Bhutan, China and Myanmar.
- **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.
- **Significance of tiger conservation:**
 - **Ecological:** Both an **Umbrella species**(tied to its geographic species range) and a **Keystone species**(Define an entire ecosystem).
 - **Economic:** Ecotourism and related industries.
 - **Cultural and spiritual**
- **Characteristics:**
 - **Solitary and territorial** animal, and an adult male's territory may encompass territories of two to seven females.
 - **Stripes** are individually as unique as human fingerprints.
- **Other conservation measures:** TX2, St. Petersburg Declaration etc.

TIGER PROTECTION STATUS



WPA, 1972

Schedule I



WPA, 1972

Schedule IV

3.2.3.2. NATIONAL TIGER CONSERVATION AUTHORITY (NTCA)

Why in the news?

The National Tiger Conservation Authority (NTCA) released the **Status of Tigers, co-predators and Prey in India-2022 report and MEE of Tiger Reserves in India (5th cycle) – Final report**.

About NTCA

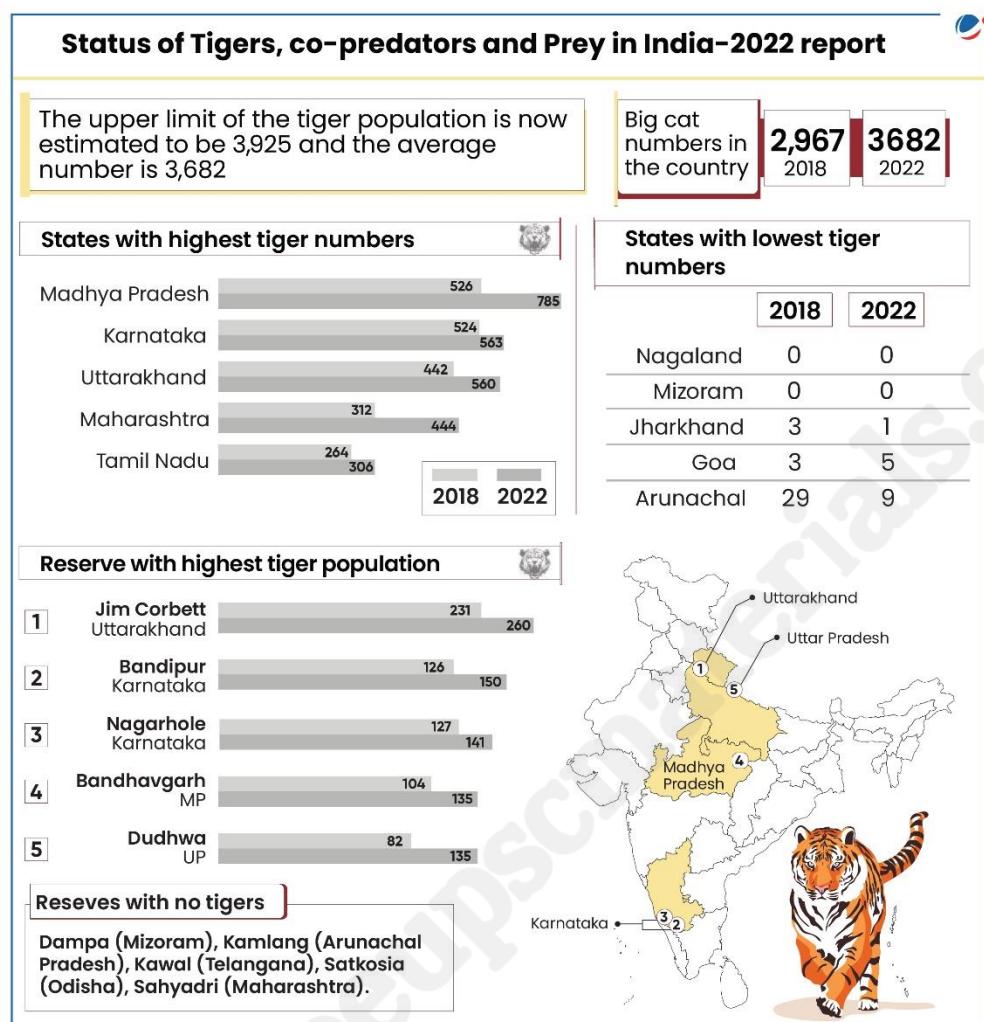
- **Statutory body** constituted under **Wildlife (Protection) Act, 1972, in 2006**.
- **Genesis:** Launched in 2005, following the recommendations of the Tiger Task Force.
- **Composition:**
 - **Minister in charge of the Ministry of Environment and Forests** (Chairperson)
 - Minister of State in the Ministry of Environment and Forests (as Vice-Chairperson)
 - 3 members of Parliament
 - Secretary, Ministry of Environment and Forests and other members.
- **Ministry:** Ministry of Environment, Forests and Climate Change.
- **Objectives:**
 - Providing statutory authority to Project Tiger.
 - Fostering accountability of Center-State in management of TR,
 - Providing for an oversight by Parliament.
 - Addressing livelihood interests of local people in areas surrounding TR.
- **Other key information:** Has a Guinness book record for the largest camera-trap wildlife survey in 2019.

Reports released by NTCA

Reports	Details
Status of Tigers, co-predators	<ul style="list-style-type: none"> • Population: India currently harbours almost 75% of the world's wild tiger population. <ul style="list-style-type: none"> ○ Central India and the Shivalik Hills and Gangetic Plains witnessed a notable increase in tiger population.

and Prey in India-2022 report

- **Technique used-**
 - **M-STripes (Monitoring System For Tigers-Intensive Protection and Ecological Status):** uses a Global Positioning System and remote sensing.
 - **Camera trap-based Capture-Mark-Recapture:** Camera trap surveys for the abundance and density estimation of tigers.
 - In areas where camera trapping was not possible molecular tools were used by extracting DNA from cats.



MEE of Tiger Reserves in India (5th cycle) – Final report

- **About MEE**
 - Used from 2006 to assess tiger reserves.
 - Jointly conducted by the National Tiger Conservation Authority (NTCA) and the Wildlife Institute of India (WII).
 - Framework given by International Union for Conservation of Nature and Natural Resources World Commission on Protected Areas (See infographic).
 - **Findings of 5th cycle of MEE**
 - 51 tiger reserves were evaluated.
- | Management Effectiveness Evaluation (MEE) | | |
|--|--|--|
| Design/Planning | Adequacy/Appropriateness | Delivery |
| Context
Status and threats where are we now?

Planning
Where do we want to be and how will we get there? | Input
What do we need?

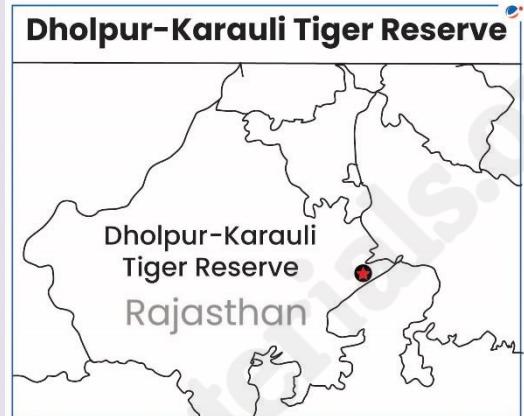
Process
How do we go about management? | Outcomes
What did we achieve?

Outputs
What did we do and what products or services were produced? |

	<ul style="list-style-type: none"> ✓ Periyar Tiger Reserve in Kerala ranked as the best-maintained tiger reserve. Overall mean MEE score increased to 78%. ✓ None of the country's tiger reserves as 'Poor'. Headline indicator 'carbon capture and climate change' received the lowest score in the current cycle due to the absence of a mandate for it in Tiger Conservation Plans.
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3.2.3.3. OTHER NEWS RELATED TO TIGER CONSERVATION

News	Description
Dholpur-Karauli Tiger Reserve (DKTR)	<ul style="list-style-type: none"> NTCA accords final approval to DKTR. Other recently approved TR: Veerangana Durgavati Tiger Reserve, Madhya Pradesh TRs are notified by State Governments on the advice of NTCA under Section 38V of the Wildlife (Protection) or WPA Act, 1972. <ul style="list-style-type: none"> In a related development MoEFCC cleared the NTCA's in-principle approval to declare Kumbhalgarh Wildlife Sanctuary (in Rajasthan) as tiger reserve. <p>About DKTR</p> <ul style="list-style-type: none"> Geographical location and other important features <ul style="list-style-type: none"> Extends between the Dholpur and Karauli districts of Eastern Rajasthan bordering Madhya Pradesh. 5th TR from Rajasthan (Other 4- Ranthambore, Sariska, Mukundra Hills and Ramgarh Vishdhari) Rivers: Chambal River flows through its vicinity. Forest: Tropical dry deciduous forest Fauna and Flora: Sambar, Chital, Blue Bull, Wild Boar, Sloth Bear, Hyena and Leopard etc.
Tiger Translocation Project	<ul style="list-style-type: none"> India's first inter-state tiger translocation project had failed. Tiger relocation project was initiated in 2018 by NTCA, wherein two big cats to be trans-located. <ul style="list-style-type: none"> A male (Mahavir) from Kanha Tiger Reserve and a female (Sundari) from Bandhavgarh from Madhya Pradesh were relocated to Satkoria Tiger Reserve in Odisha. Failure of Project: Poor prey augmentation; lack of capacity building of staff; enhancement of protection couldn't be achieved; funds provided under Project Tiger were diverted; Tiger-Human conflict.
IUCN's Integrated Tiger Habitat Conservation Programme (ITHCP) or Tiger program	<ul style="list-style-type: none"> ITHCP has launched a Call for Concept Notes for Phase IV of Program. <ul style="list-style-type: none"> Phase IV will expand its focus to include other Pantherine species, in particular leopards and clouded leopards. Launched in 2014, it's a strategic funding mechanism supported by German Federal Ministry for Economic Cooperation and Development (BMZ). <ul style="list-style-type: none"> Contributing to Global Tiger Recovery Programme.
Global Tiger Recovery Program (GTRP)	<ul style="list-style-type: none"> Overall increase of 60% in Tiger Population was highlighted by a report submitted under GTRP 2.0. GTRP was an effort of 13 countries to double tiger numbers in the wild by 2022. <ul style="list-style-type: none"> Evolved under the Global Tiger Initiative in 2010 via the St Petersburg Declaration. In 2022, GTRP 2.0 was launched (till 2034).



3.2.4. PROJECT CHEETAH

Why in the News?

NTCA formed **Cheetah Project Steering Committee** (CPSC) to keep watch on cheetah project.

About CPSC

- The 11 member CPSC, comprising national and international experts constituted **to oversee the implementation of Project Cheetah** will be in **force for two years**.
 - ‘Committee is formed in the wake of the recent death of cubs born to a translocated Namibian cheetah at the Kuno National Park (KNP) in Madhya Pradesh.

Key features of project Cheetah

- At least 50 Cheetahs** (mostly from southern Africa) will be introduced **in various National Parks over five years**.
- Implementation by:** NTCA
- Funding of project:** From Project Tiger as well as 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)**.

Progress made

- Out of 6 criteria** for assessing **short-term success**, project has already **met four criteria** namely: 50% survival of introduced cheetahs, **Establishment of home ranges**, **Birth of cubs** in Kuno, **Revenue to local communities**.
- Restorative investments in other selected areas** (Nauradehi and Gandhi Sagar Wildlife Sanctuaries in MP) have commenced.
- Central government has approved setting up a cheetah breeding and conservation centre in **Banni Grassland**.
- Earlier **20 Cheetahs were translocated** from **Namibia (8)** and **South Africa (12)** to KNP, Madhya Pradesh.
 - Currently there are **19 Cheetahs in India** after the death of 6 adults and 4 new born cubs.

About African Cheetah		African Cheetah	Asiatic Cheetah
Pictorial Representation			
IUCN Status		VU	CR
CITES		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.	

- 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.
- Among large carnivores, conflicts with human interests are lowest for cheetahs.

3.2.5. PROJECT ELEPHANT

Why in the News?

President Participated in **Gaj Utsav** at Kaziranga National Park and Tiger Reserve (KNPTR) in Assam to mark **30 years of Project Elephant**.

About Kaziranga National Park

- Geographical location and other important features:
 - Located on 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**.
- **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. Largest ER: Mysore ER in Karnataka

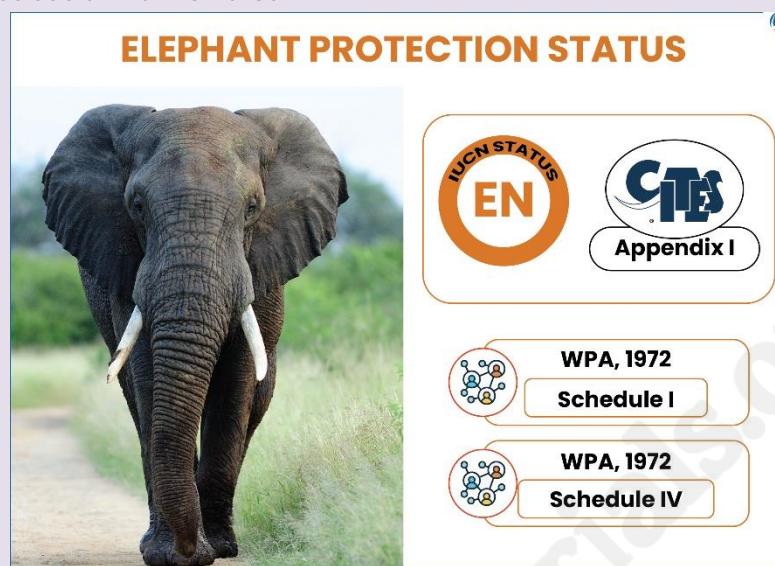


About Project Elephant

- Launched in **1992** by **MoEFCC**
- A **Centrally Sponsored Scheme**
- **Support and Coverage:** **Financial and Technical** support are being provided to major **elephant-bearing States** in the country. Presently the Project is being implemented in 22 States/UTs.
- **Steering Committee:** Includes **representatives** of the Government as well as **non-government wildlife experts and scientists**.
- **Elephant reserves in India:**
 - Declared as an **administrative category** by the government to demarcate **large landscapes** that hold elephants and their movements.
 - **33 elephant** reserves (cover a total area of nearly 80,000 sq km).
 - **Highest number of ERs:** **Tamil Nadu** and **Assam** (5 each) followed by Kerala (4) and Odisha (3).
- **Elephant Corridors of India**
 - **West Bengal has the highest number** of elephant corridors.
 - There are **6 transnational corridors** between **India and Nepal**.

About Indian elephant (*Elephas maximus indicus*)

- Characteristics:**
 - Highly intelligent animals characterised by strong family bonds with sophisticated forms of communication.
 - Complex behaviour, including the ability to feel grief and compassion.
 - Form herds of related females led by the oldest female, the 'matriarch'.
 - Have the 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.
 - Kumki elephants:** Term used in India for captive Asian elephants that are trained to be used in operations to trap wild elephants.
- 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.
 - India is home to > 60% of all wild Asian elephants.
 - India had 29,964 elephants. (Elephant Census 2017)
 - Highest number of elephants:** Karnataka, followed by Assam and Kerala.
- Threats:** Human-elephant conflict, habitat loss and fragmentations, poaching and the loss of genetic viability resulting from small population size and isolation.
- Other Measures to protect elephants:**
 - AI-based sensor system "Gajraj" will be deployed to prevent elephant deaths in rail accidents.
 - Census is carried out at every five-year interval.
 - Planting of native species of trees in Assam.
 - Species include Amla, Bel, Gamhari, Jamun, Bhumura, Arjun etc.



Difference between Asian Elephant and African Elephant		
Indicators	Asian Elephant	African Elephant
IUCN Status	EN	Savanna elephant Forest elephant
Size	Smaller, weighing between 3000–6000 kg	Larger, weighing between 4000–8000 kg
Ears	Smaller rounded ears	Large fan shaped ears
Skin	Comparatively smoother skin	Skin is more wrinkled
Forehead	Twin domed head	Single dome shape
Tusks	Only some male Asian elephants have tusks Tusks are absent in females (only rudimentary tusks found).	Both male and female African elephants grow tusks.

3.2.6. STATE OF THE RHINO 2023 REPORT

Why in the News?

International Rhino Foundation (IRF) released the State of Rhino 2023 report.

About IRF

- Founded as International Black Rhino Foundation in 1991.
- Dedicated to survival of all five living rhino species.**
- Key findings**
 - Greater one-horned rhino (aka Indian rhino) population in India and Nepal continues to grow.
 - Black rhino populations are increasing despite constant poaching pressure.
 - Population of white rhinos and Sumatran rhinos are decreasing.



About Rhino

- 5 species** of rhino (refer image)
 - 3 found in Asia: Sumatran rhino, Javan rhino and Great one horned rhino (Indian rhino).
 - 2 found in Africa: White rhino and Black rhino
- They comparatively have poor vision and mostly rely on the sense of smell.
 - Rhino horns are made of Keratin and grow up to 7cm a year
 - Asian rhinos are excellent swimmers and can easily swim across rivers.

About Indian rhino

- Characteristics:**
 - Largest of all rhino species.
 - Usually solitary, except for females with small calves.
 - Male rhinos fight violently for preferred habitual areas.
 - Cover their skin in mud aids thermo-regulation by preventing overheating.
 - Can run fast (up to 40 km/h) and are very agile.
- Threats:** Poaching for medical purpose (biggest threat), habitat loss, low genetic diversity.
- Habitat:** Alluvial Terai-Duar savanna and grasslands and riverine forest.
 - Found commonly in **Nepal, Bhutan, Pakistan and India**, with India being home to or over 85% of the population.
 - In India found in- Uttar Pradesh, West Bengal and Assam.
 - Assam has 71% of the world's population** (2895 as per 2022 census) with Kaziranga National Park harbouring the highest number.
- Conservation Measures**
 - National Rhino Conservation Strategy 2019** to conserve Indian rhinoceros.
 - New Delhi Declaration on Asian Rhinos 2019.**
 - Indian Rhino Vision 2020** is a joint program of **Assam Forest Department, World Wide Fund for Nature – India** (WWF-India) and **IRF** to increase rhinos population.



3.2.7. BAN ON DRUGS HARMFUL FOR VULTURES

Why in the news?

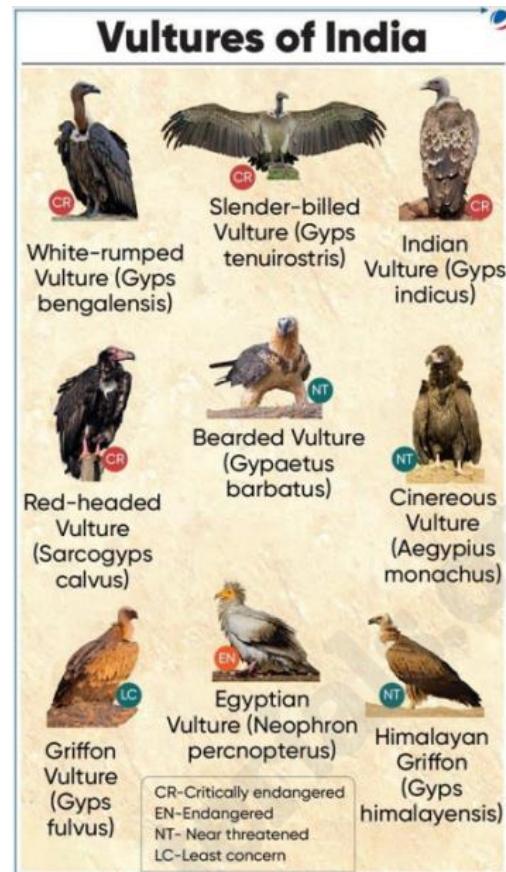
Drugs Technical Advisory Board (DTAB) recommended a **ban on two more drugs harmful to vultures**.

More about the news

- DTAB agreed to **prohibit drugs Ketoprofen and Aceclofenac** for treatment of livestock.
- DTAB: **Highest statutory decision-making body on technical matters related to drugs.**
 - Part of **Central Drugs Standard Control Organization (CDSCO)** in the Ministry of Health and Family Welfare.

About the Drug ban

- Ketoprofen, Aceclofenac, Diclofenac and Nimesulide** are **Non-steroidal Anti-Inflammatory drugs (NSAIDs)** used in veterinary practice that have been proven toxic to vultures and other birds of prey.
 - Diclofenac is already banned** by India.
- Some NSAIDs are not fully metabolized** by vultures and cause damage to the birds' kidneys.
- A total of **9 species of vultures** are found in India (see image).
 - Population of White-backed Vulture, Slender-billed Vulture and Long-billed Vulture** has declined drastically over the past decades.
 - Vultures are part of Species Recovery Programme.**



3.2.8. FUNGA: RECOGNITION AND CONSERVATION

Why in the news?

The Fungi Foundation through UN Biodiversity has urged people globally to use the word '**Funga**' whenever they say, 'flora and fauna', as part of the trinity of life on Earth.

About Funga/Fungi

- Refers to the levels of diversity of fungi in any given place.
- Vary from **single-celled organisms** to complex **multicellular organisms**.
- Distribution:** From tropical, temperate to arctic regions in both terrestrial and aquatic ecosystems.
- Threats:** Loss of habitat and hosts, over-exploitation, climate change and pollution.
- Significance of Fungi:** Culinary use, Mycorrhizal, Carbon reservoirs, Decomposition and nutrient cycling, Mycoremediation and Medicine.

Comparing Flora, Fauna and Funga (3Fs)

Aspect	Flora	Fauna	Funga
Kingdom	Plantae (Plants)	Animalia (Animals)	Fungi
Examples	Algae, Flowers, Trees	Insects, Reptiles, Mammals	Mushrooms, molds, yeasts
Mobility	Immobile generally	Capable of Movement	Immobile generally
Reproduction	Through seeds, spores, vegetative propagation	Through sexual and asexual reproduction	Through Spores or asexual reproduction
Role in ecosystem	Primary producer	Consumer, Prey, and predator	Decomposers

3.2.9. EXPORT POLICY OF RED SANDERS WOOD

Why in the news?

Directorate General of Foreign Trade (DGFT), under the **Ministry of Commerce and Industry** amended export policy of red sanders wood sourced from privately cultivated land.

More about the news

- Amendments issued under the power conferred by the **Foreign Trade (Development & Regulation) Act, 1992 and Foreign Trade Policy 2023**.
- Under the foreign trade policy **import** of Red Sanders is **prohibited**, while its **export** is **restricted**.
 - Earlier DGFT in 2019** had revised its export policy to **permit export of Red Sanders**, in **log form and roots**, if it is exclusively obtained from private cultivated land (including patta land).
- Recent amendment allows-**
 - Annual export quota** for artificially propagated red sanders **and**
 - Zero export quota** for wild specimens of red sanders.

About Red Sanders

- Conservation Status**
 - IUCN Status:** Endangered
 - Wildlife (Protection) Act, 1972, India:** Schedule IV
 - CITES Status:** Appendix II
- Habitat:** Indian endemic tree species, with a restricted geographical range in the Eastern Ghats of India.
 - Found in distinct tract of forests in Andhra Pradesh.
- Characteristics:**
 - Very slow-growing tree species** that attains maturity after 25 – 40 years.
 - Resistant to droughts.**
 - Also known as:** Almug, Saunderwood, Red Sanders, Red Sanderswood, Red Saunders, Yerra Chandanam, Rakta chandana (Indian), Lal Chandan, Ragat Chandan, Rukhto Chandan, Undum.
 - High in demand across Asia, particularly China**, due to its therapeutic properties, for use in cosmetics, medicinal products, and high-end furniture/woodcraft.

Related News: CITES Review of Significant Trade

- 77th CITES Standing Committee** meeting removed Red Sanders from **Review of Significant Trade (RST)**.
- CITES RST process enables disciplinary action (trade suspensions) on countries that do not meet their obligations.

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

- An international agreement between governments.
- Genesis:** Drafted as a result of a resolution adopted in 1963 at a meeting of members of IUCN (The World Conservation Union).
 - Text agreed in 1973 and entered in force in 1975.

CITES Appendix		
Appendix	Species covered	Restrictions on International trade
 Appendix I	Most endangered among CITES-listed animals and plants	Prohibited except in non-commercial import purposes
 Appendix II	<ul style="list-style-type: none">Not necessarily threatened with extinction now but may become if trade is not closely controlled"Look-alike species"	Authorized by granting of export permit or re-export certificate
 Appendix III	Included at request of a Party and cooperation of other countries needed to prevent unsustainable or illegal exploitation	Allowed only on presentation of the appropriate permits or certificates

- **Secretariat:** Administered by UNEP, located at **Geneva, Switzerland**.
- **Objective:** To ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species
- **Membership:** 184 Parties (including India)
 - **Management Authority for CITES (CITES-MA)** in India: **Director of Wildlife Preservation, Government of India.**
- **Other key Information:**
 - **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.
 - **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.**
 - Species covered by CITES listed in **3 Appendices.**

3.2.10. INVASIVE ALIEN SPECIES

Why in the News?

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) has released the '**Assessment Report on Invasive Alien Species and their Control**'.

About Invasive Alien Species

- Represent a **subset of alien species** known to have established and spread with negative impacts on biodiversity, local ecosystems, and species.
 - **Alien species:** Animals/plants/other organisms **introduced by human activities** to new regions.
 - **All Alien species are not invasive species** and they can benefit from extreme weather.
- As per the report, **invasive alien species are one of the five major direct drivers of biodiversity loss globally.**

Global Efforts

- **Invasive Species Specialist Group (ISSG):** Global network of scientific and policy experts on invasive species, and was established in 1994.
 - Organized under **Species Survival Commission (SSC)** of the International Union for Conservation of Nature (IUCN).

About Intergovernmental Science-policy platform on Biodiversity and Ecosystem Services (IPBES)

- **About:** An independent intergovernmental body
 - Not a UN body.
- **Genesis:** Established in 2012
- **Committed to strengthening the science-policy interface** for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.
- **United Nations Environment Programme (UNEP) provides secretariat services to IPBES.**
- **Membership:** 144 members including India.

Common characteristics of invasive alien species

-  **Rapid reproduction and growth**
-  **High dispersal ability**
-  **Ability to adapt physiologically to new conditions.**
-  **Ability to survive on various food types and in a wide range of environmental conditions.**

Related News: Asia Pacific Plant Protection Commission (APPPC)

- The APPPC unanimously elected **India as chair of the Standing Committee** on Integrated Pest Management (IPM) for the biennium 2023-24 during the 32nd Session held in Bangkok.
- **About:** Intergovernmental organisation that promotes **cooperation among countries** in the Asia-Pacific region to enhance plant health and protection.
- **Genesis:** Established in 1956 as a **regional body approved by the Food and Agriculture Organization (FAO)** of the United Nations.
- **Mandate:** helps with the management of outbreaks of invasive species to promote safe agricultural trade.

3.2.10.1. INVASIVE SPECIES IN NEWS

Species	Description
Prosopis Chilensis	<ul style="list-style-type: none"> • As per the it is threatening to pulverize native vegetation across 21 islands in the Gulf of Mannar Biosphere Reserve (GoMBR). <ul style="list-style-type: none"> ◦ GoMBR, India's first marine biosphere reserve, is one of the important habitats for coastal birds migrating from the Arctic Circle. • Drought-resistant plant • Native to the arid regions of four South American countries (Argentina, Bolivia, Chile, and Peru). • Also known as Chilean mesquite.
Mosquitofish	<ul style="list-style-type: none"> • A new study has revealed that two species of mosquitofish, Gambusia affinis and Gambusia holbrooki, have invaded various ecosystems across India. • Widely introduced worldwide as a form of biological mosquito control (feeds on mosquito larvae). • Native to U.S. • Habitat: Shallow waters, dense vegetation growth where larvae and pupae hide. • Introduced 1st in India in 1928, during British rule.
Conocarpus Trees	<ul style="list-style-type: none"> • Invasive mangrove species, recently banned by Gujarat government. <ul style="list-style-type: none"> ◦ Earlier, Telangana government also banned it. • A genus of two species of flowering plants of Winter, native to tropical regions of the world. • Widely used in public spaces for its ornamental looks
Ludwigia peruviana	<ul style="list-style-type: none"> • An invasive weed, is threatening elephant habitats and foraging grounds in Tamil Nadu. <ul style="list-style-type: none"> ◦ Infested the majority of the hill station's swamps, locally known as vayals . • Popularly called primrose willow. • Native of Central and South America including Peru. • Used as an ornamental plant for its tiny yellow flowers. • Grows fast along water bodies. • Among the 22 priority invasive plants in Tamil Nadu.
Red fire ant	<ul style="list-style-type: none"> • It was found in Europe for the first time. • Native to: South America however, spread in United States, Mexico, the Caribbean, China, and Australia. • Impacts <ul style="list-style-type: none"> ◦ Form 'super colonies' with multiple queens and has the ability to spread rapidly. ◦ Feed on fauna that nests or feeds on the ground, including insects, spiders, etc. • Communication: Through chemical secretions and stridulation (sounds produced by rubbing or drumming one body part against another)

3.2.11. RED LIST OF THREATENED SPECIES

Why in the News?

International Union for Conservation of Nature (IUCN) released an updated Red List of threatened species.

Key-findings

- Around 44,000 are threatened with extinction**, which increased by 2000 from last year.
- Saiga: Moved from Critically Endangered to Near Threatened.**
 - An antelope that have roamed the earth since the **last Ice Age**.
- 25% of freshwater fish at risk of extinction**
 - At least 17% affected by climate change.
- First global freshwater fish assessment**
- Four freshwater subterranean fish species** (found in water bodies under the surface) **from Kerala** included in list:

- Endangered:**

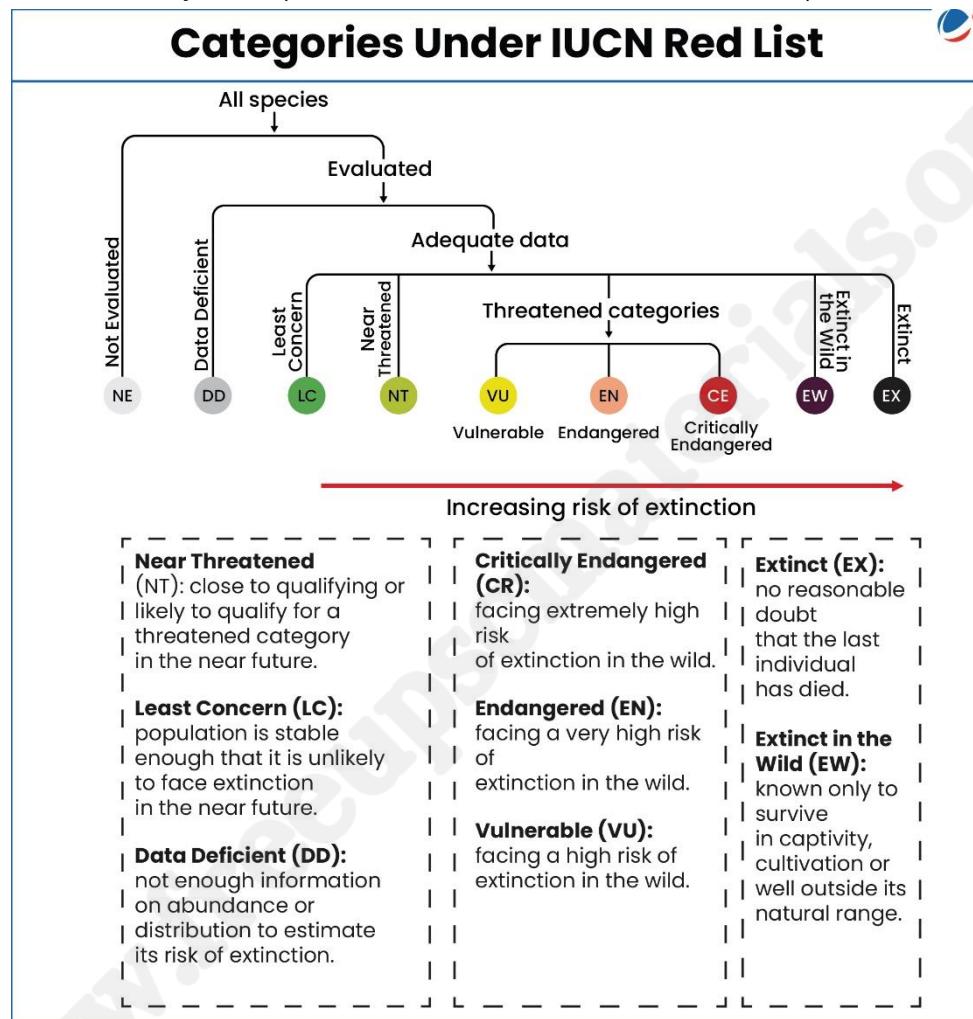
Shaji's Catfish,
Abdulkalam's Blind
Cave Catfish,
Pangio Bhujia

- Vulnerable:**

Gollum snakehead

About Red list

- A critical indicator of the health of the world's biodiversity.**
- Provides information about **range, population size, habitat and ecology, use and trade, threats, and conservation actions.**
- Criteria used to determine the risk of species:** Population size reduction, Restricted geographical range, small population and declining, Very small or lives in a restricted area and Quantitative analysis of extinction risk.

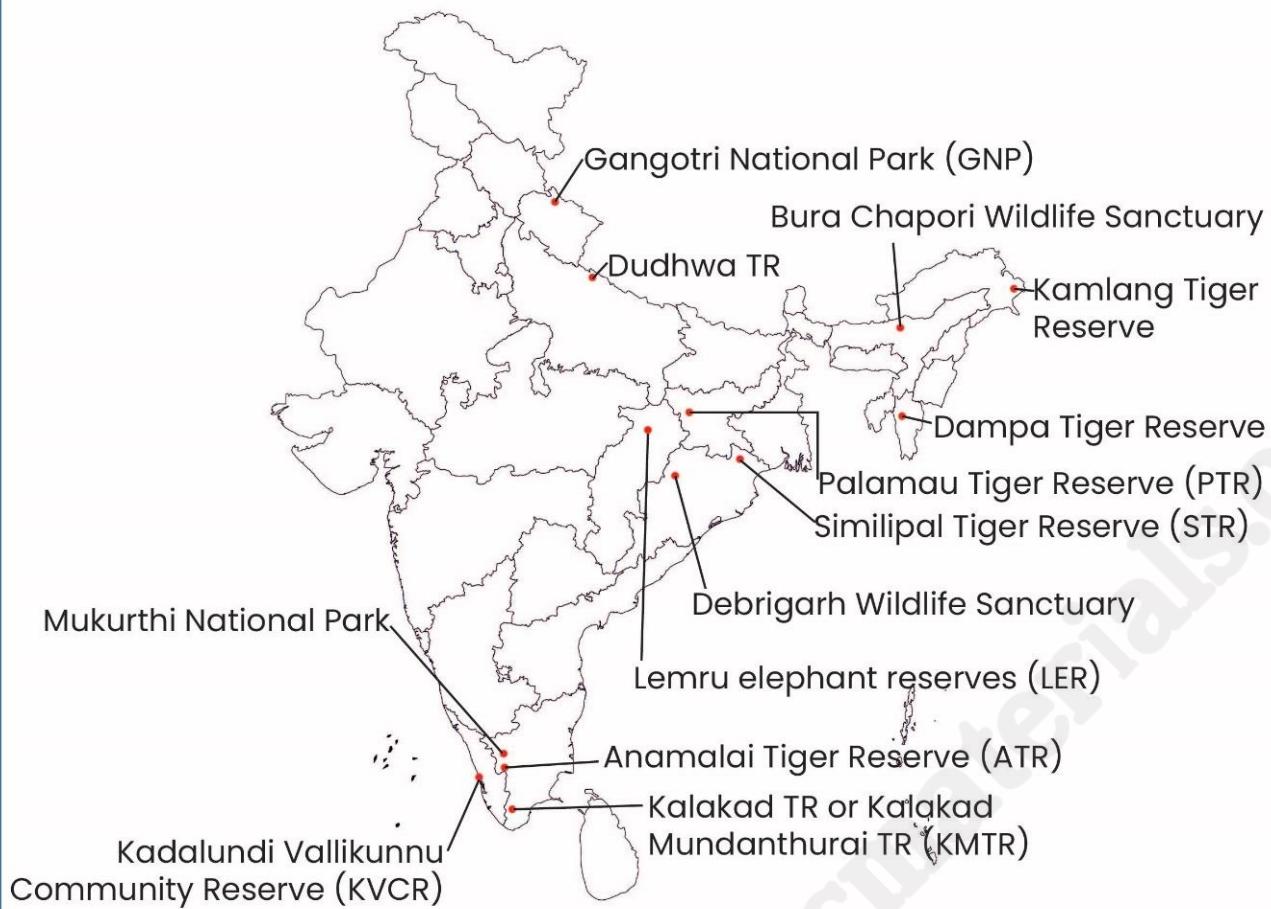


About IUCN

- Genesis:** Created in 1948.
- HQ:** Gland, Switzerland
- Mandate:** To advance sustainable development and create a just world that values and conserves nature
- Membership:** Composed of both government and civil society organisations.
- Other Reports:**
 - State of the World's Amphibians: The Second Global Amphibian Assessment Report.

3.2.12. PROTECTED AREAS IN NEWS

Protected Areas in News



Arunachal Pradesh

Kamlang Tiger Reserve	<ul style="list-style-type: none"> Kamlang Tiger Reserve conducted a butterfly walk and nature trail event for the first time ever in association with NGOs. Geographical location and other important features <ul style="list-style-type: none"> Location: Lohit district of Arunachal Pradesh. Has Sub-tropical climate Glow Lake falls within reserve. Important Bird Areas (IBA) of Birdlife International River: Kamlang, Tawa, Lang Forest: Tropical, temperate and alpine. Flora and Fauna: Snow Leopard, Clouded Leopard, Tiger, Himalayan Palm Civets, Hornbill, etc.
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Assam

Bura Chapor Wildlife Sanctuary	<ul style="list-style-type: none"> Rhinoceros has returned to this sanctuary after 40 years. Geographical location and other important features: <ul style="list-style-type: none"> Location: South bank of Brahmaputra in Sonitpur district. Part of Laokhowa Wildlife Sanctuary (centrally located Protected Area of Assam) A notified buffer of the Kazairanga Tiger reserve. Important Bird Areas (IBA) of Birdlife International
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	<ul style="list-style-type: none"> Forest type: wet alluvial grassland, riparian and semi-evergreen forests Flora and Fauna: Great Indian one-horned rhinoceros, Tiger, Leopard, Bengal Florican, Black-necked Stork etc.
Chhattisgarh	
Lemru elephant reserves (LER)	<ul style="list-style-type: none"> Request of the Chhattisgarh state to de-notify coal mines falling under the Lemru Elephant Corridor has been accepted by Ministry of Coal. LER was established to prevent human-animal conflict with elephants moving into Chhattisgarh from Odisha and Jharkhand. Geographical location and other important features <ul style="list-style-type: none"> Location: part of the Hasdeo Aranya forests (rich in coal deposits) and is known as lungs of Chhattisgarh.
Jharkhand	
Palamu Tiger Reserve (PTR)	<ul style="list-style-type: none"> Four soft-release centres for Cheetals are under construction in PTR. Geographical location and other important features <ul style="list-style-type: none"> Location: western part of the Chotanagpur plateau, and is a part of Betla National Park and Palamu Wildlife Sanctuary Important Bird Areas (IBA) of Birdlife International Rivers: North Koyal, Auranga, and Burha. Forest type: Mixed deciduous forests. Flora and Fauna: Tigers, leopards, wolves, etc.
Mizoram	
Dampa Tiger Reserve	<ul style="list-style-type: none"> A new species of toad (Frog) Bufoides bhupathyi was found in Dampa tiger reserve. <ul style="list-style-type: none"> It is named after known Indian herpetologist Subramanian Bhupathy. Geographical location and other important features <ul style="list-style-type: none"> Location: western flank (Lushai Hills) of Mizoram, bounded by the Chittagong hill tracts (Sazek hill range) of Bangladesh. Important Bird Areas (IBA) of Birdlife International River: Khawthlangtuipui, Teirei Forest type: tropical evergreen to semi-evergreen forests. Flora and Fauna: Hoolock Gibbon, Tiger, Leopard, Clouded Leopard, Golden Cat, Himalayan Black Bear etc.
Kerala	
Kadalundi Vallikunnu Community Reserve (KVCR)	<ul style="list-style-type: none"> Experts noticed that shrinking mudflat ecosystem of Kadalundi river is keeping shorebirds away. Geographical location and other important features <ul style="list-style-type: none"> Location: Kerala Greek traders came here, calling it Tyndis. India's first river front community reserve. <ul style="list-style-type: none"> Community Reserve: A protected area category first introduced through the Wild Life (Protection) Amendment Act of 2002. Act as buffer zones to or corridors between established national parks, wildlife sanctuaries and reserved and protected forests. Can be declared as conservation areas if they are uninhabited and completely owned by the Government. Governing authority: Chief Wildlife Warden of the State Restrictions: Agriculture and Hunting prohibited, collection of non-timber forest produce allowed. River: Kadalundi Forest type: Mangroves Forest Flora and Fauna: 8 species of mangroves, crabs, , crustaceans, otters, etc.

Odisha	
Debrigarh Wildlife Sanctuary	<ul style="list-style-type: none"> • High prey density was recorded in Debrigarh Wildlife Sanctuary of Odisha. • Geographical location and other important features <ul style="list-style-type: none"> ◦ Location: near reservoir of Hirakud Dam, built on Mahanadi River. • Forest type: dry deciduous forest • Flora and Fauna: Indian Bison, Tiger, Leopard, Wild Boars, Sambhar and Chausingga, etc.
Similipal Tiger Reserve (STR)	<ul style="list-style-type: none"> • According to Union government Melanistic tigers have been recorded only in Similipal Tiger Reserve (STR) in Odisha. <ul style="list-style-type: none"> ◦ As per All India Tiger Estimation (2022), out of 16 tigers 10 were melanistic at STR. ◦ A single mutation in the gene Transmembrane Aminopeptidase Q (Taqpep) causes the black tigers to develop broadened stripes. • Geographical location and other important features <ul style="list-style-type: none"> ◦ Location: Mayurbhanj district (Odisha) ◦ Was added to UNESCO's Man and Biosphere Program in 2009. ◦ Important Bird Areas (IBA) of Birdlife International ◦ Harbors the only population of melanistic tigers in the world. <ul style="list-style-type: none"> ✓ Identified as a distinct genetic cluster for conservation. ✓ Receives funding assistance under the Centrally Sponsored Scheme of Integrated Development of Wildlife Habitats (CSS-IDWH). • Rivers: Budhabalanga, Salandi and many tributaries of Baitarani river. • Forest type: Northern Tropical Moist Deciduous with some evergreen patches • Flora and Fauna: Sal, Tiger, Elephant, Hill Mynah, Leopard, Sambar, giant squirrel, etc.
Tamil Nadu	
Mukurthi National Park	<ul style="list-style-type: none"> • Recently, Tamil Nadu Police increased vigil around Mukurthi National Park to curb poaching. • Geographical location and other important features <ul style="list-style-type: none"> ◦ Location: Nilgiri hills ◦ Part of the Nilgiri Biosphere Reserve ◦ Shares borders with Mudumalai National Park and Silent Valley National Park. ◦ Important Bird Areas (IBA) of Birdlife International • Forest type: Montane grasslands and shrublands, shola forests • Flora and Fauna: Rhododendron, raspberries and black berries, Barking deer, Indian Elephant, panther, Indian leopard, Jackal etc.
Kalakad TR or Kalakad Mundanthurai TR (KMTR)	<ul style="list-style-type: none"> • Plea in Madras high court to restrict entry of outsiders inside KMTR to protect flora, fauna. • Geographical location and other important features <ul style="list-style-type: none"> ◦ Location: Southern Western Ghat. ◦ Consists of two adjacent sanctuaries: <ul style="list-style-type: none"> ✓ Kalakad Wildlife Sanctuary (KWS), ✓ Mundanthurai Tiger Sanctuary (MTS) ◦ Part of Veerapuli and Kilamalai Reserve Forests. ◦ Forms part of the interstate (Kerala and TN) Agasthyamalai Biosphere Reserve. ◦ Established primarily for conservation of Lion Tailed Macaque. ◦ Important Bird Areas (IBA) of Birdlife International • River: River Thamirabarani and 13 other rivers originate from KMTR, popularizing it as River Sanctuary.

	<ul style="list-style-type: none"> Forest type: Changes from dry thorn forest to dry deciduous. Flora and Fauna: Leopard, Indian Pangolin, Mouse Deer, Great Indian Hornbill etc.
Anamalai Tiger Reserve (ATR)	<ul style="list-style-type: none"> ATR is carved out of the Tamil Nadu portion of the Anamalais. Geographical location and other important features <ul style="list-style-type: none"> Location: Southern Western Ghats. Home for six different indigenous people i.e., Malai Malasars, Kadar, Malasar, Muduvan, Pulayar, Eravallar. CATS recognized. River: Aliyar, Uppar, and Nirar Forest type: Wet evergreen forests, semi-evergreen forests, moist deciduous, dry deciduous, dry thorn and shola forests. Flora and fauna: Mango, Jackfruit, Asiatic elephant, Sambar, Spotted deer, Barking deer, Mouse deer, etc.
Uttarakhand	
Gangotri National Park (GNP)	<ul style="list-style-type: none"> Decided to transfer approximately 50 hectares of land to the Army and Indo-Tibetan Border. Geographical location and other important features <ul style="list-style-type: none"> Location: Uttarkashi District region Runs along the international boundary between India and China. Provides continuity for conservation with the Govind National Park and Kedarnath Wildlife Sanctuary Important Bird Areas (IBA) of Birdlife International. Gaumukh glacier, the origin of river Ganges located inside the park. River: Bhagirathi Forest type: Himalayan moist temperate forest, Himalayan dry temperate forest, sub-alpine forest, moist alpine scrub and dry alpine scrub Flora and Fauna: Pine, Deodar, oak, rhododendrons, black bear, brown bear, Himalayan Monal, Himalayan thar, musk deer and snow leopard etc.
Uttar Pradesh	
Dudhwa TR	<ul style="list-style-type: none"> Female Royal Bengal Tiger was found in buffer zone of Dudhwa TR. Geographical location and other important features <ul style="list-style-type: none"> Location: India-Nepal border Comprises Dudhwa National Park, and two nearby Sanctuaries, viz. Kishanpur and Katerniaghata. Recognized under CATS. Important Bird Areas (IBA) of Birdlife International Rivers: Suheli, Mohana, Joraha, Sharda and Ull. Forest type: Moist deciduous forest Flora and Fauna: Tigers, Leopards, Elephants, Sloth Bear

3.2.13. SPECIES IN NEWS

Note: As per the amendments made under the 'Wild life (Protection) Amendment Act, 2022', species that are covered under Appendices of CITES are listed under Schedule IV of the Act.



Terrestrial species

<p>Hangul (Kashmir Stag)</p> 	<ul style="list-style-type: none"> Population of Hangul (Kashmir stag) has registered a 10 percent increase. <p>Protection status</p> <table border="1"> <tr> <td></td><td>WPA, 1972 Schedule I</td><td></td><td>Among 22 species covered under Species Recovery Programme</td></tr> </table> <p>Characteristics</p> <ul style="list-style-type: none"> Subspecies of Central Asian red deer endemic to Kashmir and surrounding areas <p>Habitat</p> <ul style="list-style-type: none"> Found in dense riverine forests in high valleys and mountains of Jammu and Kashmir and northern Himachal Pradesh. In Kashmir, found primarily in Dachigam National Park (DNP) and Tral wildlife sanctuary. <p>Conservation Measures: Project hangul, state animal of Jammu and Kashmir</p>		WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme
	WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme		
<p>Nilgiri Tahr</p> 	<ul style="list-style-type: none"> Tamil Nadu government launched Project Nilgiri Tahr. <p>Protection status</p> <table border="1"> <tr> <td></td><td>WPA, 1972 Schedule I</td><td></td><td>Among 22 species covered under Species Recovery Programme</td></tr> </table> <p>Characteristics</p> <ul style="list-style-type: none"> Only mountain ungulate (animal with hooves) in southern India amongst the 12 species present in India. Locally known as "Varaiaadu" Two epics — Silappathikaram and Sivakasindamani — mention its descriptions <p>Habitat</p> <ul style="list-style-type: none"> Endemic to western ghats Ernavikulam National Park in Anamalai Hills, Kerala, home to the largest population. <p>Conservation Measures</p> <ul style="list-style-type: none"> State animal of Tamil Nadu October 7 declared as Nilgiri Tahr day by Tamil Nadu 		WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme
	WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme		
<p>Sangai deer</p> 	<ul style="list-style-type: none"> Manipur Government raised concern that Loktak Lake's hydroelectric plan may affect Sangai deer. <p>Protection status</p> <table border="1"> <tr> <td></td><td>WPA, 1972 Schedule I</td><td></td><td>Among 22 species covered under Species Recovery Programme</td></tr> </table> <p>Characteristics</p> <ul style="list-style-type: none"> A medium-sized deer, with unique distinctive antlers Called Dancing deer <p>Habitat</p> <ul style="list-style-type: none"> Loktak lake inside Keibul Lamjao National Park (Manipur), over floating biomass called phumdi 		WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme
	WPA, 1972 Schedule I		Among 22 species covered under Species Recovery Programme		

	<ul style="list-style-type: none"> Loktak Lake was designated as a wetland of international importance under the Ramsar Convention. <p>Conservation Measures</p> <ul style="list-style-type: none"> State animal of Manipur
Pangolin	<ul style="list-style-type: none"> Scientists have discovered a new species of highly endangered Pangolin in China. <p>Protection status (Indian Pangolin)</p>  <p>Characteristics</p> <ul style="list-style-type: none"> Only mammals wholly covered in scales. Adult male is about one-third larger than the female. If under threat, will immediately curl into a tight ball. <p>Habitat</p> <ul style="list-style-type: none"> Four species live in Africa: Black-bellied pangolin, White-bellied pangolin, Giant Ground pangolin and Temminck's Ground pangolin. Four species found in Asia: Indian pangolin, Philippine pangolin, Sunda pangolin, and the Chinese pangolin.
Hoolock Gibbon	<ul style="list-style-type: none"> Conservation status of India's only ape (Hoolock Gibbon) was a cause for concern at a global event on gibbons held in China. <p>Protection status:</p> <ul style="list-style-type: none"> IUCN: Endangered (Western hoolock gibbon) and Vulnerable (Eastern hoolock gibbon).  <p>Characteristics</p> <ul style="list-style-type: none"> Gibb smallest and fastest of all apes, commonly found near rivers. Omnivorous and survive by eating fruits, insects, and leaves. <p>Habitat:</p> <ul style="list-style-type: none"> Live in tropical and subtropical forests in the south-eastern part of Asia. Hoolock gibbon, unique to India's northeast, is one of 20 species of gibbons on Earth.
Namdapha flying squirrel	<ul style="list-style-type: none"> Missing for 42 years, flying squirrel resurfaces in Arunachal Pradesh. <p>Protection status</p>  <p>Characteristics:</p> <ul style="list-style-type: none"> A nocturnal, endemic to northeastern India mammal. Range: Only known with certainty from a single specimen collected in Namdapha National Park, Arunachal Pradesh. Threats: Poaching, habitat loss. <p>Habitat:</p> <ul style="list-style-type: none"> Occurs in dry deciduous montane forests occupying moist forest tracts along streams.

Dhole 	<ul style="list-style-type: none"> A rare sighting of Dhole was encountered in Shivamogga district, Karnataka.
	Protection status
	  
	Characteristics <ul style="list-style-type: none"> Play an important role as apex predators in forest ecosystems. Carnivore of the dog family
Attenborough echidna 	Habitat <ul style="list-style-type: none"> Found in the forests of central, south, and southeast Asia. Most populations found in India, Nepal, Bhutan, and Thailand. Threats: Habitat loss, reduced prey base, retaliatory killings.
	Conservation Measures <ul style="list-style-type: none"> Dhole conservation breeding program.
	<ul style="list-style-type: none"> Elusive Attenborough echidna (<i>Zaglossus attenboroughi</i>) rediscovered in Indonesia. <ul style="list-style-type: none"> Named after famed British naturalist David Attenborough, it was last seen in 1961.
	Protection status 
Emperor Penguins 	Characteristics: <ul style="list-style-type: none"> There are four echidna species. Three have long beaks, with the Attenborough echidna, and the western echidna considered critically endangered. Nocturnal and shy Members of the monotremes – an egg-laying mammal (the only other member is the duck-billed platypus) Eat through toothless beaks.
	Habitat: <ul style="list-style-type: none"> Found in Australia, Tasmania, and New Guinea.
	<ul style="list-style-type: none"> A study predicted that Emperor Penguins will face Quasi-Extinction by the end of the century. Quasi-extinction threshold reflects that a population may be doomed to extinction even if there are still individuals alive.
	Protection status 
	Characteristics <ul style="list-style-type: none"> Flightless birds and biggest of the 18 species of penguins Carnivores and live in groups called colonies Males incubate the eggs for a period of 65-75 days in a specially adapted brood pouch
	Habitat <ul style="list-style-type: none"> Outlying Antarctic islands
	<ul style="list-style-type: none"> Food Safety and Standards Authority of India has recognised the Mithun (<i>Bos frontalis</i>) as a food animal.

Mithun 	<ul style="list-style-type: none"> ○ Food Animals are those that are raised and used for food production or consumption by humans.
	Protection status 
	Characteristics <ul style="list-style-type: none"> ● Species: Ruminant species of Bovidae family. ● Similar to that of Gaur (Indian bison) but are smaller in size.
	Habitat: <ul style="list-style-type: none"> ● Live at altitudes of 300-3000m above the sea level ● Largest population is in India along with Bangladesh, Myanmar and China. <ul style="list-style-type: none"> ○ Habitat in India: Arunachal Pradesh, Nagaland, Manipur, and Mizoram. ● Also found in parts of Bangladesh, Myanmar, and Bhutan.
	Conservation Measures <ul style="list-style-type: none"> ● State animal of Arunachal Pradesh and Nagaland ● ICAR-National research Centre on Mithun was established in Nagaland
 Avian Species	
Great Indian Bustard 	<ul style="list-style-type: none"> ● The Supreme Court has directed the Union Government to come up with plans to save the bird species.
	Protection status      <p>Among 22 species covered under Species Recovery Programme</p>
	Characteristics <ul style="list-style-type: none"> ● An agro-grassland bird endemic to the Indian Subcontinent. ● An omnivorous bird. ● Males play no role in the incubation and care of the young. ● Bustard Species Found in India: Great Indian Bustard, the Lesser Florican and the Bengal Florican ● Called 'Son Chiriya' in Madhya Pradesh, 'Godawan' in Rajasthan and 'Maldhok' in Maharashtra. ● Threat: Habitat loss and alteration, collisions with high tension electric wires, fast moving vehicles and free-ranging dogs in villages
	Habitat <ul style="list-style-type: none"> ● Mainly confined to Rajasthan, Gujarat and few tracts of Andhra Pradesh <ul style="list-style-type: none"> ○ Rajasthan has the highest population.
	Conservation Measures <ul style="list-style-type: none"> ● Sites for the establishment of a conservation breeding centres.
Western Tragopan	<ul style="list-style-type: none"> ● A gradual increase in the population of the bird species was observed in Himachal Pradesh's Sarahan pheasantry.
	Protection status    

	<p>Characteristics</p> <ul style="list-style-type: none"> During the breeding season (April-June), it inhabits little-disturbed temperate coniferous and deciduous forests. Feeds mostly on leaves, shoots and seeds, but also consumes insects and other invertebrates. Threat: Habitat degradation and fragmentation through subsistence farming, etc. <p>Habitat</p> <ul style="list-style-type: none"> Endemic to the northwest Himalaya, within a narrow range of north Pakistan through Jammu and Kashmir and Himachal Pradesh, to the western part of Garhwal. <p>Conservation Measures</p> <ul style="list-style-type: none"> State bird of Himachal Pradesh
Dodo 	<ul style="list-style-type: none"> Geneticists and conservationists have joined forces to re-introduce the Dodo, extinct since the late 17th century. <p>Protection status</p> <div style="text-align: center;">  </div> <p>Characteristics</p> <ul style="list-style-type: none"> Flightless birds Related to pigeons and the closest living relative of the dodo is the Nicobar pigeon. Believed to have used gizzard stones to help its digestion. Reason for its extinction: Deforestation, hunting, and destruction of their nests by animals brought to the island by the Dutch <p>Habitat</p> <ul style="list-style-type: none"> Were endemic to the island of Mauritius
Mangrove Pitta Birds 	<ul style="list-style-type: none"> A first-ever census of mangrove pitta birds was carried out in Odisha and around 179 birds were sighted. <p>Protection status</p> <div style="text-align: center;">  WPA, 1972 Schedule II  </div> <p>Characteristics</p> <ul style="list-style-type: none"> Small secretive birds, measuring 17 to 19 cm in length and weighing 45 to 65 grams. Usually feeds on insects and other small invertebrates. A ground forager (an animal that searches widely for food) <p>Habitat</p> <ul style="list-style-type: none"> Found in the eastern part of India especially in Odisha and West Bengal along with countries like Myanmar, Bangladesh, Malaysia, Singapore etc.
Painted Storks <i>(Mycteria leucocephala)</i>	<ul style="list-style-type: none"> One of the largest flocks of Painted Storks has been spotted in Andhra Pradesh.

	<p>Protection status</p> <table border="1"> <tr> <td></td><td>WPA, 1972</td><td>Schedule II</td><td></td></tr> </table>		WPA, 1972	Schedule II		
	WPA, 1972	Schedule II				
	<p>Characteristics</p> <ul style="list-style-type: none"> Belong to Ciconiidae family. Breeding season <ul style="list-style-type: none"> July to October in North India November to March in South India. Have a long heavy yellow beak with a down curved tip. Bare head is reddish or orange <p>Habitat</p> <ul style="list-style-type: none"> Usually seen in freshwater wetlands and occasionally in coastal regions. Widely distributed over plains of Asia. Found in Pakistan, India, Sri Lanka, Myanmar, Malaysia, Thailand and Vietnam. 					
 Aquatic Species	<p>Ghol or Black spotted Crocker</p>  <ul style="list-style-type: none"> Gujarat declared Ghol species as the state fish at the Global Fisheries Conference India 2023. <p>Characteristics</p> <ul style="list-style-type: none"> Its swim bladders are highly priced because of their medicinal and commercial values. Exported to countries of south-east Asia (Hong Kong, Singapore and Malaysia). Usage: To prepare isinglass (a form of collagen used mainly for the clarification of wine and beer). Traditional medicine (believed to prevent bleeding in patients with urinary problems). Cosmetics. <p>Habitat:</p> <ul style="list-style-type: none"> Widely distributed in Indo-Pacific from Persian Gulf to Pacific Ocean 					
 Reptiles, insects, amphibians , etc.	<p>Gharial (Gavialis gangeticus)</p>  <ul style="list-style-type: none"> 35 hatchlings of Gharial, a crocodile species, were spotted near Satkosia gorge in Mahanadi River in Odisha. <p>Protection status</p> <table border="1"> <tr> <td></td> <td>WPA, 1972</td> <td>Schedule I</td> <td></td> <td></td> </tr> </table>		WPA, 1972	Schedule I		
	WPA, 1972	Schedule I				
	<p>Characteristics</p> <ul style="list-style-type: none"> Snout of the gharial is uniquely the thinnest and most elongated among all the crocodilians. Unlike other crocodiles, the gharials feed on warm-blooded species <ul style="list-style-type: none"> Even largest gharial adults feed exclusively on fish, Use sandy banks for basking and breeding. Most aquatic of all crocodilians for it never moves far from the water. 					

	<ul style="list-style-type: none"> Has a thick skin covered with smooth epidermal scales that do not overlap. <p>Habitat:</p> <ul style="list-style-type: none"> Reside exclusively in river habitats with deep, clear, fast-flowing waters and steep, sandy banks. Adult gharials prefer still, deep pools, formed at sharp river-bends and river confluences. Found majorly in Chambal River (tributary of Yamuna River).
Red Sand Boa	<ul style="list-style-type: none"> A report by the Wildlife Conservation Society (WCS)-India report flags the illegal trade of red sand boa. <p>Protection status</p>  <p>WPA, 1972 Schedule I</p> 
	<p>Characteristics</p> <ul style="list-style-type: none"> Non-Venomous and Ovoviparous snake. Called a "Two-headed snake" due to its round tail that looks like a head. Used for making certain medicines, cosmetics, and in black magic, and is in huge demand in the international market. <p>Habitat:</p> <ul style="list-style-type: none"> Endemic to India, Pakistan, and Iran
Dancing Frogs	<ul style="list-style-type: none"> Dancing frogs of the Western Ghats are considered one of the most threatened amphibian genera as per second Global Amphibian Assessment of IUCN <p>Protection status (IUCN Status)</p> <ul style="list-style-type: none"> Nilgiri Dancing Frog: Vulnerable White-Cheeked Dancing Frog: Endangered <p>Characteristics</p> <ul style="list-style-type: none"> Named so as they perform "foot flagging" in which males stretch up their hind legs one at a time and wave their webbed toes in air in a rapid motion akin to a dance. Threats: Invasive species, land use change, extreme weather, etc. <p>Habitat:</p> <ul style="list-style-type: none"> Endemic to the Western Ghats
Yellow-bellied Sea snake (Pelamis Platurus)	<ul style="list-style-type: none"> Recently Yellow-bellied Sea snake, a highly venomous species of snake was seen on the coast of Bay of Bengal, which is usually found in Arabian Sea. <p>Protection status</p> 
	<p>Characteristics</p> <ul style="list-style-type: none"> Has a distinctive bicolor pattern with a yellow underbelly and brown back with a flattened yellow tail with large black spots Carnivores and feed on fishes. Can swim by lateral undulation of the body, and can move both forwards and backwards. <p>Habitat</p> <ul style="list-style-type: none"> Tropical parts of the Pacific and Indian Oceans.

Plant species							
Gucchi mushroom	<ul style="list-style-type: none"> Unpredictable weather patterns and early springs have left gucci mushroom hunters in distress. Characteristics <ul style="list-style-type: none"> Also known as Morel Mushrooms Costliest among fungi in the world. Grows in clusters on logs of decaying wood. Limited to a few weeks in the spring. Cannot be cultivated commercially, does not grow at the same spot every time. Health Benefits: Rich in potassium, vitamins (including Vitamin D), copper and antioxidants. Habitat: Himachal Pradesh, Uttarakhand, and Jammu and Kashmir. 						
Baobabs	<ul style="list-style-type: none"> Bhil tribe of Central India is opposing the forest department's decision to give permission for uprooting baobab trees for commercial use. <p>Protection status</p> 						
Gentiana Kurroo	<p>Characteristics</p> <ul style="list-style-type: none"> Belongs to the genus Adansonia are native to mainland Africa, Madagascar, and Australia. Have unusual barrel-like trunks Known for their extraordinary longevity (live up to 2,000 years) and ethnobotanical importance. Tree's unique pendulous flowers are pollinated by bats and bush babies. 						
<p>Newly discovered species</p> <table border="1"> <tr> <td>Impatiens karuppusamy</td><td> <ul style="list-style-type: none"> Plant species was recently discovered by Botanical Survey of India (BSI) in Kalakad Mundanthurai Tiger Reserve, Tamil Nadu. Named after Dr. S Karuppusamy (Madhura College, Tamil Nadu) for his significant contributions to the taxonomy of south Indian angiosperms. </td></tr> <tr> <td>Lysionotus namchoomii</td><td> <ul style="list-style-type: none"> Species of epiphytic plant (grow upon another plant) discovered by BSI. Found in Himalayas, Japan and Indo-China. Named in honour of late Chau Phunkyoo Nomchoon, a social reformer from Arunachal Pradesh's Khapti community. </td></tr> <tr> <td>Curcuma Kakchingense</td><td> <ul style="list-style-type: none"> Flowering plant species discovered in Manipur </td></tr> </table>		Impatiens karuppusamy	<ul style="list-style-type: none"> Plant species was recently discovered by Botanical Survey of India (BSI) in Kalakad Mundanthurai Tiger Reserve, Tamil Nadu. Named after Dr. S Karuppusamy (Madhura College, Tamil Nadu) for his significant contributions to the taxonomy of south Indian angiosperms. 	Lysionotus namchoomii	<ul style="list-style-type: none"> Species of epiphytic plant (grow upon another plant) discovered by BSI. Found in Himalayas, Japan and Indo-China. Named in honour of late Chau Phunkyoo Nomchoon, a social reformer from Arunachal Pradesh's Khapti community. 	Curcuma Kakchingense	<ul style="list-style-type: none"> Flowering plant species discovered in Manipur
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Curcuma Kakchingense	<ul style="list-style-type: none"> Flowering plant species discovered in Manipur 						

Cyrtodactylus vairengtensis	<ul style="list-style-type: none"> Species of gecko and named after the town Vairengte (in Mizoram),
Noa-Dihing Music Frog	<ul style="list-style-type: none"> New species of music frog in the Namdapha-Kamlang landscape of Arunachal Pradesh. Named after the Noa-Dihing River tributary of Brahmaputra River.
Batillipes Kalami	<ul style="list-style-type: none"> New species of marine tardigrade after former President A.P.J. Abdul Kalam. <ul style="list-style-type: none"> Tardigrades (Water Bears), are microscopic eight-legged animals. Belong to species known as extremophiles (survive in extreme conditions, up to 30 years without food or water).
Armageddon Reedtail	<ul style="list-style-type: none"> Damselfly species found in the Western Ghats (Kerala). Direct reference to the concept of “Ecological Armageddon”, a term used to describe the devastating decline of insect populations around the world.
Badis limaakumi	<ul style="list-style-type: none"> Small freshwater fish found from the Milak river, Nagaland
Pterygotrigla intermedia	<ul style="list-style-type: none"> Zoological Survey of India discovered a new species of marine fish from West Bengal.

3.3. FORESTS

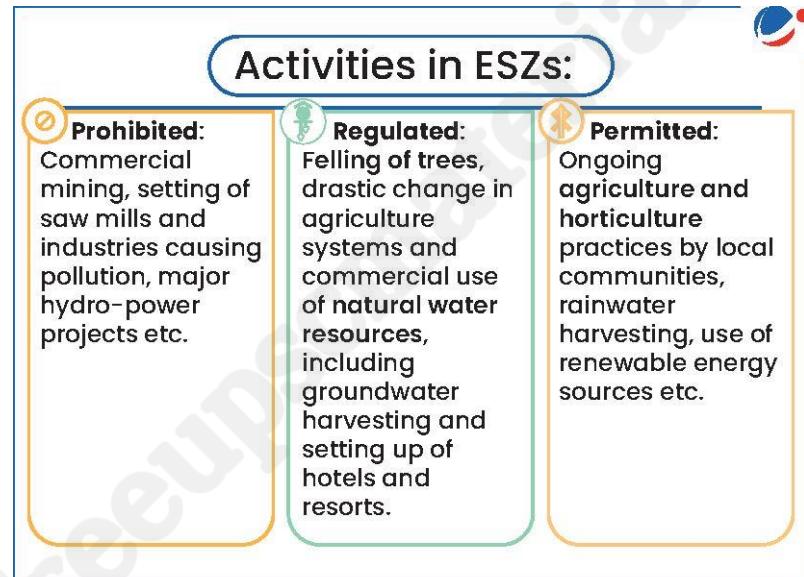
3.3.1. ECO-SENSITIVE ZONE (ESZ)

Why in the news?

MoEFCC has unveiled the **draft notification for an ESZ** for Dachigam National Park (DNP), Thajwas (Baltal) and Overa- Aru wildlife sanctuaries in Jammu and Kashmir.

Eco-Sensitive Zone (ESZ)

- Created as “shock absorbers” for the protected areas.
- National Wildlife Action Plan (2002-2016)** provides for establishing ESZ under the **Environmental (Protection) Act, 1986**.
- As per National Wildlife Action Plan (2002-2016), **land within 10 km of boundaries** of national parks and wildlife sanctuaries is **to be notified as ESZ**.
- In 2022, the Supreme Court mandated that a **minimum 1-km ESZ around national parks or wildlife sanctuaries should be there**.
 - In 2023, SC ruled it is not applicable to **ESZs in respect to which draft and final notifications have been issued** and where the **national parks etc. located on inter-state borders or share common boundaries**.
 - No mining is allowed, either within national parks and sanctuaries or in a 1-km radius.**



About Dachigam National Park (DNP)

- **Geographical location and other important features**
 - Located in Jammu and Kashmir (Zabarwan mountain ranges of the Himalayas).
 - Occupies almost half of the catchment zone of the Dal Lake.
 - Dachigam nallah coming from Marshar Lake flows through it.
- **Fauna:** Hangul or Kashmir stag, Himalayan Brown bear, Indian leopard, Himalayan grey langur, yellow-throated marten etc.
- **Flora:** the vegetation is typically **Himalayan moist temperate forest** and consists of trees like Kashmir elm, White willow, Himalayan Poplar, apricots and oaks etc.

Dachigam National Park (DNP)



3.3.2. CENTRAL EMPOWERED COMMITTEE (CEC)

Why in news?

MoEF&CC forms a new **CEC on Environmental issues**, exercising power under the **Environment (Protection) Act (1986)**.

About CEC

- **Permanent statutory body**
- **To replace an ad hoc CEC formed in 2002** for monitoring the implementation of SC's order in **TN Godavarman vs. Union of India (1996)**.
- **Composition:**
 - **Chairman and 3 Expert Members** selected for **3 years** (extendable once upto age of 60).
 - **Chief Coordinating Officer** a serving officer not below rank of **DIG of Forests/Director in GOI**.
- All of them should have **experience in Environment, Forest and Wildlife**.
- **Functions:**
 - **Monitor implementation of SCs orders** and place **reports of noncompliance** before the Centre.
 - Deal with any **applications made by any aggrieved person**.
- **Jurisdiction:** Whole country
 - If State differs from CEC's recommendation, it shall be referred to the Centre whose decision **shall be final and binding**.

3.3.3. UNITED NATION FORUM ON FORESTS

Why in the news?

India hosted a **Country-Led Initiative (CLI)** event as part of the United Nations Forum on Forests (UNFF) in Dehradun, Uttarakhand.

More on the news

- CLI focussed on **two thematic areas-**
 - **Forest fires/ wildfires**
 - **Forest Certification (FC) & Sustainable Forest Management (SFM)**.
- **Primary goal:** To contribute to the discussions of UNFF regarding the implementation of Sustainable Forest Management and the UN Strategic Plan for Forests (UNSPF).
- **UNSPF 2017-2030** (adopted by UNGA) has **six Global Forest Goals** and **26 associated targets** which are voluntary and universal.

About Sustainable Forest Management (SFM)

- Ensures that forests supply goods and services meeting both present and future needs.
 - UN Forest Instrument encourages SFM through voluntary certification systems or other appropriate mechanisms in a transparent manner.
- Other UN declarations related to Forests:** 'New York Declaration on Forests'
 - 1st endorsed at the **United Nations Climate Summit in 2014**.
 - Proposes a global timeline to end the loss of forests.
 - Endorsed by governments, big companies and indigenous communities.
- Forest certification is a mechanism for forest monitoring, tracing and labeling forest products, where the quality of forest management is judged against a series of agreed standards.
 - Between 2010- 2021, area of forest land under certification schemes increased by 35%.

Seven Elements of SFM

	Extent of Forest Resources
	Biological Diversity
	Forest Health and Vitality
	Productive functions of forest resources
	Protective functions of forest resources
	Socio-economic functions
	Legal, policy and institutional framework

About United Nation Forum on Forests (UNFF)

- Genesis:** Economic and Social Council of the United Nations (ECOSOC) in 2000 established UNFF as a subsidiary body.
- About:** It promotes the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end.
- Members:** All Member States of United Nations (including India which is a founding member) and specialized agencies.

3.3.4. INDIAN FOREST & WOOD CERTIFICATION SCHEME (IFWCS)

Why in news?

MoEFCC launched Indian Forest & Wood Certification Scheme (IFWCS).

About IFWCS

- National forest certification scheme of India**
- Designed to promote SFM and sustainable management of Trees outside Forests (TOF) in country.
- Offers voluntary third-party certification.
- Provides market incentives to various entities (state forest departments, individual farmers, or Farmer Producer Organizations) that adhere to responsible forest management and agroforestry practices in their operation.
- Applicable across country, both in forest areas and TOF plantations on government, private, agroforestry and other lands.
- Certification applicable for both timber and non-timber forest produce.
- Includes three types of certification
 - Forest management certification
 - TOF management certification
 - Chain of Custody Certification (traceability of a forest product).
- Forest Management certification is based on Indian Forest Management Standard, consisting of 8 criteria, which is an integral part of National Working Plan Code 2023.
- Institutional arrangement for IFWCS
 - Indian Forest and Wood Certification Council: Act as a multi-stakeholder advisory body.
 - Indian Institute of Forest Management, Bhopal: Act as operating agency and responsible for overall management of IFWCS.

- **National Accreditation Board for Certification Bodies under Quality Council of India:** Accredit certification bodies to carry out independent audits of various entities.

About National Working Plan Code (NWPC)-2023

- For scientific management of forests and evolving new approaches.
 - First adopted in 2004 with a subsequent amendment in 2014.
- Incorporates India Forest Management Standards (IFMS), a set of 8 comprehensive guidelines and rules applicable to all states which focus upon-
 - Soil and water conservation, productivity and utilisations of forest resources, enhancement of social-economic and cultural benefits related to forests, extent and condition of forest and tree cover and adequacy of policy, legal and institutional framework.
 - IFMS developed from Bhopal-India process (1998), one of the nine global initiatives for forest management.
- For the first time, NWPC-2023 prescribed state forest departments to engage in continuous data collection and its updation in a centralized database.

3.3.5. OTHER FOREST RELATED NEWS

News	Details
International Tropical Timber Organisation (ITTO)	<ul style="list-style-type: none"> ● Its 59th Council session concluded recently. ● About ITTO <ul style="list-style-type: none"> ○ An intergovernmental organization founded in 1989 ○ HQ: Yokohama (Japan) ○ Aim: To promote the sustainable management and conservation of tropical forests ○ Membership: 76 countries (Including India) ○ Governing body consists of International Tropical Timber Council.
Accredited Compensatory Afforestation (ACA)	<ul style="list-style-type: none"> ● Ministry of Coal has proposed 579 hectares of reclaimed land under ACA program. ● About ACA <ul style="list-style-type: none"> ● Introduced under Forest (Conservation) Rules, 2022 ● A system of proactive afforestation to obtain approval for non-forestry use of forest land. ● Under ACA, people and government entities can raise vegetation on fallow land and sell it to project developers who need to meet CA targets. <ul style="list-style-type: none"> ○ Before this, Forest Department undertook compensatory afforestation (CA) only after approval of diversion of forest land for non-forestry use. ● CA is mandatory under Forest (Conservation) Act, 1980 for non-forestry use of forestland.
Global Forest Watch	<ul style="list-style-type: none"> ● The World Resources Institute (WRI) and the University of Maryland updated Global Forest Review (GFR) on the Global Forest Watch platform. ● WRI established Global Forest Watch in 1997 as part of the Forest Frontiers Initiative. <ul style="list-style-type: none"> ○ Started as a network of NGOs producing up-to-date reports about the state of forests. ○ As of 2019 it provides data on 82 countries (Including India). ● About WRI <ul style="list-style-type: none"> ○ A global nonprofit organization established in 1997. ○ Mandate: <ul style="list-style-type: none"> ✓ Focuses countries to meet people's essential needs ✓ Protect and restore nature; and to stabilize the climate ✓ Build more resilient communities.

Collaborative Partnership on Forests (CPF)	<ul style="list-style-type: none"> CPF has launched the Joint Call to Action for Forests towards 2030. <p>About CPF</p> <ul style="list-style-type: none"> Genesis: Established in 2001 by a resolution of the Economic and Social Council of the UN (ECOSOC) as an voluntary interagency partnership on forests. Mission: To help enhance the contribution of all types of forests and trees outside forests to the 2030 Agenda for Sustainable Development. Functions: Support work of UN Forum on Forests (UNFF), provide scientific and technical advice to the UNFF, etc. Members: Comprises international organizations, institutions, and secretariats that have substantial programs on forests.
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3.4. WETLANDS, COASTLAND AND OCEANS

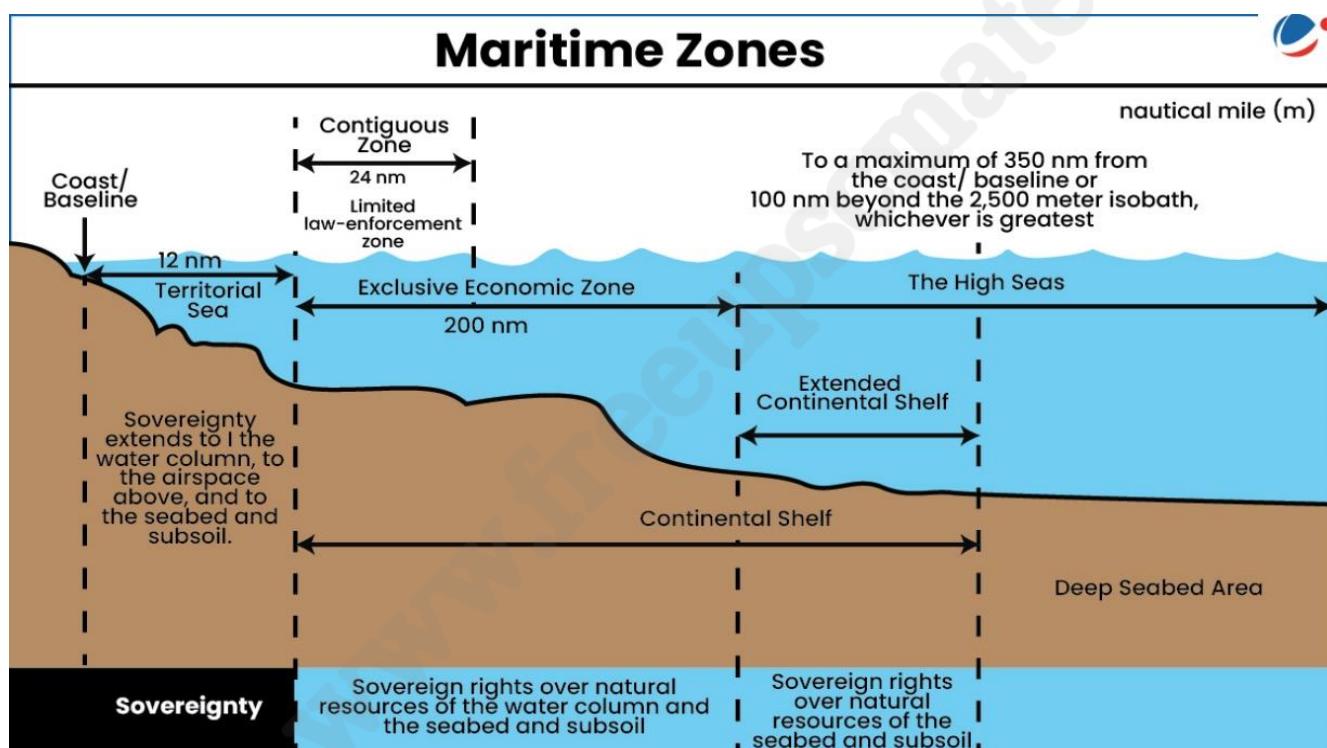
3.4.1. FIRST INTERNATIONAL TREATY TO PROTECT THE HIGH SEAS

Why in the news?

UN adopts **world's first international treaty** to protect the high seas.

About the Treaty

- Adopted by the **Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ)**, “high seas” treaty aims at **taking stewardship of ocean** on behalf of present and future generations.
 - Adopted under the framework of **United Nations Convention on Laws of the Sea (UNCLOS)**.
 - Legally binding in nature.
 - Will enter into force after ratification from **60 countries**.



Key highlights of the treaty

- Strengthening resilience** and contains provisions **based on polluter-pays principle** as well as mechanisms for disputes.

- Parties must **assess potential environmental impacts** of any planned activities **beyond their jurisdictions**.
- Offers guidance, including through an **integrated approach to ocean management** that builds ecosystem resilience **to tackle** adverse effects of **climate change** and **ocean acidification**.
- **Recognize rights and traditional knowledge of indigenous peoples and local communities**, freedom of scientific research, and need for the fair and equitable sharing of benefits.
- **Aims to establish large-scale marine protected areas in international waters**, which protect marine biodiversity in high seas.
- Also **calls for setting up of a Conference of Parties to oversee and enforce compliance** with treaty's terms

3.4.2. CORAL REEF BREAKTHROUGH

Why in the news?

The International Coral Reef Initiative (ICRI) has launched the Coral Reef Breakthrough in **partnership with Global Fund for Coral Reefs and High-Level Climate Champions**.

International Coral Reef Initiative (ICRI)

- A **global partnership between Nations and organizations**
- **Genesis: Founded in 1994** by Australia, France, Japan, Jamaica, Philippines, Sweden, UK, and USA.
- Strives to **preserve coral reefs and related ecosystems** around world.
- **Members:** 101 members (**including India**).
- **Other information:** Part of **Global Fund for Coral Reefs Coalition**, a blended finance instrument to mobilise action and resources to protect and restore coral reef ecosystems.
 - **Blended finance:** Strategic use of development finance for mobilisation of additional finance towards sustainable development.
 - ✓ Uses concessional finance (i.e. a subsidy) to reduce perceived risk of an investment.

About Coral Reef Breakthrough

- Aims to **prevent extinction of at least 125,000 km² of shallow-water tropical coral reefs**.
- **Action Plans to achieve target**
 - **Mitigate local drivers of loss** including land-based sources of pollution, destructive coastal development, and overfishing.
 - **Bolster resilience based coral reef conservation** efforts by aligning with and surpassing global coastal protection targets including 30by30.
 - ✓ **Target 3 of Kunming-Montreal Global Biodiversity Framework** i.e. **at least 30%** of terrestrial and inland water areas, and marine and coastal areas should be **conserved by 2030**.
 - **Assist the development and implementation of innovative solutions** at scale and climate-smart designs that support coral to impact **30% of degraded reefs by 2030**.
 - **Secure investments of at least USD 12 billion by 2030** from public and private sources

About Coral reefs

- Marine **invertebrate animals** with **hard exoskeletons made of calcium carbonate**.
- Made up of colonies of hundreds to thousands of tiny individual corals, called **polyps**.
- 45 countries have **75% of world's coral reefs**.
- **Global distribution:** Mainly Found in Australia, Indonesia, Philippines, Maldives, Fiji, Papua New Guinea
 - **Presence in India: Gulf of Kutch, Gulf of Mannar, Andaman & Nicobar, and Lakshadweep Islands**.
- Department of Fisheries is promoting Artificial reef under **Pradhan Mantri Matsya Sampada Yojana** for rejuvenating coastal fisheries.

Staghorn coral

- A genome-wide survey of highly endangered staghorn coral in the Caribbean has identified 10 genomic regions associated with resilience against white band disease.
- **Characteristics**
 - One of the most important corals in the Caribbean.
 - Along with elkhorn coral and star corals it built Caribbean coral reefs over the last 5,000 years.
 - Can form dense groups called “thickets” in very shallow water.
 - Get food from photosynthetic algae that live inside the coral's cells.



3.4.3. LAKES AND WETLANDS IN NEWS

Wetlands in News : India



Wetlands	Details
Chilika Lake, Odisha	<ul style="list-style-type: none"> 88 Bird species were found in lake during annual summer survey of birds conducted by Chilika wildlife division of Odisha. Asia's largest brackish water World's 2nd largest coastal lagoon. 1st Indian Wetland of International Importance (WII) to be designated under Ramsar Convention in 1981. <ul style="list-style-type: none"> 1st site in Asia which was removed from Montreux Record (MR) in 2002. ✓ MR is register of WII where changes in ecological character have occurred or are likely to occur. Kalijai temple situated on an island in Chilika Lake. Major attraction: Nalabana Bird Sanctuary and Irrawaddy dolphin (Endangered - IUCN Red List).
Pulicat lake	<ul style="list-style-type: none"> After a six-year absence, lesser flamingos found their way back to Pulicat Lake. <ul style="list-style-type: none"> Lesser flamingo (IUCN: Near Threatened) is a rare migratory bird from the sub-Saharan region in Africa. Location: Andhra Pradesh-Tamil Nadu Border 2nd largest brackish water lake or lagoon in India (after Chilka lake). A Ramsar site Three major rivers feed the lagoon: Arani, Kalangi and Swarnamukhi River. Barrier island of Sriharikota separates it from Bay of Bengal.
Dal Lake, Jammu and Kashmir	<ul style="list-style-type: none"> Thousands of dead fish float on Dal Lake due to temperature variations at different depths of lake. Location: Srinagar, Jammu and Kashmir Called "Srinagar's Jewel". Formed due to flood spillage from Jhelum River. Has floating gardens, known as "Raad" in Kashmiri. <ul style="list-style-type: none"> The houseboats called Shikhara are closely associated with Dal Lake.
Bhoj Wetland, Madhya Pradesh	<ul style="list-style-type: none"> National Green Tribunal has banned the operation of cruise boats in Upper Lake in Bhopal and other wetland site. <ul style="list-style-type: none"> It further banned construction within "no development zone i.e. "buffer zone" as provided in Wetland Rules, 2017. Location: Bhopal, Madhya Pradesh Designated as a Ramsar site in 2002. Has 2 man-made reservoirs i.e. Upper lake (Bhojtal) and Lower Lake.
Vembanad Kole Wetland, Kerala	<ul style="list-style-type: none"> Cabomba Furcata, aka Pink Bloom, due its massive flowering, has been a new threat to the Kole fields, in addition to water hyacinth and Salvinia molesta. Largest brackish lake of Kerala Fed by 10 rivers <ul style="list-style-type: none"> Pamba and Achankovil rivers in Vembanad form part of the Kuttanad- Famous for exotic fish varieties and paddy fields that are below sea level. Part of Central Asian Flyway Harbors birds like Spot billed Pelican.
Deepor Beel, Assam	<ul style="list-style-type: none"> Assam government has expressed intent to allow water sports and tourism-related activities in Deepor Beel. Permanent freshwater lake and largest Beel (lake) in Brahmaputra valley of Lower Assam. A wildlife sanctuary, Ramsar site and Important Bird Area site (declared by an NGO Birdlife International). Migratory bird spotted: White-eyed pochard, greylag goose, Baer's pochard, etc.

	<ul style="list-style-type: none"> Threat to Beel: Filling of wetlands for habitation, pollution, fishing, excessive fodder practices etc.
Kanwar lake (Kabartal Wetland), Bihar	<ul style="list-style-type: none"> Kanwar Lake is facing threat of running dry. A freshwater natural wetland Draws water from confluence of rivers Gandak, Bia and Kareth. Part of Central Asian Flyway Ox-bow lake . (located in an abandoned meander loop of a river channel.) Designated as Ramsar wetland site in 2020.
Kolleru Lake, Andhra Pradesh	<ul style="list-style-type: none"> An inventory of land use and other activities adjacent to Kolleru Wildlife Sanctuary is underway for declaring it an eco-sensitive zone. Largest freshwater lake in India Connected to Krishna and Godavari systems. Fed by seasonal Budameru and Tammileru rivers. A Ramsar Site Flora: Ipomoea aquatic, Ottelia spp, Prosopis juliflora, etc Fauna: Grey pelican (Indicator Species), migratory birds like Glossy ibis, Painted storks, etc.
Sundarbans, West Bengal	<ul style="list-style-type: none"> Experts from India and Bangladesh believe that climate change triggered loss and damage in the Sundarbans, should be seen as a “global commons”. A cluster of low-lying islands in Bay of Bengal Location: Spread across India (40%) and Bangladesh (60%). <ul style="list-style-type: none"> Lies on the delta of the Ganges, Brahmaputra and Meghna rivers. World's Largest area of mangrove forest. A Cultural UNESCO World Heritage Site, and Ramsar site. Fauna: Estuarine crocodile, royal Bengal tiger, Water monitor lizard, Gangetic dolphin, Olive ridley turtle etc. Threats: Vulnerable to floods, earthquakes, cyclones, sea-level rise and coastline erosion.

3.5. OTHER BIODIVERSITY RELATED NEWS

News	Description
Operation “Kachchhap”	<ul style="list-style-type: none"> Directorate of Revenue Intelligence (DRI) saved 955 live baby Gangetic turtles in a crackdown on illegal wildlife trade in multicity Operation “Kachchhap”. <ul style="list-style-type: none"> India is one of the world's hotspots for turtle diversity, representing 29 species of tortoises and freshwater turtles. The Ganges river system is home to 13 such species. DRI, under the Central Board of Indirect Taxes and Customs (CBIC), Ministry of Finance, is the apex agency of the Indian Customs in the field of anti-smuggling in India.
Cryptobiosis	<ul style="list-style-type: none"> Scientists brought microscopic worms back to life after they were frozen in the Siberian permafrost for 46,000 years by entering in to state called cryptobiosis. Cryptobiosis is the state of an organism when it shows no visible signs of life and when its metabolic activity becomes hardly measurable or comes reversibly to a standstill.
Facultative parthenogenesis (FP)	<ul style="list-style-type: none"> Scientists have documented the first-known instance of a FP (also referred as “virgin birth”) by a crocodile. FP is the ability of sexually reproducing species to sometimes produce offspring asexually.

	<ul style="list-style-type: none"> • In FP, a female's egg cell can develop into a baby without being fertilized by a male's sperm cell. <ul style="list-style-type: none"> ○ Here, in making an egg cell, a precursor cell divides into four cells. One of them acts as a sperm cell and fuses with the egg to become fertilized. • FP has also been documented in other species of fish, birds, lizards and snakes.
Environmental DNA (eDNA)	<ul style="list-style-type: none"> • Scientists found elusive De Winton's Golden Mole (<i>Cryptochloris wintoni</i>) for the 1st time in last 87 years with the help of Environmental DNA (eDNA) technique. <ul style="list-style-type: none"> ○ De Winton's Golden Mole (IUCN status - Critically endangered) is endemic to South Africa. ○ Key features: Completely blind and dwells entirely underground. • eDNA Technique: Method for studying biodiversity and monitoring ecosystem changes. <ul style="list-style-type: none"> ○ In it, collected DNA is compared and matched with reference DNA. • eDNA is nuclear or mitochondrial DNA that is released from an organism into the environment.
Tropicalisation	<ul style="list-style-type: none"> • A study indicates that rising sea temperatures due to climate change are causing tropical marine species to move from equator towards poles and retraction of temperate species. <ul style="list-style-type: none"> ○ This mass movement of marine life has been termed tropicalisation. • Borealisation is expansion of temperate species (terrestrial and marine) into Arctic polar- regions.
Indian National Centre for Ocean Information Services (INCOIS)	<ul style="list-style-type: none"> • Recently, the Indian National Centre for Ocean Information Services(INCOIS) deploys two deep sea gliders into the Bay of Bengal to study climate change. • Indian National Centre for Ocean Information Services(INCOIS) <ul style="list-style-type: none"> ○ Genesis - It was established as an autonomous body in 1999 under the Ministry of Earth Sciences (MoES) and is a unit of the Earth System Science Organisation (ESSO). ○ Mission - To provide ocean data, information and advisory services to society, industry, the government and the scientific community. ○ Organizational Structure - <ul style="list-style-type: none"> ✓ Chaired by the Secretary of the Ministry of Earth Sciences. ✓ A director along with a governing council oversees its functioning. ○ Other important functions - <ul style="list-style-type: none"> ✓ To establish an Early Warning System for Tsunami and Storm Surges. ✓ To promote research in the field of ocean information and related services including satellite oceanography.
First Census of Water bodies	<ul style="list-style-type: none"> • Ministry of Jal Shakti released All India report of the first census of Water Bodies. • Objective is to develop a national database for all water bodies. ○ Launched in convergence with 6th Minor Irrigation Census under Centrally Sponsored Scheme "Irrigation Census". • Key highlights of the Census <ul style="list-style-type: none"> ○ 24.24 lakh water bodies <ul style="list-style-type: none"> ✓ 97.1% in rural areas ✓ 2.9% are in urban areas ○ Top 3 states with most water bodies: West Bengal, Uttar Pradesh, Andhra Pradesh. ○ States/UTs with least water bodies: Sikkim, Chandigarh, Delhi. ○ Man-made water bodies: 78% ○ Natural water bodies: 22%

	<ul style="list-style-type: none"> ○ 55.2% owned by private entities, rest are under public ownership.
MISHTI	<ul style="list-style-type: none"> ● Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) was launched on the World Environment Day (5th June 2023). ● Aim: “Restoration of mangrove forests” by undertaking mangrove reforestation/ afforestation measures along India’s coast by adopting existing best practices in India and globally. ● Financial outlay: 100 Crores allocated for the FY 2023-24. ● Funding Cycle: 80% of the project cost borne by the Government of India, remaining 20% contributed by respective State Governments
Rejuvenating Watersheds for Agricultural Resilience through Innovative Development (REWARD) program	<ul style="list-style-type: none"> ● The Secretary, the Department of Land Resources (DoLR), reviewed the Implementation Support Mission of REWARD program. ● REWARD: A World Bank assisted Watershed development program which is being implemented from 2021 to 2026. ● Objective: Strengthen capacities of National and State institutions to adopt improved watershed management in selected watersheds of participating States ● Presently implemented in Karnataka and Odisha.

3.6. INSTITUTIONS/ORGANIZATIONS IN NEWS

3.6.1. WILDLIFE INSTITUTE OF INDIA (WII)

- **Genesis:** Established in 1982 as an **autonomous natural resource service institution** under MoEFCC.
- **Function:** Conducts wildlife research in the areas of Biodiversity, Endangered Species, etc.
- **President of WII Society:** Minister in charge of MoEFCC.
- Located in **Dehradun**.

Reports released by WII

Report	Highlights
State of India's Birds 2023' Report	<ul style="list-style-type: none"> ● Released jointly with Zoological Survey of India (ZSI). ● A periodic assessment of the distribution range, trends in abundance and conservation status of India's key bird species. ● Key highlights: <ul style="list-style-type: none"> ○ Bird species richness has reduced ○ Long-distance migrants have declined the most, by over 50%. ✓ Shorebirds that breed in the Arctic have been particularly affected (declining by close to 80%). ○ Several bird species such as the Indian Peafowl, Rock Pigeon, Asian Koel and House Crow are showing an increasing trend. ● Key birds and their habitat <ul style="list-style-type: none"> ○ Endangered <ul style="list-style-type: none"> ✓ Indian Skimmer: Around Chambal, Ganga, Mahanadi, Yamuna, and Son ✓ Black-bellied Tern: Around Chambal, Mahanadi, Ganga, Son, Godavari, and Yamuna ○ Critically Endangered <ul style="list-style-type: none"> ✓ Bengal Florican: Restricted to the Himalayan Terai and grasslands of northeastern India (Uttar Pradesh, Assam, Arunachal Pradesh) ✓ Baer's Pochard: Wetlands of Assam and Manipur

3.6.2. ZOOLOGICAL SURVEY OF INDIA (ZSI)

- **Genesis:** Established in 1916, traces its origin to Zoological Section of the Indian Museum at Calcutta in 1875.
- **Mandate:** Undertakes exploring, naming, describing, classifying and documenting animals from all over India.
- **HQ:** Kolkata
- **Declared as the Designated Repository for the National Zoological Collection** as per the National Biodiversity Act, 2002.

Recent reports release by ZSI

Report	Highlights
Flora and Fauna Database	<ul style="list-style-type: none"> • India added 664 animal species to its fauna database and 339 taxa to its flora. • The list by MoEFCC also contains new records (species found in India for the first time) of animals and new distributional records of flora. <ul style="list-style-type: none"> ◦ Faunal discoveries are compiled by the Zoological Survey of India (ZSI) and the Floral by Botanical Survey of India (BSI). • Maximum discoveries of both flora and fauna were made in Kerala. • Key Fauna discovered <ul style="list-style-type: none"> ◦ Meghalaya: <ul style="list-style-type: none"> ✓ Miniopterus phillipsi, a long-fingered bat ✓ Glischropus meghalayanus, a bamboo-dwelling bat ◦ Arunachal Pradesh <ul style="list-style-type: none"> ✓ Sela macaque (Macaca selai) named after Sela Pass. ✓ Macaca leucogenys, a white-cheeked macaque (found in Modog, Tibet) sighted in India for the first time. ◦ Narcondam Island of Andaman <ul style="list-style-type: none"> ✓ Ficedula zanthopygia, a yellow-rumped flycatcher (known from Mongolia, China, Korea and Japan) found in India. • Key flora discovered <ul style="list-style-type: none"> ◦ Calanthe lamellose: Found in India in the Japfu mountain range in Kohima, Nagaland. ◦ Nandadevia Pusalkar: Foothills and warm outer valleys of Uttarakhand Himalayas. ◦ Nilgiriella Pusalkar: Endemic to southern Western Ghats and distributed in Karnataka, Kerala and Tamil Nadu.
75 Endemic Birds of India	<ul style="list-style-type: none"> • Findings are part of ZSI's publication "75 Endemic Birds of India" that provides details of bio-geographic regions where the species are found, their conservation status, distinguishing traits, preferred habitats etc. ◦ Endemic species of plants and animals are found exclusively in a particular area. • Other Key findings <ul style="list-style-type: none"> ◦ India home to 12.40% of global bird diversity. ◦ Three endemic species not recorded in last few decades <ul style="list-style-type: none"> ✓ Manipur Bush Quail ✓ Himalayan Quail ✓ Jerdon's Courser ◦ Three species classified as 'Critically Endangered' by IUCN <ul style="list-style-type: none"> ✓ Himalayan Quail ✓ Jerdon's Courser ✓ Bugun Liocichla ◦ Highest number of endemic species have been recorded in Western Ghats <ul style="list-style-type: none"> ✓ Malabar Grey Hornbill ✓ Malabar Parakeet

	<ul style="list-style-type: none"> ✓ Ashambu Laughing Thrush ✓ White-bellied Sholakili ○ Several species are endemic to Andaman and Nicobar Islands: <ul style="list-style-type: none"> ✓ Nicobar Megapode (✓ Nicobar Serpent Eagle ✓ Andaman Crake ✓ Andaman Barn Owl
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3.6.3. WORLD WIDE FUND FOR NATURE (WWF)

- An **international nonprofit organization** working in nearly 100 countries.
- **Aim:** To develop and deliver innovative solutions that protect communities, wildlife, and the places in which they live.
- **Genesis:** Established in **1961** as **World Wildlife fund** at IUCN's headquarters in Morges, Switzerland
 - Renamed as **World Wide Fund for Nature in 1985**
 - WWF India established as a Charitable Trust in 1969.
- **HQ:** Gland, Switzerland
- Organizes worldwide movement '**Earth Hour**'
 - **Genesis: 2007**, started as a "lights off" movement in Sydney
 - Observed every year in **March between** in country's local time
- **Reports released by WWF**
- **Living Planet Report 2022** (Uses Living Planet index (LPI))
 - **LPI:** Measure of state of **world's biological diversity based on population trends** of vertebrate species from **terrestrial, freshwater and marine habitats**.
 - **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**.
- High Cost of Cheap Water Report

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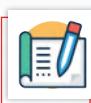
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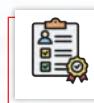


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COMPONENTS OF AN IMPACTFUL ANSWER



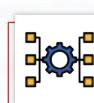
Identification of Context: Understanding the specific theme or topic of the question, and situating the response within its relevant context.



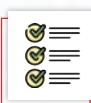
Content Competence: Demonstrating a comprehensive grasp of the subject matter, supported by accurate facts, relevant examples, and insightful analysis.



An impactful Introduction: Engagingly setting the stage for the answer, capturing the examiner's attention while providing a brief overview of the discussion to follow.



Structure and Presentation: Organizing the answer coherently with clear headings, subheadings, or bullet points, and presenting information logically and aesthetically for easy comprehension.



Balanced Conclusion: Summarizing key points concisely, offering insights or recommendations if applicable, and providing a satisfying closure to the argument or discussion.



Language: Employing precise, formal language appropriate to the context, avoiding jargon, colloquialisms, or ambiguity, and demonstrating fluency and clarity in expression.

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4. SUSTAINABLE DEVELOPMENT

4.1. FRAMEWORK FOR ACCEPTANCE OF GREEN DEPOSITS

Why in the News?

Reserve Bank of India (RBI) has issued a framework for acceptance of 'Green Deposits'

About Green deposit

- An interest-bearing deposit, received by regulated entities (REs) for fixed period and proceeds of which are earmarked for being allocated towards green finance.
 - Aims to offer green deposits to customers, protect interest of depositors, to achieve their sustainability agenda, address greenwashing concerns and augment the flow of credit to green activities/project.

Key highlights of framework for acceptance of green deposits

- Applicable to following entities (known as regulated entities (RE)):
 - Scheduled Commercial Banks including Small Finance Banks (excluding Regional Rural Banks, Local Area Banks and Payments Banks)
 - All Deposit taking Non-Banking Financial Companies (NBFCs) registered with RBI including Housing Finance Companies (HFCs).
- To be denominated in Indian Rupees only.
- Not mandatory for RE to raise green deposits.
- RE cannot finance green activities/ projects first and raise green deposits later.
- Investments made by REs in Sovereign Green Bonds are covered under the framework.
- Deposits raised under the framework are covered by the Deposit Insurance and Credit Guarantee Corporation.
- Green activities/ projects financed under the framework can be classified under the priority sector if they meet priority sector lending (PSL) guidelines of RBI.
- Banks are allowed to offer overdraft facilities to customers against Green Deposits.
- Annual Independent Third-Party Verification/Assurance for funds raised through green deposits.

Included Sectors/projects	Excluded projects
<ul style="list-style-type: none">• Renewable Energy• Energy Efficiency• Clean Transportation• Climate Change Adaptation,• Sustainable Water and Waste management• Green Buildings etc.	<ul style="list-style-type: none">• Projects involving new/existing extraction, production and distribution of fossil fuels• Nuclear power generation• Direct waste incineration• Renewable energy projects generating biomass energy from feedstock originating from protected areas• Alcohol, weapons, tobacco, gaming, or palm oil industries,• Landfill projects• Hydropower plants larger than 25 MW etc.

4.1.1. SOVEREIGN GREEN BOND (SGBS)

Government issued FY24's first tranche of Sovereign Green Bond (SGBs) announced in 2022-23 budget.

About SGBs

- Green bonds: Debt instruments that support expenditures and projects with environmental benefits.
- India issued its 1st green bond in 2015.
- Union Budget 2022-23 announced the issuance of SGBs.
- India's final Sovereign Green Bonds framework:
 - Use of Proceeds: Outlines 9 eligible categories of projects to finance using SGrB proceeds.

- 2-tier governance process:
 - ✓ **Ministry or department in charge of implementing the project or program** responsible for the initial selection of projects.
 - ✓ **Green Finance Working Committee:** oversees and validates decisions by the ministries or departments
- **Management:** Proceeds are deposited into the Consolidated Fund of India and managed by the Ministry of Finance's **Public Debt Management Cell**.
- **Audit:** by Comptroller and Auditor General (CAG).

Eligible categories of projects under framework

- Renewable Energy
- Energy Efficiency
- Clean Transportation
- Climate Change Adaptation
- Sustainable Water and Waste Management
- Pollution Prevention and Control
- Green Buildings
- Sustainable Management of Living Natural Resources and Land Use
- Terrestrial and Aquatic Biodiversity Conservation

Related concepts:

Sustainability Bond

- India Exim Bank has listed its 10-year \$1billion **sustainability bond** on Sustainable Bond Market platform at London Stock Exchange
- Sustainability Bonds are **specifically designed to raise money for environmentally- and socially responsible initiatives**.
- **Combines the features of Green- and Social Bonds**.

Rhino Bond

- Rhino bond boosts **South Africa's efforts to protect Black Rhinos** and support local communities.
- **Wildlife Conservation Bond**, aka Rhino Bond, is a first-of-its-kind, outcome-based financial instrument that channels investments to achieve conservation outcomes.
- The **World Bank priced the Wildlife Conservation Bond (WCB)** to support South Africa's efforts to conserve endangered species.

4.2. RESOURCE EFFICIENCY CIRCULAR ECONOMY INDUSTRY COALITION (RECEIC)

Why in the news?

Recently, RECEIC was launched at the **G20 4th Environment and Climate Sustainability Working Group (ECSWG)** meeting, held in Mumbai.

About RECEIC

- An **industry-driven initiative**.
- About 39 companies headquartered in 11 countries have joined the coalition as its **founding members**.
- Envisaged to **accelerate the implementation of**
 - **The 2030 Agenda for Sustainable Development** and its **Sustainable Development Goals**.
 - Climate Goals under the **Paris Agreement**.
 - Goals and targets under the **Kunming Montreal Global Biodiversity Framework**.
 - **Kigali Amendments, Resource Efficiency Dialogue Roadmap** and other relevant international goals.



Data Bank

- ➔ **Tripling** of global resource consumption since 1970.
- ➔ **Only 7.2%** of the global economy is **circular**.
- ➔ **Only 20%** of goods are recycled in India.
- ➔ **India is 3rd** highest emitter of greenhouse gases and accounts for 9.2% of total world emissions.

- Structured around the three guiding pillars:
 - Partnerships for Impact
 - Enhancing Capabilities and Technology Collaborations
 - Investments for Scale

About Circular Economy (CE)

- An **economic system** where means of **production** are **organized** around **reusing** and **recycling** the inputs.
 - At the end of a **product's life**, the materials used to make it are kept in the **economy** and reused wherever possible.
- According to the **Circularity Gap Report 2023**, only 7.2% of the global economy is **circular** with a declining trend.



Related News: Sustainable Finance Working Group (SFWG)

- 4th G20 Sustainable Finance Working Group (SFWG) Meeting concluded in India.
- About SFWG:**
 - Established in 2016 as Green Finance Study Group.
 - Aim:** To mobilize sustainable finance to ensure global growth and stability to promote the **transition towards greener, more resilient, and inclusive societies**
 - SFWG during India's G20 presidency** has identified various challenges for green financing-
 - Lack of clear and predictable public climate policy
 - Lack of investment-ready or bankable projects for Capital inflow

4.3. GREEN BUILDINGS

Why in the news?

Recently **Indian Green Building Congress** was held in Chennai (Tamil Nadu) by the Indian Green Building Council (IGBC).

About Green Building

- Refer to the use of **environmentally friendly construction materials, processes, operation, and maintenance**.
- Different from **Energy-efficient, and Net-zero carbon buildings**.
- Concept driven by incentives to **reduce the cost of energy and waste management** considering global warming and environmental degradation.
- Some innovative solutions in green construction:**
 - Agrocrete:** Carbon-negative building material made of crop residues such as paddy straw, wheat straw, sugarcane bagasse, etc.
 - Carbon Craft Tile:** Made with **upcycled carbon** by using recovered carbon waste as a resource
 - Use of Geothermal Heating**, Smart Grid refrigerators, Vegetated rooftops, etc.

About IGBC

- India's **Premier Certification body for Green Buildings**.
- One of the **founding members of World Green Building Council**

- A network of national green building councils in more than ninety countries, established in 2002, for transformation of the built environment to make it healthier and more sustainable.
- Established in 2001 by the Confederation of Indian Industry
- Headquarters: Hyderabad

4.3.1. LEED RATING SYSTEM

Why in the news?

India outperforms US and China in Leadership in Energy and Environmental Design (LEED) net zero certifications.

About LEED rating system

- A globally recognized certification system.
- Provides a framework for healthy, efficient, carbon and cost-saving green buildings.
- Developed by: U.S. Green Building Council and administered by **Green Business Certification Inc.**
- Achieves and recognizes building at 4 certification level: Certified, Silver, Gold, Platinum.
- LEED India Programme administered by: Indian Green Building Council (IGBC).

About LEED Zero

- A complement to LEED certification.
- Recognises projects that have **reached net zero or net positive status in the categories of carbon, energy, water, or waste.**
- India has **73 LEED Zero certified projects**, comprising **45% of the more than 150 total LEED Zero certifications.**
 - Nearly one-third of all carbon emissions in India come from **building and construction sector.**
- **Haryana and Tamil Nadu are leading states** in certifications.
- **India's DLF group** is the leader globally in total LEED Zero certifications.

Related concept: Green Rating for Integrated Habitat Assessment (GRIHA)

- **India's own green building rating system**
- **Jointly developed by:** The Energy & Resources Institute (TERI) and Ministry of New and Renewable Energy.
- **A five star rating system.**
- **Rating valid for a period of 5 years.**

4.4. ALTERNATIVE FUELS AND ENERGY RESOURCES

4.4.1. MISSION ON ADVANCED AND HIGH-IMPACT RESEARCH (MAHIR)

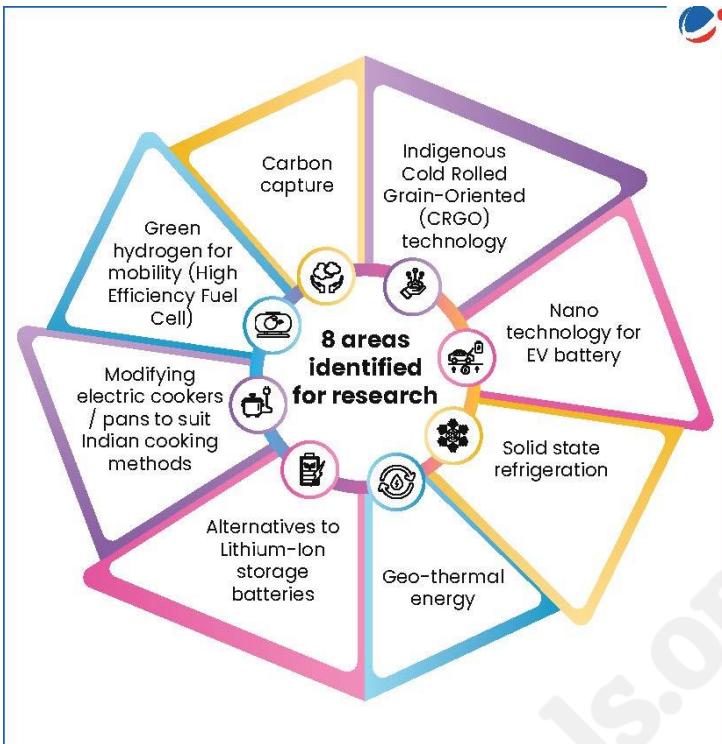
Why in news?

The **Ministry of Power and the Ministry of New and Renewable Energy** have jointly launched the Mission on Advanced and High-Impact Research (**MAHIR**) to leverage Emerging Technologies in the Power Sector.

About MAHIR

- **Key objectives**
 - **Identify emerging technologies of future relevance.**
 - **Create a vibrant & innovative ecosystem** for energy Sector Stakeholders.
- **Funding:** Ministry of Power, Ministry of New and Renewable Energy and the Central Public Sector Enterprises under them, and also Centres' budgetary resources.
- **Approach:** Technology life cycle approach of Idea to Product.
- **Duration:** 5 years (2023-28)
- **Structure of the Mission**
 - **Technical Scoping Committee** chaired by Central Electricity Authority (CEA)

- ✓ **Role:** Identify and recommend potential technologies for development, monitoring of approved projects, etc.
- **Apex Committee chaired** by Union Minister for Power & New and Renewable Energy
 - ✓ **Role:** Look into international collaborations, approve and monitor the research proposals
- **Coverage:** The proposals for outcome-linked funding will be invited from companies/ organizations across the globe.
- **Selection of the proposal:** To be done through Quality cum Cost-Based Selection (QCBS) basis.
- **Patent:** The IPR of the technology developed would be shared by the Government of India and the Research Agency.



4.4.2. US-INDIA RENEWABLE ENERGY TECHNOLOGY ACTION PLATFORM (RETAP)

Why in the News?

The RETAP was launched under US-India under Strategic Clean Energy Partnership (SCEP).

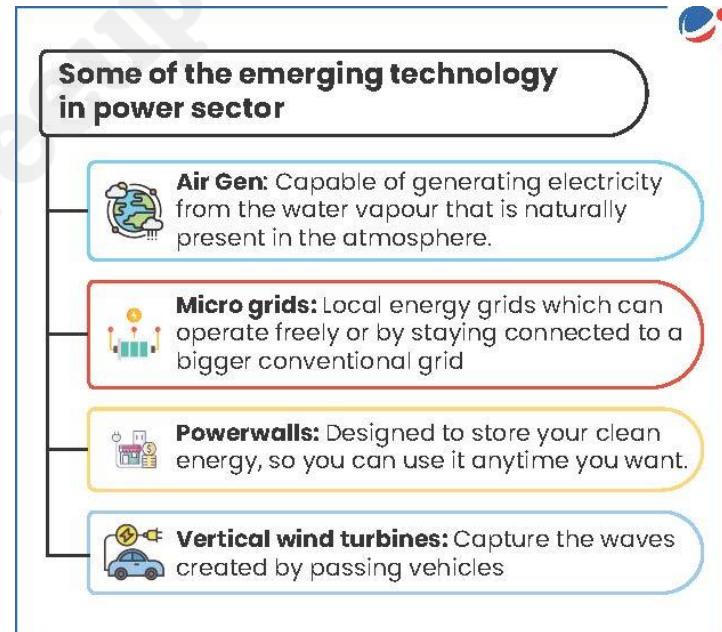
About US-India SCEP

- Joint effort to advance energy security, emphasizes electrification and decarbonisation and scale up emerging clean energy technologies.
- Established as one of the two-track engagements under the US-India Climate and Clean Energy Agenda 2030 Partnership.
 - **Other engagement:** Climate Action and Finance Mobilization Dialogue.
- Consists of 5 pillars (refer image)



About RETAP

- **Aim:** To accelerate the development of emerging renewable technologies.
- Focus on green hydrogen, wind energy, and long-duration energy storage, and explore geothermal and tidal energy, etc.
- **Launched by:** United States Department of Energy (DOE) and Ministry of New and Renewable Energy (MNRE), India.
- Pillars of RETAP
 - **Research & Development**
 - **Piloting and testing of Innovative Technologies**



- Advanced Training & Skill Development
- Policy and Planning for advancing enabling technologies
- Investment, Incubation, and Outreach programs

4.4.3. INTERNATIONAL SOLAR ALLIANCE (ISA)

Why in the News?

ISA announced that **Global Solar Facility (GSF)** is set to receive a capital contribution of \$35 million dollars in its 6th Session held recently.

About GSF

- Approved by ISA Assembly
- Expected to attract private capital to flow into off-grid solar projects, rooftop solar projects, and productive use solar projects.
- GSF will provide:
 - Payment guarantee fund
 - Insurance fund to mitigate project risks
 - Investment fund for Technical Assistance
- Designed to catalyze solar investments in underserved segments and geographies across Africa.
- After Africa, GSF aims to expand to regions such as Asia, Latin America and the Middle East.

About ISA

- **About:** A treaty-based international intergovernmental organization.
- **Genesis:** Conceived as a joint effort by India and France.
 - Conceptualized on side-lines of the Conference of Parties to UNFCCC held in Paris in 2015.
- **HQ:** Gurugram, India
- **Membership:** 97 countries have signed and ratified (**including India**).
- **Mandate:** Strives to develop and deploy cost-effective and transformational energy solutions powered by Sun.

Other important initiatives of ISA

Initiatives	Key Features/Highlights
One Sun, One World, One Grid (OSOWOG)	<ul style="list-style-type: none"> ● Aims to connect different regional grids through a common grid that will be used to transfer RE power and, thus, realize potential of RE sources, especially solar energy. ● Led by India and UK in collaboration with International Solar Alliance (ISA) and World Bank Group. ● Divided into 3 phases: <ul style="list-style-type: none"> ○ Phase 1: Indian Grid interconnection with Middle East, South Asia and South East Asian grids. ○ Phase 2: Would connect the functional first phase to the pool of renewable resources in Africa. ○ Phase 3: Final step of global interconnection. ● India has already established cross-border interconnections with its neighbours through which electricity is exported to Nepal, Bangladesh, and Myanmar and imported from Bhutan. ● A MoU on BIMSTEC Grid Interconnection was also signed in 2018.
Solar Technology Application Resource Centre [STAR C] Initiative	<ul style="list-style-type: none"> ● Run by the ISA in partnership with the United Nations Industrial Development Organization (UNIDO). ● Aim: To create a strong network of institutional capacities within ISA member states to enhance quality infrastructure for the uptake of solar energy products and services.

4.4.4. NATIONAL GREEN HYDROGEN MISSION (NGHM)

Why in the news?

Ministry of New and Renewable Energy (MNRE) notified **Indian Green Hydrogen Standard** under **National Green Hydrogen Mission (NGHM)**.

Key notified Standards

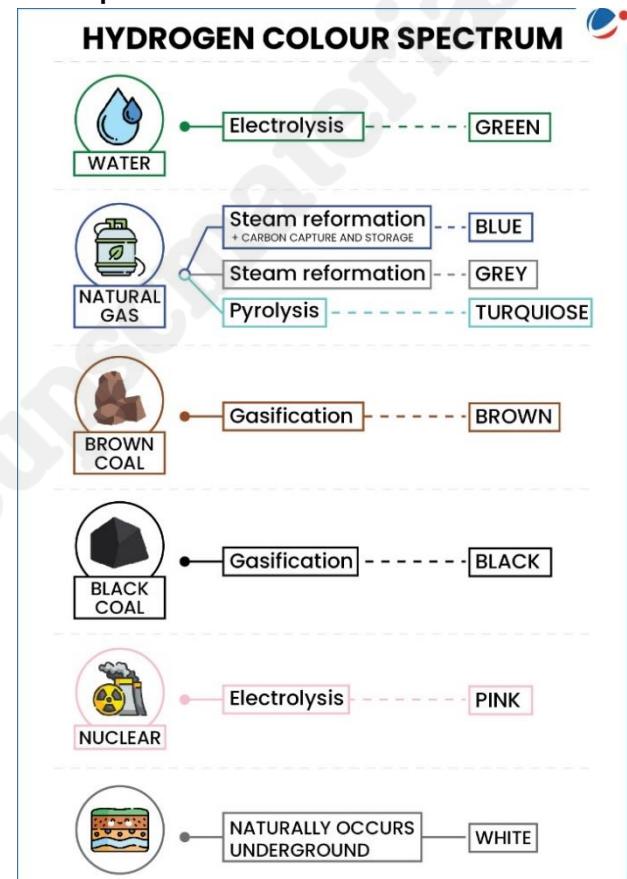
- Outlines **emission thresholds** that must be met in order to classify produced hydrogen as 'Green'.
- Definition:** Green Hydrogen (GH) is produced using renewable energy including, production through electrolysis or biomass conversion.
- Emission thresholds:** Well-to-gate emission (i.e., water treatment, electrolysis, gas purification, etc.) of not more than 2 kg CO₂ equivalent/kg H₂.
- Nodal Authority:** Bureau of Energy Efficiency to accredit agencies for the monitoring, verification, and certification of GH production projects.

About NGHM

- Aim:** To make India a **Global Hub** for producing, utilizing, and exporting GH.
- Expected Mission Outcomes by 2030**
 - GH production capacity of at least **5 MMT per annum**.
 - Renewable energy capacity addition of about **125 GW** in country.
 - Abatement of nearly **50 MMT** of annual greenhouse gas emissions.
 - Over ₹1 lakh crore cumulative reduction in fossil fuel imports.
- Mission Sub Components**
 - Strategic Interventions for Green Hydrogen Transition Programme (SIGHT) for financial incentive, implemented by **Solar Energy Corporation of India**, under two components namely
 - ✓ **Component I** - Targeting domestic manufacturing of electrolyzers
 - ✓ **Component II** - Production of Green Hydrogen
 - Strategic Hydrogen Innovation Partnership (SHIP)** PPP framework for R&D.
- India is prioritising green hydrogen as a potential solution to decarbonise industries like **fertilisers, oil and steel, etc.**

About Hydrogen as Fuel

- Clean-burning fuel with water as its by-product.**
- Produced with the help of an electrolyzer.**
 - Electrolysis: Process of using electricity to split water into hydrogen and oxygen.
- 99% of pure hydrogen demand in India comes from primarily **two sectors**, i.e., **refinery (petroleum refining) & fertilizers (ammonia production)**.
- Has the potential to be used in other sectors as an **energy carrier**.
- Different colour codes** have been assigned to distinguish between hydrogen generated from various sources (refer infographic).
- Advantages:** Near zero harmful emission, high energy efficiency, etc.
- Disadvantages:** Storage of hydrogen is complex, highly inflammable, cost of production is high, etc.



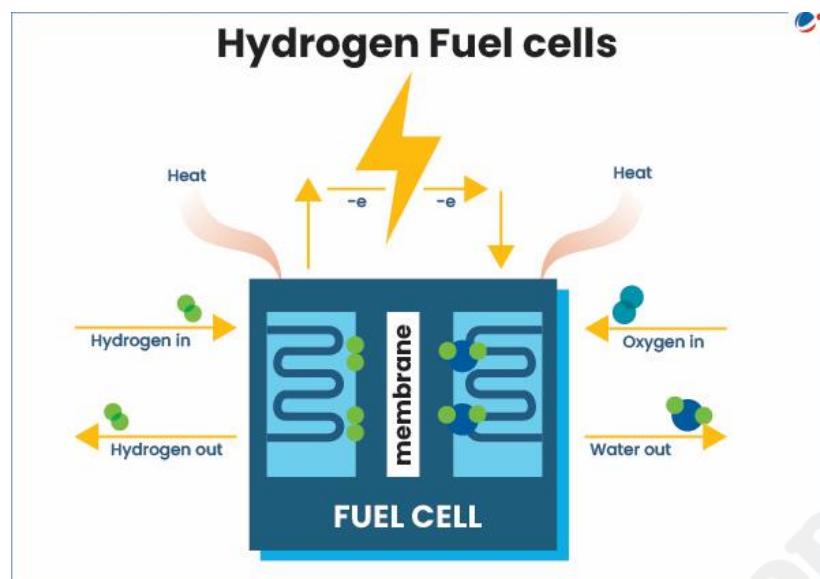
4.4.4.1. GREEN HYDROGEN FUEL CELL

Why in the News?

Indian Oil Corporations launched India's 1st Green Hydrogen Fuel Cell bus.

About Hydrogen Fuel cells

- An **electrochemical energy conversion** device that generates **electricity, heat, and water** by using **hydrogen and air**.
 - **Fuel cell technology**, powered by **hydrogen**, is a significant **component of the e-mobility landscape**.
- **Working Mechanism**
 - Consist of two electrodes, **an anode**, and a **cathode**, where the reactions take place.
 - ✓ An **electrolyte** and a **catalyst** in fuel cell facilitate reactions.
 - **Hydrogen enters a cell and splits** into charged protons and electrons at the anode
 - **Negatively charged electrons** are forced through a circuit, generating electricity, and propelling vehicles using motors.
 - **Positively charged protons** pass through a membrane to cathode, **combining with oxygen to form water**.
- **Benefits**
 - Lower operational costs due to **higher efficiency** and **high energy density of hydrogen**.
 - **Shorter refueling time**, and vehicle mileage not influenced by weather conditions.
 - Decarbonization of transportation.
- **Issues:** Lack of **infrastructure for production, transportation**, flammability and storage of hydrogen, High cost, **Technological challenges** like system size, management of air, heat and water, etc.



4.4.4.2. OTHER INITIATIVES FOR PROMOTION OF HYDROGEN FUEL

Initiatives	Key Features/Highlights
R&D Roadmap for Green Hydrogen Ecosystem in India	<ul style="list-style-type: none"> • Released by: Ministry of New and Renewable Energy • Aims to address the challenges and cost effectiveness of green hydrogen production ecosystem including its storage and transportation. • Draft proposes 3 key approaches for R&D in Green Hydrogen; <ul style="list-style-type: none"> ○ Blue Sky Projects (long term strategy for Intellectual Property), ○ Mission Mode approach for Electrolysers and ○ Grand Challenge to encourage startups.
Hydrogen for Heritage scheme	<ul style="list-style-type: none"> • India proposed to invite global firms to manufacture Hydrogen trains for implementing the Hydrogen for heritage scheme. • Announced in the Union Budget 2023-24. • Indian Railways (IR) has envisaged to <ul style="list-style-type: none"> ○ Run 35 Hydrogen trains. ○ Retro fitment of Hydrogen Fuel cell on existing Diesel Electric Multiple Unit (DEMU).
Incentive Scheme for	<ul style="list-style-type: none"> • Ministry of New and Renewable Energy (MNRE) notified the incentives scheme under Mode 2A (Green Ammonia) and Mode 2B (Green Hydrogen) of the SIGHT Programme.

Production of Green Ammonia and Green Hydrogen	<ul style="list-style-type: none"> • Aim: To maximize the production, enhance cost-competitiveness and encourage large scale utilization of Green Ammonia and Green hydrogen. • Implementing Agency: <ul style="list-style-type: none"> ○ For Mode-2A (Green Ammonia) scheme, Solar Energy Corporation of India Limited (SECI). ○ For Mode-2B (Green Hydrogen) scheme, Oil & Gas companies and Centre for High Technology (CHT) - nominated by Ministry of Petroleum and Natural Gas. <p>About Green ammonia</p> <ul style="list-style-type: none"> • Made using 100% renewable and carbon-free source. <ul style="list-style-type: none"> ○ Blue Ammonia: Ammonia for which by-product CO₂ has been captured and stored, reducing climate impact ○ Grey/Brown Ammonia: Ammonia produced using fossil fuels. • Ammonia (NH₃) is a pungent gas widely used to make fertilizers. ○ Produced through Haber-Bosch process in which hydrogen and nitrogen are reacted together at high temperatures and pressures. • Ministry of Power has notified Green Ammonia Policy in 2022
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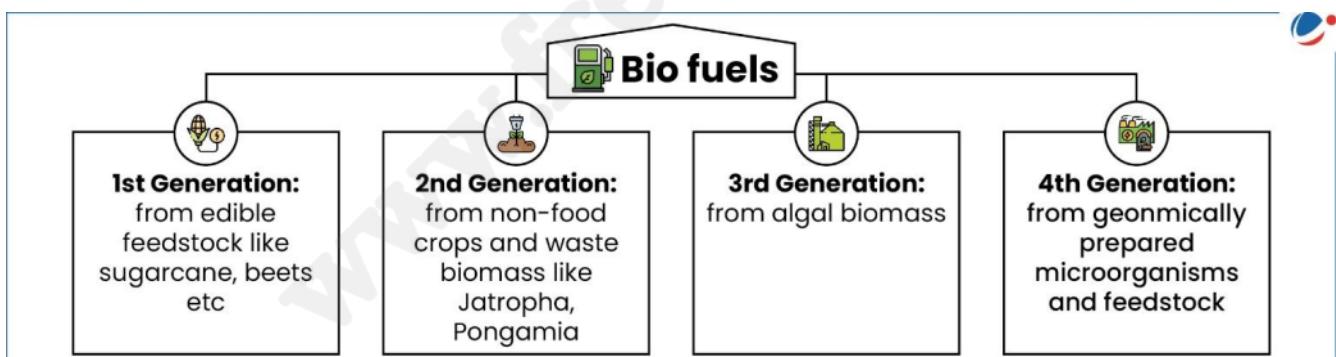
4.4.5. ETHANOL BLENDING

Why in the News?

Sugar mills are on course to meet their **12% ethanol blending target**.

About ethanol blending

- **Ethanol blend:** **Second generation biofuel** in which **a blended motor fuel contains ethyl alcohol** at least 99% pure.
- **Derived from agricultural products**, and blended exclusively with gasoline.
 - Apart from sugarcane-based raw materials, **ethanol production from surplus rice** with Food Corporation of India **and Maize is also allowed**.
- Government has been **implementing Ethanol Blended Petrol Programme** wherein OMCs sell petrol **blended with ethanol**.
- **Advantages of Ethanol blended fuel:** Reduces GHG emissions, improve air quality, higher octane number than gasoline etc.
- **Disadvantages:** Lower energy content per volume, less efficient, etc.
- **Status in India**
 - Target of achieving **average 10% blending was achieved in June, 2022** and **target of 20% ethanol blending was advanced to 2025** (from 2030).
 - **E20 fuel**, a blend of 20% ethanol and 80% petrol, **launched 2 years ahead of target**.



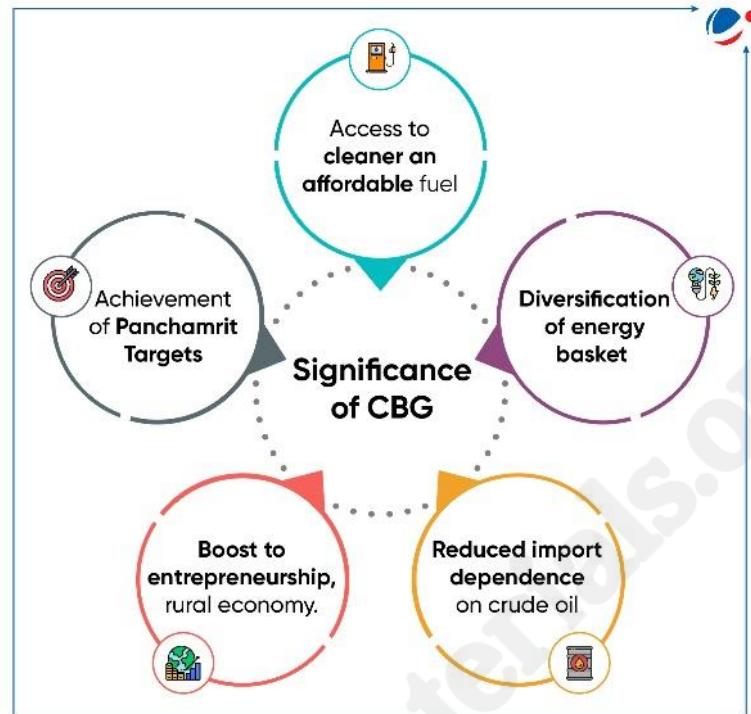
4.4.6. COMPRESSED BIO-GAS BLENDING (CBG)

Why in the News?

Ministry of Petroleum & Natural Gas introduced phase-wise CBG Blending Obligation (CBO) in CNG (Transport) & PNG (Domestic) segments of City Gas Distribution (CGD) Sector.

About CBO

- Obligation where mixtures of traditional and alternative fuels (like CBG) are blended in varying percentages in order to displace petroleum.
- CBO Roadmap
 - Voluntary till FY 2024-2025
 - Mandatory blending obligation start from FY 2025-26.
 - CBO kept as 1%, 3% and 4% of total CNG/PNG consumption for FY26, FY27 and FY28 respectively. From 2028-29 onwards CBO will be 5%.
 - Central Repository Body shall monitor and implement blending mandate.



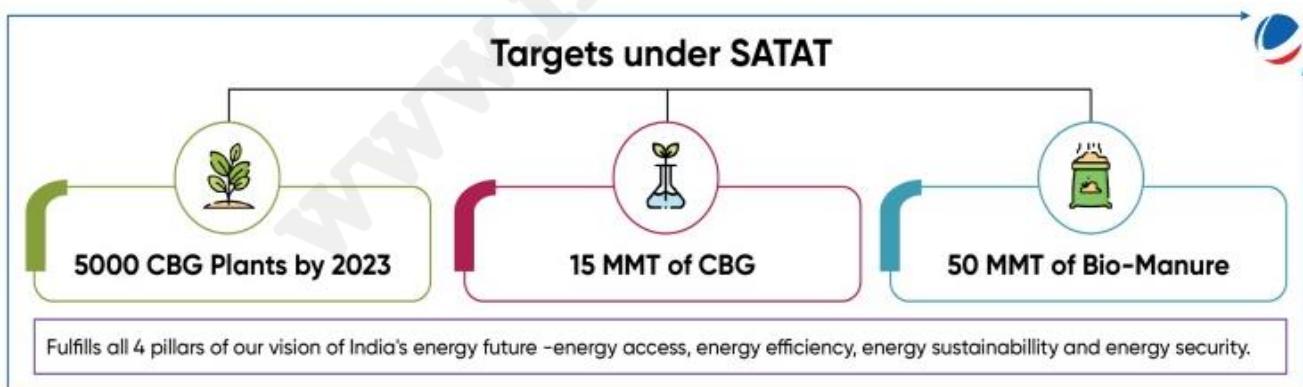
About Compressed Bio Gas (CBG)

- Biogas:** A mixture of methane, CO₂ and small quantities of other gases
 - Produced naturally through the **anaerobic decomposition of biomass**, such as agricultural residue, municipal solid waste, sugarcane press mud, etc.
- CBG:** Obtained after purification and compression of bio-gas
 - Has a high **methane content (>90%)** and **higher calorific value (47-52 MJ/kg)**.
 - Other components of CBG:** CO₂ (<4%), Hydrogen Sulphide (<16 ppm), Nitrogen (<0.5%), Oxygen (<0.5%), and **Moisture (<5mg/m³)**.

4.4.6.1. SUSTAINABLE ALTERNATIVE TOWARDS AFFORDABLE TRANSPORTATION (SATAT)

Why in the news?

Parliamentary Standing Committee on Petroleum and Natural Gas submitted an action taken report on its earlier recommendations on the subject 'Review of Implementation of CBG (SATAT)'.



About SATAT

- **Launch:** 2018
- **Objective:** Encourages entrepreneurs to set up CBG plants, produce & supply CBG to Oil Marketing Companies (OMCs) for sale as automotive & industrial fuels.
- **Nodal Ministry:** Ministry of Petroleum and Natural Gas (MoPNG).

Other initiatives to promote CBG in India

- Integration of **Bio-CNG as a fuel for transportation**
- **National Policy on Biofuels, 2018**
- **GOBAR-Dhan Scheme:** To support villages in effective management of cattle and bio-degradable wastes.
- **Recognition of CBG projects under the Priority Sector Lending (PSL) scheme** by the RBI to improve access to credit.
- **Fertilizer Control Order for Fermented Organic Manure:** To promote usage of organic fertilizer in agriculture and expand market for solid and liquid by-products of CBG plants.
- **National Bioenergy Programme by MNRE:** For capacity building and research in biogas, solid waste management, and other bioenergy aspects.

4.4.7. OFFSHORE WIND ENERGY

Why in the news?

MNRE issued tender for **construction of India's first offshore wind projects** in Tamil Nadu.

About Offshore Wind energy

- **Wind Energy is classified into-**
 - **Onshore wind energy:** Wind turbines are placed in farmland, coastal areas near the ocean's edge, or at high altitudes.
 - **Offshore wind energy:** Wind turbines are situated out to sea or in large bodies of water
- **Benefits:** Offshore wind turbines are more efficient, more land for projects and lack of physical interference etc.
- **Potential in India:** ~140 Gigawatt of electricity from **offshore wind**.
 - MNRE has set a target of **30 GW offshore wind installations by 2030**.
- **Initiatives taken for offshore wind energy**
 - **National Offshore Wind Energy Policy, 2015.**
 - Global Collaborations on **Facilitating Offshore Wind Energy in India (FOWIND)** with European Union.
- **About Wind energy in India**
 - **India stands 4th in the world** in terms of wind power installed capacity (43.7 GW), only after China, USA and Germany.
 - Wind energy contributes to **10.3% in India's energy basket**.

4.4.8. TIDAL ENERGY

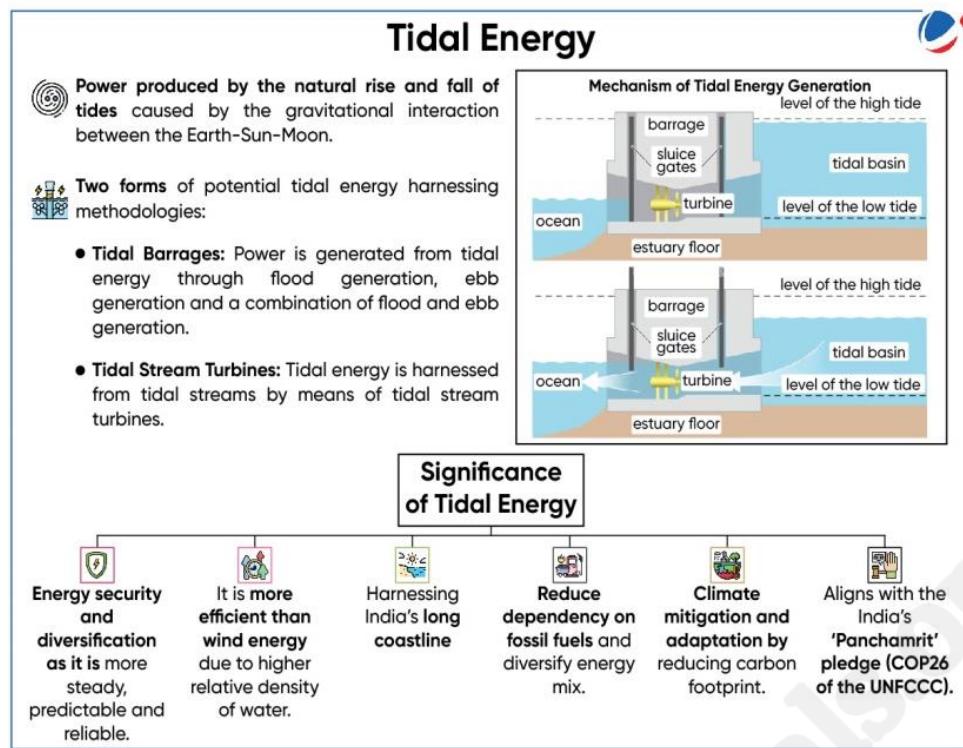
Why in the news?

Parliamentary Standing Committee on Energy submitted a report on '**Tidal Power Development in India.**'

Recommendations of the committee

- **The committee stated that the estimated potential** of tidal and wave energy in India are 12455 MW and 41300 MW, respectively.
- **Potential areas with low/medium tidal wave strength:**
 - Gulf of Khambat, Gulf of Kutch & southern regions in Gujarat.
 - Palk Bay- Mannar Channel in Tamil Nadu.
 - Hoogly river, South Haldia & Sunderbans in West Bengal.

- Potential of Ocean-Thermal energy has not been estimated till date.
- Other types of Ocean Energy
 - Waves Energy derived from transfer of kinetic energy of wind to the upper surface of the ocean.
 - Ocean currents Energy derived from oceanic circulations.
 - Ocean Thermal Energy Conversion derived from temperature differences between upper and lower ocean layers.



4.4.9. ELECTRIFIED FLEX FUEL VEHICLE (FFV)

Why in the News?

The World's first prototype of the BS 6 Stage II 'Electrified Flex fuel vehicle' was launched.

About electrified FFV

- Has both the **flex fuel engine as well as an electric powertrain**.
- Offers **higher use of ethanol** combined with **better fuel efficiencies**.

About FFV

- Has Internal combustion engine **that can run on more than one type of fuel, or even a mixture of fuels** such as petrol and ethanol.
 - **For example: E85** which has 85% ethanol fuel and 15% gasoline or other hydrocarbon by volume.
- **Benefits:** Lower harmful pollutant emission like Carbon monoxide, sulphur, etc., reduced import dependence on crude oil.
- **Drawbacks:** Lower mileage compared to traditional gasoline, use of water-intensive crops such as sugarcane for production of ethanol, etc.

About Bharat Stage VI (BS VI)

- **Bharat stage (BS) emission standards:** Regulate the output of air pollutants from internal combustion engine and spark-ignition engine equipment.
- Government decided to **leapfrog directly from BS-IV to BS-VI** emission norms w.e.f. **April 01, 2020**.
- **Fuel quality has improved significantly from BS-IV to BS-VI norms by reducing the permissible Sulphur content by 80%** (from 50 Parts Per Million (ppm) to maximum 10 ppm).
- This enabled introduction of **advanced emission control technologies**, including-
 - **Diesel Particulate Filters (DPF)** to reduce Particulate Matter (PM) and
 - **Selective Catalyst Reduction (SCR) systems** for reduction in Nitrogen Oxides (NOx) emissions.

4.4.10. GREEN ENERGY OPEN ACCESS RULES (GOAR) 2022

Why in the News?

Government had notified **Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022** for promoting generation, purchase and consumption of green energy.

About Open Access

- Open Access (OA) means **non-discriminatory access to electricity transmission and distribution system** provided to eligible consumers, generators and state distribution companies (DISCOMs).

Key features of GOAR 2022

- Promoting **generation, purchase and consumption of green** energy including from **Waste-to-Energy plants**.
- Green Open Access is **allowed to any consumer**
- **Limit of OA Transaction reduced from 1 MW to 100 kW** for green energy.
- **Consumers entitled to demand supply** of Green Power from Discoms.
 - **Discoms obligated** to procure and supply green power to eligible consumers.
- **Commercial and Industrial consumers** are allowed to **purchase green power on a voluntary basis**.
- There shall be a **uniform Renewable Purchase Obligation** (RPO), on **all obligated entities** in area of a distribution licensees. **Green Hydrogen/Green Ammonia included for fulfillment of its RPO**.

Renewable energy capacity in India

- Government of India aims to install **250 GW of renewable energy capacity** by March 2028.
 - It is a **part of India's plans** to bring its **renewable energy generation to 500 GW by 2030**, to help cut its carbon emissions by 45% from 2005 level.
- Presently, India has installed **176.49 GW renewable capacity** by June 2023.
 - **Solar** currently makes up **over half of India's renewables capacity**, with wind accounting for almost one third.

4.4.11. OTHER ALTERNATIVE FUELS IN NEWS

Fuel	Details
Natural Gas	<ul style="list-style-type: none">• India's natural gas consumption fell 6% in FY23 as compared to FY22. <p>About Natural Gas</p> <ul style="list-style-type: none">• Odourless gaseous mixture of light hydrocarbons including ethane, methane, propane, butane and pentanes.• Also consists of CO₂, Helium, Hydrogen Sulphide and Nitrogen.• Physical Properties: Neither corrosive nor toxic, High ignition temperature, Narrow flammability range• Types:<ul style="list-style-type: none">◦ Conventional: Found in large cracks and spaces between the layers of the rock◦ Unconventional: Found in shale, sandstone and other sedimentary rocks◦ Associated: Found along with deposits of Crude oil◦ Coalbed Methane: Found in coal deposits.
Dimethyl Ether (DME)	<ul style="list-style-type: none">• Country's first Dimethyl Ether (DME) fuelled tractor was developed by IIT Kanpur <p>About DME</p> <ul style="list-style-type: none">• Colourless, non-toxic, highly flammable gas at ambient conditions, but can be handled as a liquid when lightly pressurized.• Primarily produced by converting natural gas, organic waste or biomass to synthesis gas (syngas).<ul style="list-style-type: none">◦ Syngas is a mixture of carbon monoxide and hydrogen.• Properties similar to liquefied petroleum gas (LPG).

	<ul style="list-style-type: none"> Used as an alternative to diesel, in chemical industry, and as an aerosol propellant. Benefits of DME: <ul style="list-style-type: none"> High brake thermal efficiency and cetane number. Renewable and can help in reducing India's oil import bill. Eliminates particulate emissions. Challenges: Low energy density, lower calorific value, poor anti-knock performance, needs engine modification etc.
MD15	<ul style="list-style-type: none"> Indian Railways Research Design and Standards Organisation (RDSO) along with the Indian Oil Corporation Ltd. (IOCL), has developed a special fuel called Methanol Diesel-15 (MD15). It is a fuel blend that consists of 15% Methanol, 71% Mineral Diesel and 14% Coupler additives.

4.5. ENERGY EFFICIENCY

4.5.1. STAR LABELLING PROGRAMME (SLP)

Why in the News?

Government also recently launched a **Star Labeling Programme (SLP)** for Solar Photovoltaic Modules (PVM).

About the SLP

- Background:** Launched in 2006 by Ministry of Power under the **Energy Conservation Act, 2001**.
- Objective:** Provide consumers with an informed choice regarding the energy savings and cost-saving potential of various energy-consuming appliances.
- Implementation:** By Bureau of Energy Efficiency (BEE)
 - Applicability:** Mandatory for 15 appliances and voluntary for 20.
 - Achievement:** Emissions reduction of almost 58 million tonnes of CO₂ per annum.
- In 2015, BEE launched a voluntary labelling program for inverter Room ACs, and made the program mandatory in January, 2018.
- In 2018, BEE adopted an improved rating methodology (ISEER) that factors in variance in temperature across the various climatic zones in India and operating hours.
 - ISEER** is the ratio of the cooling seasonal total load (in kWh) to cooling seasonal energy consumption (in kWh).

List of 35 Appliances/Equipment	
Mandatory	Voluntary
 1. Frost Free Refrigerator 2. Direct Cool Refrigerator 3. Deep Freezers 4. Room Air Conditioner (Variable Speed) 5. Room Air Conditioner (Fixed Speed) 6. RAC (Cassette, Floor Standing Tower, Ceiling, Corner AC) 7. Light Commercial AC Fixed Speed 8. Stationary Storage Type Electric Water Heater 9. Tubular Fluorescent Lamps 10. Washing Machine (Semi/Top load/Front load) 11. LED LAMPS 12. Ultra-High Definition (UHD) Televisions 13. Colour Television 14. Distribution Transformer 15. Ceiling Fan 16. Chillers  1. General Purpose Industrial Motor 2. Agricultural Pump Set 3. Domestic Gas Stove 4. Computer 5. Ballast 6. Office Automation Products 7. Diesel Engine Driven Monoset Pumps for Agricultural Purposes 8. Solid State Inverter 9. Diesel Generator Set 10. Microwave Oven 11. Solar Water Heater 12. Air Compressors 13. High Energy Li-Battery 14. Tyres Tires 15. Side by Side Multi Door Refrigerator 16. Pedestal Fan 17. Table/Wall Fan 18. Induction Hob 19. Solar PVM'	  

About the SLP for PVM

- To help citizens to make an informed decision while deploying solar PVM or solar panels.
 - Solar panels convert light energy captured from Sun into electric energy.
- Voluntary for two years and will be compulsory after that.

- **Expected outcome**
 - A progression from 1-Star to 5-Star solar PVM will result in additional electricity generation of around 35%.
 - Reduce carbon dioxide emissions by 30 million tonnes per annum by 2030.

About Bureau of Energy Efficiency (BEE)

- **Established:** In 2001 as a **statutory body** under provisions of **Energy Conservation Act (ESA), 2001**
- **Headquarters:** New Delhi
- **Ministry:** Ministry of Power
- **Objective:** Reducing energy intensity of the Indian Economy
- **Functions:**
 - Create awareness on energy efficiency and conservation
 - Promote innovative financing for energy efficiency

Other initiatives of BEE

Initiative	Details
India's Energy Conservation Building Code (ECBC), 2017	<ul style="list-style-type: none"> • The International Energy Agency cited India's ECBC as a notable exception among developing countries. <p>About ECBC:</p> <ul style="list-style-type: none"> • Released by the Bureau of Energy Efficiency under the Ministry of Power. <ul style="list-style-type: none"> ○ Sets minimum energy standards for new commercial buildings. • Prescribes new energy performance standards for new commercial buildings to be constructed across India. • Applicability: Both government and Private commercial buildings with certain specifications. • Energy Conservation (Amendment) Act, 2022 changed ECBC to 'Energy Conservation and Sustainable Building Code'. <ul style="list-style-type: none"> ○ It now applies to office and residential buildings meeting certain criteria.
State Energy Efficiency Index (SEEI)	<ul style="list-style-type: none"> • Ministry of Power released SEEI 2021-22. • Developed by BEE in collaboration with Alliance for an Energy Efficient Economy (AEEE) a not-for-profit organization • Assesses the annual progress of States and UTs in energy efficiency (EE) implementation. • Uses 51 indicators across seven sectors namely: <ul style="list-style-type: none"> ○ Buildings, industry, municipality, transport, agriculture, distribution companies (DISCOMs), and cross-sectoral initiatives. • Key Highlights <ul style="list-style-type: none"> ○ Categorizes states and UTs as 'Front runner' (>60), 'Achiever' (50-60), 'Contender' (30-49.5), and 'Aspirant' (<30). ○ States in Front Runner category: Andhra Pradesh, Karnataka, Kerala, Rajasthan and Telangana. ○ Telangana and Andhra Pradesh showed most improvement since the last index.
UTPRERAK (Unnat Takniki Pradarshan Kendra)	<ul style="list-style-type: none"> • Ministry of Power established UTPRERAK, a Centre of Excellence to Accelerate Adoption of Energy Efficient Technologies in Indian Industry. • Set up by BEE. • To be implemented to support projects in areas such as training/capacity building, showcase for energy efficient technologies, information centre and knowledge repository etc. • Centre mandated to become the key reference and resource institution on industrial energy-efficient technologies

4.5.2. NATIONAL EFFICIENT COOKING PROGRAMME (NECP)

Why in the news?

Energy Efficiency Services Limited (EESL) launched the National Efficient Cooking Programme (NECP).

About National Efficient Cooking Programme (NECP)

- Subset of the **Clean Cooking Scheme**.
- Aim:** To revolutionise cooking practices in India.
- Target:** To deploy 20 Lakh induction-based cook stoves across India.
- Focus:** Non-Solar/Electricity-based Induction Cookstoves, aligning with the Go-electric initiative by the Ministry of Power.
 - Go Electric Campaign** aims to create awareness on the **e-mobility ecosystem & benefits of electric cooking** through Information, Communication and Education (ICE) activities.

About EESL

- A joint venture of 4 Public Sector Undertakings**- NTPC Limited, Power Finance Corporation Limited, REC Limited and POWERGRID Corporation of India Limited.
- Genesis:** Established in 2009
- Headquarters:** New Delhi
- Ministry:** Ministry of Power
- Objective:** To enable ecosystems for responsible energy adoption with innovations and market creation approaches.
- Other information:** Does not take support of any subsidy from the Govt.
- Other Flagship Programs of EESL:**
 - Unnat Jyoti by Affordable LEDs for All (UJALA)
 - Street Lighting National Programme
 - Smart Meter National Programme
 - Buildings Energy Efficiency Programme etc.

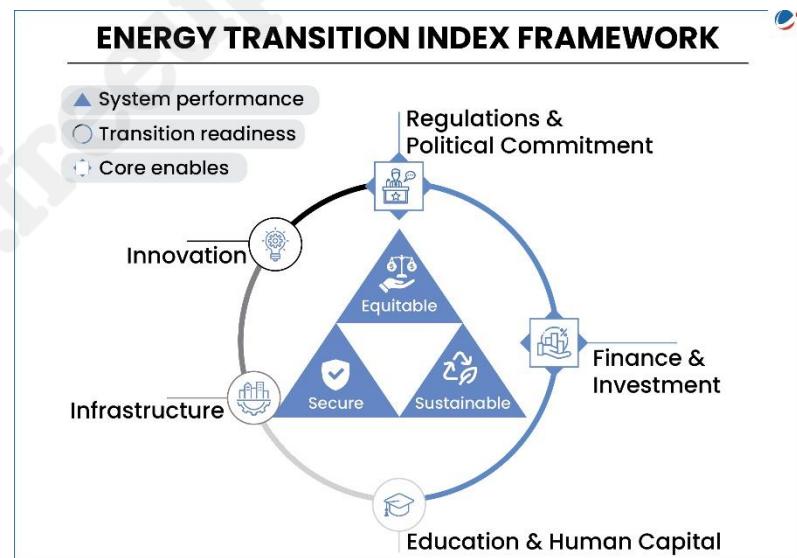
4.5.3. ENERGY TRANSITION INDEX

Why in News?

World Economic Forum (WEF), in collaboration with Accenture, released the report titled “**Fostering Effective Energy Transition 2023**” and **Energy Transition Index (ETI)**.

About Energy Transition Index (ETI), 2023

- Prepared on the three parameters- **equity, security, and sustainable**.
- Key Findings**
 - Sweden** is placed at the first spot, followed by Norway and Denmark.
 - India has been **ranked at 67th place** out of 120 countries.
 - India & Singapore** are the only two countries making advances in **all aspects of energy system performance**.
 - ET has increased each consecutive year over the last decade, but the **growth has plateaued in the past three years**, due to **rising challenges** to the **equity and inclusiveness** of the transition.



- **Energy transition:** Refers to the **global energy sector's shift** from **fossil-based systems** of energy production and consumption (including oil, natural gas, and coal) **to renewable energy (RE)** sources like wind and solar.

4.6. SUSTAINABLE AGRICULTURE

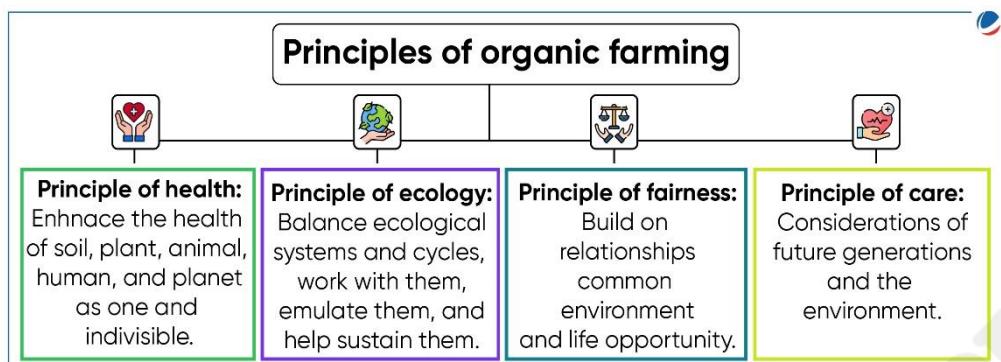
4.6.1. CERTIFICATION OF ORGANIC PRODUCTS IN INDIA

Why in the News?

European Union (EU) audit findings reveal deficiencies in the certification process of Indian organic products for exports to the EU.

About Organic Farming

- Promotes and enhances agro-ecosystem health, including biodiversity, biological cycle and soil biological activity.
- Uses on-farm agronomic, biological, and mechanical methods in exclusion of all synthetic off-farm inputs.
- Benefits of Organic Farming
 - For the Environment: Prohibits Use of Harmful Pesticides; Healthy Soil; Mitigate climate change through carbon sequestration; Reduces Erosion; Cleaner Water; Stimulates Biodiversity and microorganisms; Ethical pasture-based systems etc.
 - For Farmers: Reduces the input cost; Attract more customers; More resilient to extreme weather events etc.
 - For Consumers: Healthier; Higher nutritional quality etc.
- Status in India:
 - Highest number of Organic farmers in the world **44.3 Lakhs** (Economic Survey 2022-23) with **59.1 Lakh Ha** under Organic cultivation
 - Sikkim became the world's first 100% organic state.



Differences between Organic and Natural farming	
Organic Farming	Natural Farming
Permits use of off-farm organic and biological inputs like compost, vermicompost, etc.	No external inputs used on farmlands; only on-farm-based inputs used.
Open for micronutrient correction through use of minerals.	Use of minerals not allowed.
Ploughing, soil tilling, and weeding might be undertaken in organic farms.	Mimics ecosystems: No ploughing, no soil tilling, and no weeding done on natural farms.

Organic products certification in India

National Programme for Organic Production (NPOP)	<ul style="list-style-type: none"> Involves accreditation of Certification Bodies, standards for organic production, promotion of organic farming and marketing, etc. Recognized by European Commission and Switzerland. Implementing agency: Agricultural and Processed Food Products Export Development Authority (APEDA) under Ministry of Commerce & Industries Accredited Certification Bodies responsible for certifying. 	
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Participatory Guarantee System of India (PGS-India)	<ul style="list-style-type: none"> Ensures that production of organic products takes place in accordance with laid-down quality standards. <ul style="list-style-type: none"> Form of a documented logo or a statement. Launched by: Ministry of Agriculture and Farmers Welfare Makes certification system affordable and accessible without need for third-party certification agencies. Local Group responsible for certifying. 	
Jaivik Bharat logo	<ul style="list-style-type: none"> The Food Safety and Standards Authority of India (FSSAI) has introduced the logo to communicate the adherence to the National organic standards (Both PSG and NPOP). 	

4.6.1.1. NATIONAL COOPERATIVE ORGANICS LTD (NCOL)

Why in the News?

Organic food products of **National Cooperative Organics Ltd (NCOL)** were launched under brand name '**Bharat Organics**'.

About the launched products

- Six organic products** were launched **under the 'Bharat Organics' brand** - tur dal, chana dal, sugar, rajma, basmati rice, and Sonamasoori rice.
- Concept of '**Organic under one roof**' i.e. a network of retail outlets for all organic products started through NCOL was also launched.
- NOCL is one of the **three** new cooperatives the government has set up.
- Other 2- **National Cooperative Exports Limited (NCEL)**, **Bharatiya Beej Sahkari Samiti Limited (BBSSL)**.

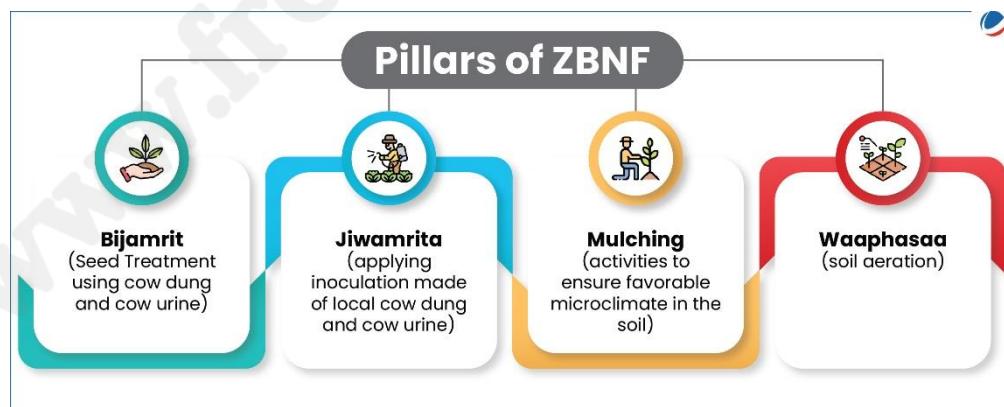
About NOCL

- Established in 2023**, under **the Multi state Cooperative Societies act, 2002**.
- Aim:** To provide a platform to all the farmers doing natural farming to make arrangements for the marketing of their produce.
- Promoted by:** Amul, National Cooperative consumers federation of India Ltd, National Agricultural Cooperative Marketing Federation of India Ltd (NAFED), **National Diary Development Board (NDDB) (chief promoter)** and National Cooperative Development Corporation (NCDC)
- Membership:** Any cooperative society or an association of persons (as permitted by the Central Registrar) can become its member.

4.6.2. ZERO BUDGET NATURAL FARMING (ZBNF)

Why in the News?

The Ministry of Rural Development (MoRD) and the Ministry of Agriculture and Farmers' Welfare (MoA&FW) launched the training of **Krishi Sakhis** for the promotion of Natural Farming.



About Krishi Sakhis

- Practicing farmers and trained para-extension professionals in agriculture at the grassroots level.

- Encourage the adoption of environmentally friendly and economically viable agricultural methods by raising awareness

About ZBNF

- Natural farming technique in which farming is done without-
 - Use of chemicals
 - Use of credit or spending any money on purchased inputs.
- Method of chemical-free agriculture drawing from traditional Indian practises based on **4 pillars (refer image)**.
- Reduces the cost of production down to zero due to utilisation of all the natural resources available in and around the crops.
- Originally promoted by **Maharashtrian agriculturist Subhash Palekar**.
- Promoted in **Union Budget 2019- 20**.
- A recent report highlighted significantly higher crop yield and unaffected nutrient availability compared to organic or conventional farming.

4.6.3. AGROFORESTRY

Why in the news?

Recently, the Centre released a **fact sheet to promote agroforestry** prepared by the **Indian Council of Forestry Research and Education (ICFRE)**.

About the Fact sheet

- Released details of cultivating **36 specific species, including bamboo**, that are suitable for agroforestry systems and home gardens.
- The 36 species include **Leucaena leucocephala, or subabul**, and various varieties of eucalyptus.
 - **Subabul: Considered an invasive species** that has been reported as a weed in more than 20 countries, according to an IUCN database.
 - **Eucalyptus:** Considered highly water-intensive.

About Agroforestry

- Combination of practicing agriculture and forestry together.
- Components of agroforestry: Crops, trees, and livestock.
- Agroforestry systems (classified based on type of component):
 - Agri silviculture (crops + trees),
 - Silvopastoral (pasture/livestock + trees); and
 - Agrosilvopastoral (crops + pasture + trees).
- Attributes of the Agroforestry system are Productivity, Sustainability and Adoptability

About Indian Council of Forestry Research and Education

- Autonomous Council under MoEFCC.
- Umbrella Organisation for forest research, education and extension needs of the country.
- HQ: Dehradun
 - Also has 9 Regional Research Institutes and 5 Centres in different India's bio-geographical regions.

Challenges with Agroforestry

- Shortage of superior seed varieties
- Trees interfering with agricultural crop yield
- Insufficient research on agroforestry models suitable for the diverse agro-climatic regions
- Long tree gestation periods resulting in delayed investment returns
- Lack of market mechanisms for tree grown
- A dearth of remuneration for undertaking tree cultivation

Government Initiatives for Agroforestry

- **Sub-Mission on Agroforestry (Har Medh par Ped) Scheme:** Launched in 2016-17 to encourage tree plantation on farmland along with crops.
- **Mission for Integrated Development of Horticulture (MIDH):** It has been implemented since 2014-15 for holistic growth of horticulture covering fruits, vegetables, mushrooms, spices, etc.

- **National Agroforestry Policy, 2014:** To encourage and expand tree plantation in a complementarity and integrated manner with crops and livestock.
- Exempted many tree species from the **Felling and Transit rules**, and removed bamboo from the **category of forest produce** to enable large-scale cultivation.

4.6.4. OTHER SUSTAINABLE AGRICULTURE PRACTICES

Practice	Details
Cellular Agriculture	<ul style="list-style-type: none"> • Cellular Agriculture is being promoted in the backdrop of rising contribution of food industry in carbon emissions. <p>About Cellular Agriculture</p> <ul style="list-style-type: none"> • Production of animal-based products from cell cultures rather than directly from animals. • Uses 2 different approaches: <ul style="list-style-type: none"> ○ Cell cultivation (cellular): Meat directly produced from cells (fed with nutrients in large cultivators). ○ Precision fermentation (acellular): Microorganisms used rather than cell cultures to produce products such as milk and egg-white proteins.
Direct-Seeding Rice (DSR) method	<ul style="list-style-type: none"> • Labour shortages and rains getting delayed are pushing farmers in several leading rice-growing states to adopt DSR method. <p>About DSR system</p> <ul style="list-style-type: none"> • Rice seeds are sown directly into field, as opposed to traditional method of growing seedlings in a nursery, then transplanting into flooded field. • In DSR, water is replaced by real chemical herbicides, and in transplanting, standing water acts as herbicide and prevents growth of weeds by denying them oxygen in submerged stage. • Advantages: Water conservation, less methane pollution, require less labour. • Disadvantages: High seed demand, higher weed, not suitable everywhere.
Electronic Soil (e-Soil)	<ul style="list-style-type: none"> • Researchers develop 'electronic soil', a low-power bioelectronic growth substrate, tailored for hydroponic cultivation. <ul style="list-style-type: none"> ○ e-Soil can electrically stimulate the root system and growth environment of plants. • Hydroponics is soil-free plant cultivation, utilising water, nutrients, and a substrate for root attachment. • Benefits- <ul style="list-style-type: none"> ○ Precise nutrient control ensures faster growth, higher yields, and superior quality produce. ○ Enables vertical cultivation in large towers to maximise space efficiency. ○ Uses dramatically less water compared with conventionally grown plants. ○ Significantly fewer pests. • Disadvantages: High Set-Up Cost, Special Expertise, Susceptibility to Waterborne Diseases etc.
Miyawaki Plantation Method	<ul style="list-style-type: none"> • South Eastern Coalfields Ltd (SECL) will undertake plantation using Miyawaki method in coal belt region of Chhattisgarh. • Pioneered by Japanese botanist Akira Miyawaki. • Involves planting native trees, shrubs and groundcover plants within every square meter to create a dense canopy layer of tall trees in small land parcels. • Benefits of the method: Forests grow rapidly; Utility in urban forestry; increase carbon sequestration, reduce air and noise pollution and attract local birds and insects.

Recirculatory Aquaculture System (RAS)	<ul style="list-style-type: none"> It is a technology in which water is recycled and reused after mechanical and biological filtration and removal of suspended matter and metabolites. Use: High-density culture of various species of fish, utilizing minimum land area and water. Advantages: Reduced operational costs, climate resilience, production of a broad range of species, judicious use of land and water, etc. Disadvantages: High capital cost, requirement of uninterrupted power supply, etc.
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4.7. MISCELLANEOUS

4.7.1. G20 SUMMIT INITIATIVES/DOCUMENTS

Why in the News?

The G20 Summit ended with various unanimously adopted Principles and documents.

Please note, the topic G20 will be covered in detail in International Relations edition of the PT 365 Series.

Key initiatives and outcome documents

Initiatives/Documents	Details
Millets And Other Ancient Grains International ReSearchH Initiative (MAHARISHI)	<ul style="list-style-type: none"> Participants of G20 Meeting of Agriculture Chief Scientists on “Sustainable Agriculture and Food System for Healthy People and Planet” unanimously supported launch of MAHARISHI. Secretariat to be housed at Indian Institute of Millets Research (IIMR), Hyderabad with technical support from ICRISAT, One CGIAR Centres and other International organisations. Focus on Research and Awareness about agro-biodiversity, food security, and nutrition aligning with International Year of Millets 2023. Millets are known as nutri-cereals or superfoods, mainly grown on marginal land in dry areas of temperate, sub-tropical and tropical regions.
Global Biofuel alliance (GBA)	<ul style="list-style-type: none"> India launched the GBA at the G20 summit. Aim: To serve as a catalytic platform, fostering global collaboration for the advancement and widespread adoption of biofuels. GBA Members- <ul style="list-style-type: none"> 7 G20 countries: Argentina, Brazil, Canada, India Italy, South Africa, USA. 4 G20 invitee countries: Bangladesh, Singapore, Mauritius, UAE. 8 Non- G20 countries: Iceland, Kenya, Guyana, Paraguay, Seychelles, Sri Lanka, Uganda, Finland. 12 International organizations: World Bank, ADB, WEF, World LPG Organization, UN Energy for All, UNIDO, Biofutures Platform, ICAO, IEA, International Energy Forum, IRENA, World Biogas Association. Significance of GBA <ul style="list-style-type: none"> Aims to expedite global uptake of biofuels. Facilitate development, adoption and implementation of recognized standards for biofuels adoption and trade
High-level Principles on Lifestyles (HLPs) for Sustainable Development	<p>Outlined 9HLPs</p> <ul style="list-style-type: none"> Promote inter-linkages between development, environment and climate agendas. Support international and national efforts towards meeting the basic needs of all people. Promote environmentally friendly individual, sustainable production and community behavior. Mainstream sustainability of all aspects of economy.

	<ul style="list-style-type: none"> • Leverage potential of data and digital technology for sustainable ecosystem. • Recognize and amplify role of local communities, local and regional governments and traditional knowledge • Strengthen international cooperation, collective action and partnership.
G20 2023 Action Plan on Accelerating Progress on SDGs	<ul style="list-style-type: none"> • To focus on key transformative transition areas i.e., <ul style="list-style-type: none"> ○ Digital transformation. ○ Gender equality and empowerment of women. ○ Implementing sustainable, inclusive and just transitions globally, while leaving no one behind. • Financing for accelerating progress on SDGs <ul style="list-style-type: none"> ○ Enhanced access to adequate finance from all sources is critical. ○ Encourage innovative inclusive financing mechanisms such as blended finance, green bonds in developing countries. ○ Reaffirm the need to assist developing countries in attaining long-term debt sustainability.
Chennai High-Level Principles	<ul style="list-style-type: none"> • Set of principles for a sustainable and resilient blue economy, majorly call for: <ul style="list-style-type: none"> ○ Establish and Implement Blue Economy Monitoring and Evaluation Mechanisms ○ Enhance Ocean Finance ○ Promote using Marine Spatial Planning. ○ Address Marine Pollution and Reverse Biodiversity Loss ○ Recognise and Protect Indigenous and Traditional Knowledge • About Blue Economy <ul style="list-style-type: none"> ○ Sustainable use of ocean resources for economic growth, improved livelihood and jobs, and ocean ecosystem health (according to World Bank). ○ SDG 14: Conserve and sustainably use the oceans, seas and marine resources. 

4.7.2. 4TH CLEAN ENERGY MINISTERIAL (CEM14) AND 8TH MISSION INNOVATION (MI-8) MEETING

Why in the news

India hosted 4th Clean Energy Ministerial (CEM14) and 8th Mission Innovation (MI-8) meeting under the theme "Advancing Clean Energy Together".

About Clean Energy Ministerial (CEM)

- A high-level global forum (India is a member) to advance clean energy technology to encourage transition to a global clean energy economy.
- Initiatives launched
 - **Clean Energy Marine Hubs (CEM-Hubs):** A cross-sectoral public-private platform to de-



risk investments needed to produce low- and zero-emission fuels to be transported by maritime sector.

About Mission Innovation (MI)

- Global initiative to make clean energy affordable, attractive and accessible to all.
 - First phase was launched alongside Paris Agreement in 2015.
 - Mission Innovation 2.0, second phase of MI, was launched in 2021.
- Consists of 23 countries and EU.
 - India a founding member.

4.7.3. ENVIRONMENTAL COST OF WAR

Why in the news?

Experts have raised concerns with respect to environmental impact and associated costs of **Russia-Ukraine war and the Israel-Palestine conflict**.

Key Initiatives launched to minimize environmental impact of war

- **Geneva Convention (1949):** Imposes restrictions on warfare methods aiming to cause widespread, long-term, and severe damage to the natural environment.
- **Brundtland Report (1987):** The report "Our Common Future" introduced the concept of sustainable development.
- **Stockholm Conference (1972):** Prohibits the use of all weapons of mass destruction.
- **UN Conference on Environment and Development (1992 Rio Conference)**
 - Principle 24 emphasizes that armed conflict is fundamentally harmful to sustainable development, urging nations to adhere to international environmental norms during war.
 - Principle 25 emphasizes the interconnectedness and indivisibility of peace and sustainable development.
- **Rome Statutes (1998) - Article 12:** Addresses the responsibility of states regarding environmental damage in armed conflicts.
- **International Day for Preventing the Exploitation of the Environment in War and Armed Conflict (by UN General Assembly):** Recognizes the importance of preventing environmental exploitation during conflicts.
- **Draft Principles on Protection of the Environment in Relation to Armed Conflicts (2022):** Adopted by the International Law Commission, these principles provide a framework for environmental protection during armed conflicts.
- **UN Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD) (1976):** Aims to prevent the military or hostile use of environmental modification techniques.

4.7.4. KEN-BETWA LINK PROJECT (KBLP)

Why in the news?

Ken-Betwa Link Project (KBLP) secured **final forest clearance**.

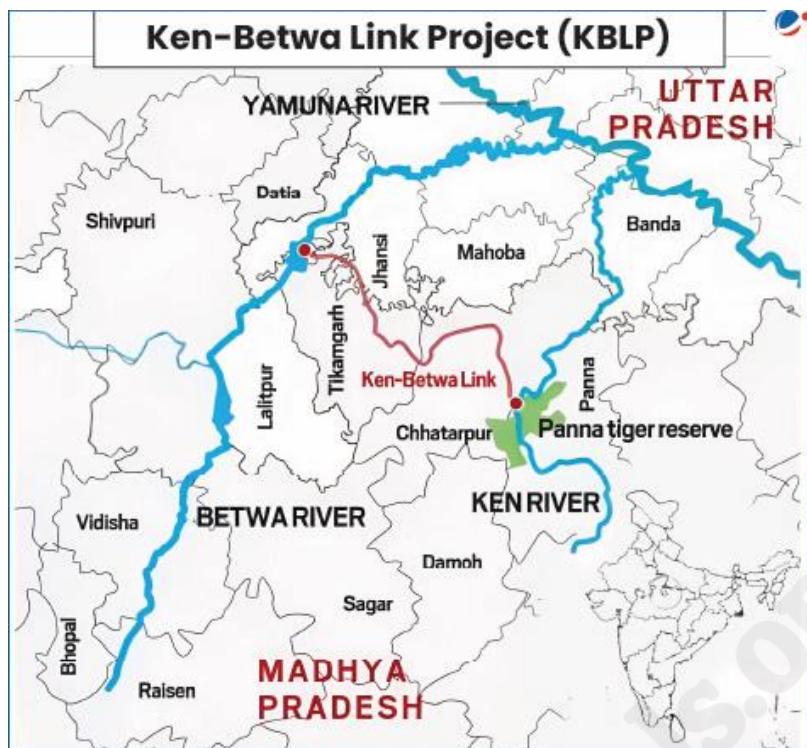
About KBLP

- Approved in 2021 under **National Perspective Plan (NPP)**.
- **Location:** Bundelkhand, a drought-prone region, which spreads across **13 districts of Uttar Pradesh and Madhya Pradesh**.
- Envisages transfer of water from Ken River to Betwa River (water deficit). Both rivers are **tributaries of river Yamuna**.
- **2 phases:**
 - Phase I: Construction of **Daudhan dam complex** and subsidiary units such as Low-level Tunnel, **Ken-Betwa Link canal**, and **powerhouses**.

- Phase II: Construction of Lower Orr dam, Bina Complex project, and Kotha Barrage.
- **Significance of KBLP:** Address water scarcity in Bundelkhand region for water supply and irrigation; **Power generation** (103 MW of hydropower and 27 MW solar power) etc.
- **Concerns with KBLP:** Loss of 20 lakh trees; Submergence of areas of Panna Tiger Reserve; threat to wildlife like gharials of Ken Gharial Sanctuary etc.

About NPP

- Formulated by the then Ministry of Irrigation (now Ministry of Jal Shakti) to transfer water from surplus basin to water deficit basin.
- Based on NPP, National Water Development Agency (NWDA) identified 30 river links—**16 under Peninsular component** (including KBLP) and **14 under Himalayan Component**.



Other River interlinking projects in News

Project	Details
Kalasa-Banduri project	<ul style="list-style-type: none"> Tenders floated for implementation of Kalasa Banduri project were put out without obtaining forest and environment clearance Aims to divert water from two tributaries of the Mahadayi river (also known as Mandovi): Kalasa and Banduri to the Malaprabha river. <ul style="list-style-type: none"> Mahadayi originates in the Bhimgad Wildlife Sanctuary in Belagavi district of Karnataka and flows into the Arabian Sea in Goa. Aimed at facilitating drinking water for towns in drought-hit northern Karnataka.

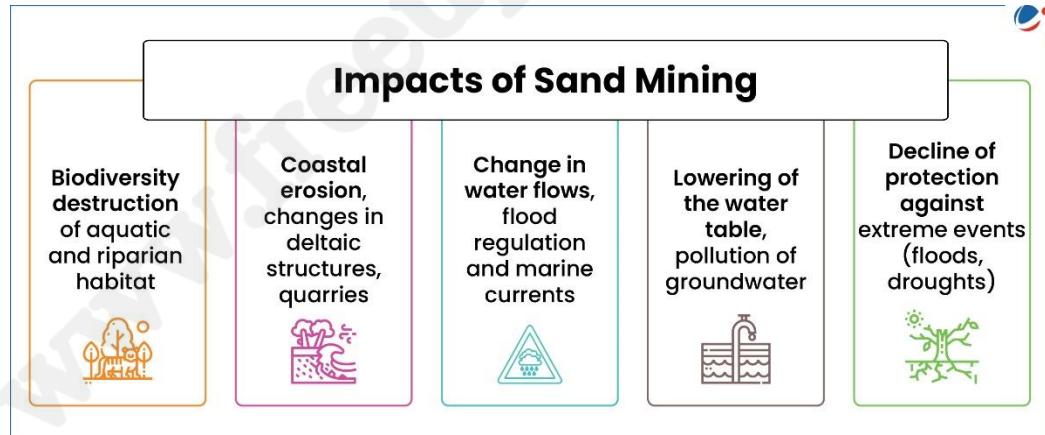
4.7.5. SAND MINING

Why in the News?

National Green Tribunal (NGT) makes **consent from State Pollution Control Board (SPCB) mandatory** for river sand mining.

About Sand

- **2nd most exploited natural resource** in the world after water.
- **Main sources of sand in India:** River (riverbed and flood plain), Lakes and reservoirs, Agricultural fields, Coastal / marine sand, Palaeo-channels etc.



Regulations for Sand Mining in India

- Sand classified as a minor mineral under **Mines and Minerals (Development and Regulations) Act, 1957 (MMDR Act)**.
 - **Administrative control over minor minerals** vests with State Governments, and accordingly, regulated through **State specific rules**.
- MoEFCC issued **Sustainable Sand Mining Management Guidelines (2016)**.
 - **Enforcement & Monitoring Guidelines for Sand Mining (2020)** released as a supplemental to the 2016 guidelines.
 - **Outline following objectives-** Identification and Quantification of Mineral Resource and its optimal utilization; Setting up the procedure for replenishment study of Sand; Post Environmental Clearance Monitoring; Procedure for Environmental Audit; Control the instance of illegal mining, etc
- Ministry of Mines has prepared **Sand Mining Framework (2018)**.
 - **Framework envisages** alternative sources of sand in form of **Manufactured Sand (M-Sand)** from crushed rock fines, sand from Overburden (OB) of coal mines.

About National Green Tribunal (NGT)

- **Genesis:** Established in 2010 under **National Green Tribunal Act 2010**
- **New Delhi** is the Principal Place of Sitting (**Other places:** Bhopal, Pune, Kolkata and Chennai)
- **Functions:**
 - **Effective and expeditious disposal of cases** relating to environmental protection, conservation of forests etc.
 - **Giving relief and compensation for damages** to persons and property
- **Not bound by the procedure laid down under Code of Civil Procedure, 1908**
- **Guided by principles of natural justice.**
- Mandated to dispose applications/appeals within **6 months of filing**

4.8. OTHER IMPORTANT NEWS

News	Details
UN Sustainable Development Cooperation Framework 2023-27	<ul style="list-style-type: none">• NITI Aayog and UN have signed Government of India - United Nations Sustainable Development Cooperation Framework (GoI- UNSDCF) 2023-27.• GoI-UNSDCF 2023-2027 is built on four strategic pillars derived from the 2030 Agenda – People, Prosperity, Planet and Participation.<ul style="list-style-type: none">○ Four interlinked pillars have 6 outcome areas<ul style="list-style-type: none">✓ Health and Well Being; Nutrition and Food Security;✓ Quality Education;✓ Economic Growth and Decent Work;✓ Environment, Climate, WASH and Resilience; and✓ Empowering People, Communities, and Institutions.• Represents UN development system's collective offer to India for achievement of Sustainable Development Goals.• UNSDCF designated as principal planning and implementation instrument for UN Development System at country level.
Partnership for Resilient and Inclusive Supply-chain Enhancement (RISE)	<ul style="list-style-type: none">• RISE is an initiative of World Bank and G7 under Japan's Presidency.<ul style="list-style-type: none">○ RISE is a \$40 million partnership project to diversify supply chains for clean energy products.• Aims: To support low- and middle-income countries in playing bigger roles in the midstream (mineral processing and refining) and downstream (component manufacturing and assembly) in supply chains of clean energy products.
Earth System Boundaries (ESBs)	<ul style="list-style-type: none">• A research has flagged that 7 of the 8 ESBs that are critical for stability of the Earth's health and survival of species have already been crossed.

	<ul style="list-style-type: none"> • ESBs are scientifically quantified safe and just limits for climate, freshwater, biodiversity and different kinds of pollution. <ul style="list-style-type: none"> ○ By operating within these limits, we can maintain a stable and resilient planet with accessibility to necessary resources. ○ These are hard limits and even temporary overshooting of some of the boundaries can permanently damage the planet's critical systems.
Cool roof policy	<ul style="list-style-type: none"> • Government of Telangana announced its Cool Roof policy to reduce the impact of heat on building. • Cool roof policy <ul style="list-style-type: none"> ○ Mandatory for all government and non-residential commercial buildings. ○ Aims to make buildings thermally resilient and reduce their energy consumption. ○ Occupancy certificate would only be given after compliance. ○ Insulation of the roof can be done by using <ul style="list-style-type: none"> ✓ Paints or liquids with high reflectivity, ✓ Prefabricated material like poly-vinyl chloride (PVC) membranes or bitumen-based sheeting..
Mission 50K- EV4 Eco	<ul style="list-style-type: none"> • Small Industries Development Bank of India (SIDBI) has launched a pilot scheme called Mission 50K-EV4ECO. • Mission aims to strengthen the Electric Vehicle (EV) ecosystem in India by financing EVs purchase through direct and indirect lending to Micro, Small and Medium Enterprises (MSMEs) and NBFCs respectively. • To serve as precursor to SIDBI-World Bank's EVOLVE programme
Perovskite	<ul style="list-style-type: none"> • Scientists discovered that a nanoscale ink coating could improve stability enough to make next-generation perovskite solar cells suitable for mass production of next-generation solar cells. • A naturally occurring mineral of calcium titanate. • Properties of Perovskite: Lightweight, high optical conductivity and absorption, high efficiency, cheaper to produce compared to traditional silicon-based cells. • Applications: Solar Panels industry, Space technology etc. • Limitations: Gets decomposed when they react with moisture and oxygen, suffers from a drop in efficiency and energy output during the manufacturing process etc.
'One CGIAR' Global Initiative	<ul style="list-style-type: none"> • International Crops Research Institute for the Semi-Arid Tropics (To control the instance of illegal mining) joins One Consultative Group on International Agricultural Research (CGIAR) global initiative. • ICRISAT: Established under a Memorandum of Agreement between the Government of India and the CGIAR in 1972. <ul style="list-style-type: none"> ○ An international research institute with a focus on tropical dryland agrifood system innovation. ○ ICRISAT in India is one of CGIAR's research centers. • One CGIAR: A reformulation of CGIAR's partnerships, and global presence, aiming for greater integration and impact in the face global challenges. • About CGIAR <ul style="list-style-type: none"> ○ Publicly-funded network of agrifood systems research centers, established in 1971. ○ Aim: Build a unified approach to transforming food, land, and water systems to address the challenges of the climate crisis. ○ Project of Climate Change, Agriculture and Food Security (CCAFS), an international research program, is carried out under a consultative group on CGIAR headquartered in France.

Norman Borlaug Field Award for Field Research and Application	<ul style="list-style-type: none"> • Dr. Swati Nayak, an Indian scientist at International Rice Research Institute (IRRI), was named the recipient of the prestigious award in 2023. <ul style="list-style-type: none"> ○ She is recognized for her innovative approach to engaging smallholder farmers in demand-driven rice seed systems and adoption of climate-resilient and nutritious rice varieties. • \$10,000 award recognizes exceptional, science-based achievement in international agriculture and food production by an individual under the age of 40. <ul style="list-style-type: none"> ○ Endowed by: Rockefeller Foundation.
Holistic Development of Great Nicobar Island at Andaman & Nicobar Islands Project	<ul style="list-style-type: none"> • The National Board for Wildlife (NBWL), denotified the entire Galathea Bay Wildlife Sanctuary in the Nicobar Islands for the construction of proposed International Container Transhipment Port (ICTP) project. • The development of this Mega Container Terminal is a part of the holistic development of Great Nicobar Island. • The MoEF&CC granted environmental clearance to the project in 2022 • Has 4 components: International Transhipment Port, Greenfield International Airport, a power plant, and a new township that could constitute a Special Economic Zone. • To be implemented over a period of 30 years. • Issues with the project: Loss of tree cover and mangroves, adverse impact on biodiversity and marine life, encroachment into tribal areas. • Great Nicobar Island <ul style="list-style-type: none"> ○ Southernmost island of the Nicobar Islands archipelago. ○ Has tropical evergreen forest ecosystem. ○ Part of UNESCO's Man and Biosphere Programme (MAB).
Mullaperiyar Dam	<ul style="list-style-type: none"> • Supreme Court has ordered Survey of India to determine whether the Kerala's mega parking project Near Mullaperiyar Dam is encroaching Periyar Lake Lease Agreement (1886) territory. • Survey of India is the National Survey and Mapping Organization (set up in 1767) <ul style="list-style-type: none"> ○ It works under the Department of Science & Technology. • About Mullaperiyar dam <ul style="list-style-type: none"> • Constructed during 1887-1895 and owned, operated, and maintained by Tamil Nadu Government, within Periyar Tiger Reserve. • Located in upper reaches of river Periyar, which flows into Kerala after originating in Tamil Nadu.

4.9. INSTITUTIONS/ORGANIZATIONS IN NEWS

4.9.1. INTERNATIONAL ENERGY AGENCY (IEA)

- Autonomous inter-governmental organisation within the OECD framework.
- Genesis: Established in 1974 to ensure the security of oil supplies after the oil crisis (1973)
- Membership: 31 members and 13 associate members (India Associate member).
 - To be a member, the country should be an OECD member along with a capacity to hold a crude reserve for 90 days of the previous year's import.

Reports released by IEA

Reports	Key Highlights
World Energy Outlook 2023	<ul style="list-style-type: none"> • Key highlights <ul style="list-style-type: none"> ○ Fossil fuel share in the global energy supply is projected to reduce from around 80% to 73% by 2030.

	<ul style="list-style-type: none"> ○ Renewables are set to contribute 80% of new power capacity by 2030 in the stated policies scenario (STEPS), with solar PV alone accounting for more than half of this. ● India specific observations <ul style="list-style-type: none"> ○ India has now become an importer of modern clean energy technologies as it scales up solar and wind power generation capacity. ○ Over the past five years, solar PV has accounted for nearly 60% of new generation capacity. ○ India's demand for electricity for running household air-conditioners is estimated to expand nine-fold by 2050.
Other reports	<ul style="list-style-type: none"> ● Breakthrough Agenda Report 2023: Jointly released by International Energy Agency, International Renewable Energy Agency, and UN Climate Change High-Level Champions. ● Electricity Grids and Secure Energy Transitions report: Provides a first-of-its-kind stocktake of grids worldwide. ● Emissions from Oil and Gas Operations in Net Zero Transitions report ● World Energy Balances ● Energy Technology Perspectives ● World Energy Statistics and Net Zero by 2050 ● Net Zero Roadmap Report: A Global Pathway to Keep the 1.5 °C Goal in Reach ● Imperative of Cutting Methane from Fossil Fuels ● A Policy Toolkit for Implementing LiFE

4.9.2. INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA)

- An **intergovernmental organisation** mandated to facilitate cooperation and promote the adoption and sustainable use of renewable energy.
- **Genesis: Established in 2009,**
- **HQ:** Masdar City - Abu Dhabi
- **Membership:** 169 Members (India a member)

Reports released by IRENA

Reports	Key highlights
World Energy Transitions Outlook 2023	<ul style="list-style-type: none"> ● Current pledges and plans fall well short of IRENA's 1.5°C pathway and will result in an emissions gap of 16 gigatonnes (Gt) in 2050. ● Global investment across all energy transition technologies reached a record high of USD 1.3 trillion in 2022
Tripling Renewable Power and Doubling Energy Efficiency by 2030: Crucial Steps Towards 1.5 °C	<ul style="list-style-type: none"> ● Jointly launched by COP28 Presidency, International Renewable Energy Agency (IRENA), and Global Renewables Alliance on sidelines of Pre-COP event in Abu Dhabi.
Tracking SDG 7: The Energy Progress' report	<ul style="list-style-type: none"> ● Released through the collaboration between the International Energy Agency (IEA), International Renewable Energy Agency (IRENA), United Nations Statistics Division, World Bank, and the WHO. ○ SDG 7 provides for achieving affordable, reliable, sustainable, and modern energy for all. ● Key Findings: <ul style="list-style-type: none"> ○ The current pace is not adequate to achieve any of the 2030 targets. ○ India alone accounts for the largest share of the access deficit (defined as the population lacking access to electricity), followed by China.
Other reports	<ul style="list-style-type: none"> ● Renewable Power Generation Costs in 2022 ● Low-cost finance for the energy transition report

4.9.3. FOOD AND AGRICULTURAL ORGANISATION (FAO)

- **Genesis:** Established in 1945
- **Headquarters:** Rome (Italy)
- **Specialized agency of United Nations**
- Leads international efforts to defeat hunger and improve nutrition and food security
- **Members:** 195 Members (Including India)
- **Reports released by FAO**
 - **The Impact of Disasters on Agriculture and Food Security:** 1st-ever global estimation of impact of disasters on agricultural production.
 - **State of Food and Agriculture (SOFA) Report 2023:** FAO dedicated two consecutive editions of SOFA to same theme for the first time ever.
 - **Asia and the Pacific - Regional Overview of Food Security and Nutrition 2023:** Statistics and Trends
 - The status of women in agrifood systems.

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5. DISASTER MANAGEMENT

5.1. COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI)

Why in the news?

The cabinet approved the ratification of the Headquarters Agreement (HQA) between India and the Coalition for Disaster Resilient Infrastructure (CDRI).

More about the news

- In 2022, Cabinet had approved recognition of CDRI as an International Organization and for signing of HQA for granting CDRI exemptions, immunities and privileges as contemplated under **Section- 3 of United Nations (Privileges & Immunities) Act, 1947.**
 - Act was enacted to give effect to Convention on the Privileges and Immunities of the United Nations, adopted by UN General Assembly in 1946.
- **UN Charter allows UN, and also its officials,** to enjoy in the territory of each of its Members such **legal capacity, privileges and immunities** which are **necessary for the exercise of its functions** and the fulfilment of its purposes.
 - Section 3 of the act states that **premises of UN** shall be **inviolable**. Act was also **extended to several other international organisations.**
- Signing of HQA will provide **CDRI an independent and international legal persona**, so that it can **carry out its functions internationally**, more efficiently.

About CDRI

- **Genesis:** A global partnership launched in 2019 by Indian Prime Minister at UN Climate Action Summit (New York).
- **Objective:** To promote the resilience of infrastructure systems to climate and disaster risks, thereby ensuring sustainable development.
- **Membership:** 31 Countries (including India), 6 International Organisations and 2 private sector organizations as members.
- **Other Key Information:** Works at intersection of the **Sendai Framework for Disaster Risk Reduction** and the Paris Climate Agreement.
- **Reports:** Biennial report on global infrastructure titled "**Global Infrastructure Resilience: Capturing the Resilience Dividend**".

Related Concepts

- **Resilient infrastructure:** Infrastructure that can absorb, respond to, and recover from hazard events and shocks.
- **Infrastructure for resilience:** Infrastructure that supports broader social and economic or systemic resilience without generating or accumulating new systemic risk.
- **Nature-based Infrastructure Solutions (NbIS):** Refers to practices that concurrently protect and provide infrastructure, adapt to climate change, promote environmental integrity and biodiversity, and provide social well-being

5.2. RISK TIPPING POINT

Why in news?

As per **Interconnected Disaster Risks Report 2023**, world is fast approaching **risk tipping points** on multiple fronts.

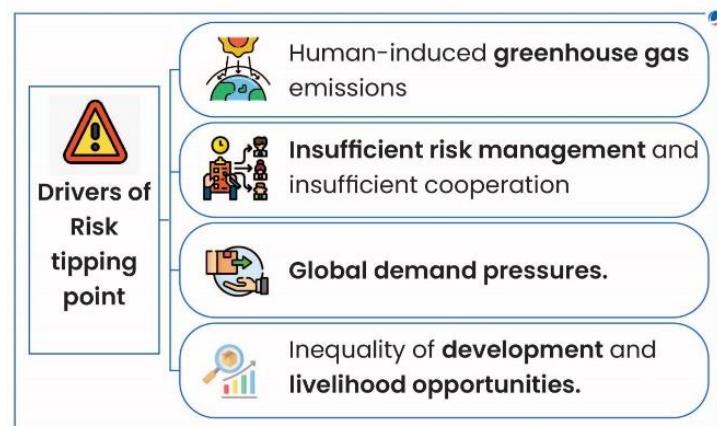
More on the news

- Report released by **United Nations University – Institute for Environment and Human Security (UNU-EHS)**

- An academic arm of the United Nations, established in 2003.
- Acts as a global think tank.
- **Mission:** Carry out research on risks and adaptation related to environmental hazards and global change.

About Risk tipping point

- **Moment** when a **socioecological system loses** its ability to buffer risks, leading to increased potential for catastrophic impacts.
- **Six interconnected risk tipping points are:**
 - **Accelerating extinctions** that trigger chain reaction to ecosystem collapse.
 - **Groundwater depletion** that drains water risking food supply.
 - **Mountain glaciers melting.**
 - **Space debris** causing loss of multiple satellites.
 - **Unbearable heat** making it hard to live in some areas.
 - **Uninsurable future** when rising risks make homes unaffordable.



5.3. GLACIAL LAKE OUTBURST FLOOD (GLOF)

Why in the News?

Sikkim witnessed Glacial Lake Outburst Flood (GLOF) due to bursting of the southern bank of the **South Lhonak Lake**.

Causes for Sikkim flash floods

- Sikkim's **South Lhonak Lake**, experienced **accelerated melting**.
- **GLOF event combined with rainfall due to cloud burst.**
- **Release of water from Chunthang Dam.**

About Glacial Lakes and GLOFs

- **Glacial lakes:** **Large bodies of water** that sit in front of, on top of, or beneath a melting glacier.
- **GLOF:** A sudden release of a significant amount of water retained in a glacial lake, irrespective of the cause.
- **GLOF vulnerability in India**
 - As per recent ICIMOD report (Hindu Kush Himalaya (HI-WISE) assessment report) - in the event of global warming between 1.5°C to 2°C, by 2100, **glaciers are set to lose 30–50% of their volume** compared with 2015.
 - India has witnessed at least **three highly devastating GLOF events** over the last decade —**Kedarnath (2013), Chamoli (2021) and Sikkim (2023)**.

5.4. EARTHQUAKE SWARM

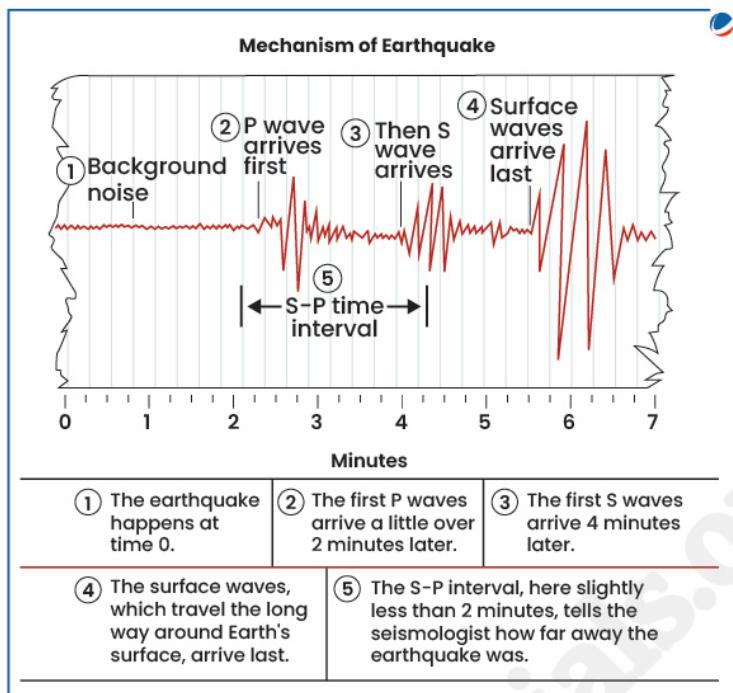
Why in the news?

2,200 earthquakes were observed in Iceland in 24 hours.

About Earthquakes and Earthquake Swarm

- Any sudden shaking of the ground caused by the **passage of seismic waves (Body Waves (P and S) and Surface Waves (Rayleigh and Love)) through Earth's rocks** (refer infographic).
- **S-Waves can only travel through solids.**

- **Earthquake swarms**
 - Sequences of many earthquakes that occur in a relatively short period without a specific foreshock, mainshock or after shocks.
 - Can last for hours, days, or even weeks.
 - Mostly consist of low to moderate-magnitude events, although larger quakes can occur within the swarm sequence.
 - Often occur at relatively shallow depths within the Earth's crust.
 - Usually occur along existing fault systems which experience continuous stress and strain accumulation.
- **Reasons for occurrence in Iceland:**
Diverging plate movements in Mid-Atlantic Ridge
 - Can also create of Hotspots through which a vertical plume of hot molten rock erupts from the mantle.
- **Iceland is Europe's largest and most active volcanic region.**
 - Mount Fagradalsfjall and Eyjafjallajokull volcano are two major earthquake zones in Iceland.



Related news: Coseismic Ionospheric Perturbations (CIP)

- A study has revealed that even smaller earthquakes have their reflection in the ionosphere.
- Earthquakes generate ionospheric disturbances that are referred to as Coseismic ionospheric perturbations (CIP).
- Coseismic vertical crustal movements excite acoustic waves in the atmosphere.
 - These waves propagate to reach the ionosphere, causing disturbances in electrons along the line of sights connecting ground Global Navigation Satellite System (GNSS) receivers and satellites.
- The CIPs can help to observe earthquake sources from space and may pave the way for deciphering earthquake precursors using space-based observations.

5.5. LANDSLIDES IN HIMALAYAS

Why in the News?

An under-construction Silkyara-Barkot tunnel in Uttarakhand's Uttarkashi collapsed due to a landslide.

More about the news

- Silkyara-Barkot tunnel will connect Yamunotri on the south end to Dharasu on the north end.
- It is part of Char-Dham all-weather road project.
- Tunnel is being built in an area comprising limestone and other soft rocks that tend to collapse.
- Possible reasons for collapse might have been fractured or fragile rock and/ or seepage of water through loose patches.

Comparison between Himalayas and Alps

Feature	Himalayas	Alps
Age	Relatively young (formed 40-50 million years ago)	Older (formed around 65 million years ago)
Formation	Result of the collision between Indian and Eurasian plates	Result of the collision between African and Eurasian plates
Tectonic Activity	Ongoing tectonic activity, seismic region	Tectonically active, but less seismic activity
Geological Features	Young, rugged terrain with deep valleys and high peaks	Older, more rounded mountains with U-shaped valleys

Why are Himalayas more prone to landslides?

- **Geological**
 - Diverse geological formations, including varying rock types and fault lines.
 - High prevalence of seismicity.
- **Morphological**
 - Mountains of unconsolidated sediments of gravel and alluvium, particularly the Shiwalik region, make them unsuitable for construction.
 - High water tables leading to water seepage through loose patches.
- **Climatological**
 - Snow and ice accumulation in and around tunnels.
 - Extreme weather events like Cloud bursts.
- **Anthropogenic**
 - Sub-optimal design and construction, including inadequate investigations.
 - Climate-change induced warming leading to thawing of permafrost region.

Initiatives to tackle Landslides

- Geological Survey of India (GSI) undertakes landslide susceptibility mapping in different parts of the country and has developed a Landslide Early Warning System (LEWS) under LANDSLIP project.
- NDMA has released National Landslide Risk Management Strategy and guidelines for Landslide Hazard Zonation.

Techniques of Tunnel Construction

- Conventional methods
- Drill and Blast Method (DBM): Drilling holes into the rocks, loading them with explosives to break them apart.
 - Carries the potential risk of causing undesired events.
 - Used in construction of tunnels in places like Himalayas.
- Other methods: New Austrian Tunneling Methodology (NATM), and Drainage, Reinforcement, Excavation, Support Solution (DRESS).
- Mechanized methods
 - Tunnel Boring Machines (TBMs)
- Bore the rock from the front while supporting the excavating tunnel behind the machine by installing precast concrete segments.
- More expensive than DBM, but much safer.
- Used in construction of underground tunnels for Delhi Metro.
- Other methods: Road Headers.

Related concept: Rat Hole Mining

- Rat Hole Mining method was used to rescue workers in Uttarkashi Tunnel Collapse.
- Involves digging of narrow pits dug into the ground, typically just large enough for one person to descend and extract coal.
- Mostly prevalent in Meghalaya because of thinness of coal found there.
- Banning Status
 - The National Green Tribunal had banned Rat hole mining in 2014 on grounds of the practice being unscientific and unsafe for workers.
 - However, in 2019 Supreme Court stated that if coal mining is done under Mines and Minerals (Development and Regulation) Act and Mineral Concession Rules 1960, then NGT ban will not be applicable.
- Issues associated with rat hole mining: Soil erosion; Water pollution; Poor Ventilation; Involvement of children etc.

5.6. HEATWAVE IN INDIA

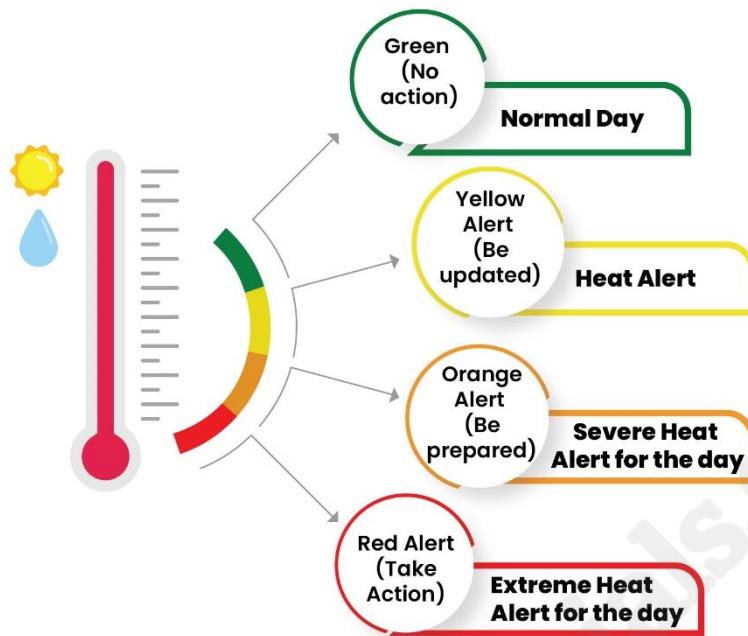
Why in the news?

Government's 5-member team to visit worst-affected states by Heatwaves.

About Heat wave

- A condition of air temperature which becomes fatal to the human body when exposed.
 - Defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.
- According to IMD, Heat wave is considered if maximum temperature of a station reaches at least 40 degree Celsius or more for Plains and at least 30 degree Celsius or more for Hilly regions.
- Efforts to deal with Heat Waves
 - National Action Plan on Heat Related Illness (NAP-HRI)
 - ✓ It was released by the Ministry of Health and Family Welfare in 2021.
 - ✓ It outlines the challenges posed by heat waves, heat-related illnesses and their management from primary to tertiary level.
 - NDMA guidelines on Heat Waves.

IMD issues Colour code impact based heat warning jointly with National Disaster Management Authority:



IDENTIFYING A HEATWAVE IN INDIA

When are heatwaves considered?

Maximum temperature



40°C
Plains



30°C
Hills

When are heatwave conditions said to be prevailing?

Normal maximum temperature

Above 40°C

Departure from normal

4–5°C or more

At or below 40°C

5–6°C or more

When are severe heatwave conditions said to be prevailing?

Normal maximum temperature

Above 40°C

At or below 40°C

Departure from normal

6°C or more

7°C or more

When should a heatwave be declared?

Recorded maximum temperature

At or above 45°C All locations



At or above 40°C Coastal locations

Note: The average pre-monsoon warm season daily temperature of 1970–1999 is defined as the normal temperature

About India Meteorological Department (IMD)

- National meteorological service of the country and handles services related to meteorology, seismology, and associated subjects.
- **Genesis:** Established in 1875 by Government of British India
- Currently under **Ministry of Earth Science**
- Acts as one of the six **Regional Specialized Meteorological Centres** of the **World Meteorological Organization**.

5.6.1. MARINE HEATWAVES (MHWS)

Why in the News?

World Meteorological Organization forecasts that **Marine Heatwaves (MHW)** may extend till 2024.

About MHWs

- **Long-term, persistent warming** and discrete periods of extreme regional ocean warming is called **MHWs**.
 - Indian Ocean (Arabian Sea and the Bay of Bengal) experienced it recently.
- **Causes:** Occurs when the surface temperature of a **particular region** of the sea rises to **3 or 4 degrees Celsius** above the **average temperature** for at **least five days**.
 - **El Nino** has contributed in its **occurrence**.
- **Key Characteristics:**
 - Can last for weeks or even years.
 - Can affect small areas of coastline or span multiple oceans.
 - Have increased by 50% over the past decade and now last longer and are more severe.
- **Impacts:**
 - **Marine ecosystems:** Deaths of **several marine species**, alter their **migration patterns**, lead to **coral bleaching** and even **impact weather patterns**.
 - **Humans:** Make **hurricanes and tropical cyclones** stronger more intense and frequent.
 - **Precipitation:** Due to its presence in the **Bay of Bengal, northwest India received sufficient rainfall**.

5.7. CYCLONES

Why in the news?

Severe Cyclonic Storm “Michaung” caused widespread damage across coast of Andhra Pradesh and Tamil Nadu.

More about the news

- Cyclone Michaung is **4th tropical cyclone** of year over the Bay of Bengal.
- The name Michaung was proposed by **Myanmar**, denoting **resilience and fortitude**.
- **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**.

What are Cyclones and how are they formed?

- A **large-scale system of air that rotates around the centre of a low-pressure area**.
- As per **National Disaster Management Authority (NDMA)**, characterised by **inward spiralling winds** that rotate
 - Anticlockwise in Northern Hemisphere
 - Clockwise in Southern Hemisphere
- **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.
- **Other Recent Cyclones in News**
 - **Cyclone Ilsa:** Made landfall in Western Australia.
 - **Cyclone Mocha:** Classified as a ‘Super Cyclone’(where wind speeds ≥ 222 kmph), made landfall along **Myanmar coast**.
 - **Cyclone Midhili:** After crossing Bangladesh coast, weakened into a deep depression and later into a depression.
 - ✓ **Cyclonic storm** is cyclonic disturbance in which the maximum average surface wind speed is in range of **34 to 47 knots (62 to 88 kmph)**.
 - ✓ In **deep depression**, maximum sustained wind speed lies in the range **28 to 33 knots (50 to 61 kmph)**.
 - ✓ **Depression** is a cyclonic disturbance in which maximum sustained surface wind speed is between **17 and 33 knots (31 and 61 kmph)**.

Related concept: Fujiwhara effect

- As per National Weather Service, **when two hurricanes or cyclones spinning in same direction** are brought close together, they **begin an intense dance around their common centre** which is called **Fujiwhara effect**.
- It can **cause formation of mega cyclone** causing large scale destructions.
- It was **observed for the first time over western Pacific Ocean**, when typhoons Marie and Kathy merged in 1964. And was **first Identified by Sakuhei Fujiwhara in 1921 in Japan**

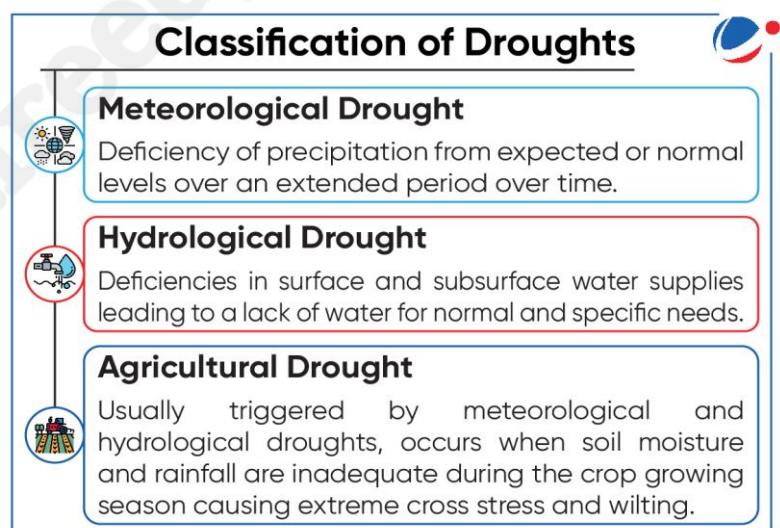
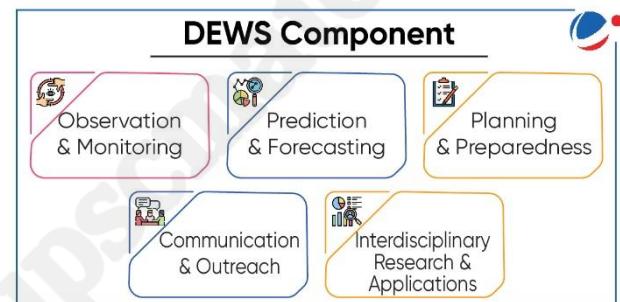
5.8. DROUGHT EARLY WARNING SYSTEM (DEWS)

Why in the News?

According to the data from the Drought Early Warning System (DEWS), **30% of India's land area experienced different degrees of drought** in September 2023.

Drought Early Warning System (DEWS)

- **India's first real-time drought-monitoring platform**
- Run by the Water and Climate Lab of **IIT Gandhinagar**.
- A **network of regional and national partners** that share information and coordinate actions **to provide accurate, timely, and integrated information** at the relevant spatial scale.
- Identifies **drought** based on the **Standardised Soil Moisture Index (SSI) and Standardised Precipitation Index (SPI)**.
 - **Soil moisture drought** is indicated by **SSI**- shows the **amount of water available to plants**.
 - **SPI**, based on **rainfall data**, is a tool used to indicate **meteorological drought**.



- As per DEWS, August 2023- driest August since 1901 when record-keeping began.

Drought Monitoring in India

- NADAMS (National Agricultural Drought Assessment and Monitoring System) provides **near real-time information** on prevalence, severity level and persistence of agricultural drought at state/ district/sub-district level.
- FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land based observations) project for crop production, forecasting of field crops.
- Satellite data from ISRO to monitor various drought related indicators.

About Drought

- A prolonged dry period in the **natural climate cycle**.
- According to IMD, a **drought year** is where:
 - Rainfall deficiency is greater than 10% of the Long-Period Average (LPA)** value and
 - More than 20% of the area is affected** by moderate or severe drought conditions or a combination of both.
- Over **68% of cropped areas in India are vulnerable** to drought.

5.9. ENNORE OIL SPILL

Why in the News?

Oil spill occurred in Ennore region of Chennai after cyclone Michaung-induced floods.

About Oil Spill

- Release of a liquid petroleum hydrocarbon into environment, especially marine areas.
- Causes of Oil Spills:** Equipment breaking down due to human errors; deliberate acts by illegal dumping natural disasters like hurricanes, etc.
- Impacts of oil spill**
 - Destroys insulating ability of fur on mammals and impacts water repelling qualities of a bird's feathers.
 - Impacts immune system and reproduction of **dolphins and whales** by oil inhalation.
 - Health problems like **heart damage, immune system effects**, headache due to strong odour, skin irritation, etc.
 - Obstruct passage of sunlight into sea, thereby destroying photosynthesising phytoplankton.
 - Impacts mangrove forests as they can no longer shield coastlines.
- Bio remediation technology developed in India for Oil spills**
 - Oilzapper (developed by TERI)**, an eco-friendly technique of using the bacteria to get rid of **oil sludges and oil-spill**.
 - Oilivorous-S** (jointly developed by TERI and Indian Oil Corporation Ltd) has an **additional bacterial strain** that makes it **more effective against sludge and crude oil with high-sulphur content**.



Related news: National Oil Spill Disaster Contingency Plan (NOSDCP)

- Director General of Indian Coast Guard (ICG) chaired 25th meeting of NOSDCP in Gujarat's Vadinar coast.
- NOSDCP promulgated by ICG (part of Ministry of Defence) in 1996.
 - Apex plan for responding to oil spill disasters in Indian waters and is applicable to shipping, ports, and oil industries.
 - ICG is Central Coordinating Authority in India for matters related to Oil Spill.
 - Since 2003, NOSDCP has come under purview of National Disaster Management Authority, Ministry of Home Affairs.
- **NOSDCP Objective:** To establish
 - Effective system for detection and reporting of spills;
 - Record-keeping procedures to facilitate recovery of costs; etc.

5.10. OTHER DISASTER RELATED NEWS

News	Details
Cloudburst	<ul style="list-style-type: none"> • Cloudburst is a rain event if 10 cm rainfall is received at a station in one hour. (According to IMD) <ul style="list-style-type: none"> ◦ Extent: It is a localized but intense rainfall activity and usually occurs over a small geographical region of about 20 to 30 sq. km. <ul style="list-style-type: none"> ✓ Cumulonimbus clouds are mainly involved in its occurrence. ◦ Vulnerable Regions: Himalayas, the Western Ghats, and the northeastern hill States of India (due to terrain and elevation). <ul style="list-style-type: none"> ✓ Cloud bursts do occur at plains. • Occurrence <ul style="list-style-type: none"> ◦ Via orographic lift: When an air mass is forced from a low elevation to a higher elevation as it moves over rising terrain. ◦ Rain fails to fall down in a steady shower: Causes excessive condensation in the clouds as new drops form and old drops are pushed back into it by the updraft.
Avalanche	<ul style="list-style-type: none"> • Tourists were killed after an avalanche struck the Gangtok-Nathu La road in Sikkim. • Avalanche: A mass of material moving rapidly down a slope which begins when an unstable mass of snow breaks away from a slope. • Types: Rock avalanches (consist of shattered rock), ice avalanches (occur in the vicinity of a glacier), and debris avalanches (contain unconsolidated materials, e.g., loose stones and soil).
National Institute of Disaster Management (NIDM)	<ul style="list-style-type: none"> • NIDM recently got global recognition as 'centre of excellence' on landslide disaster reduction for the period 2023-2026. • A statutory organisation under the National Disaster Management Act 2005 (under Ministry of Home Affairs). • Tasked with human resource development, capacity building, training, research, documentation, and policy advocacy in the field of disaster management. • Union Home Minister is President of NIDM.

5.11. INSTITUTIONS/ORGANIZATIONS IN NEWS

5.11.1. UN OFFICE FOR DISASTER RISK REDUCTION (UNDRR)

- **Genesis:** Established in 1999.
- **Mandate:** To facilitate the implementation of the International Strategy for Disaster Reduction (ISDR).
- **Other information:** Tasked to support the implementation, follow-up and review of the Sendai Framework (2015-2030) and coordinates action within the UN system around disaster risk reduction.

Report	Observations
“2023 Global Survey Report on Persons with Disabilities and Disasters”	<ul style="list-style-type: none"> Survey aimed to understand the progress made in disability inclusion in DRR. It is follow-up to the 2013 Global Survey. <ul style="list-style-type: none"> Shows limited progress in disability inclusion over past 10 years, with no significant differences across the regions. Sendai Framework for DRR 2015–2030 was first of the major 2015 development frameworks. <ul style="list-style-type: none"> Recognizes Persons with Disabilities (PwDs) as contributing stakeholders, and emphasizing the need for their inclusion in all DRR policies and practices. DRR is the concept and practice of reducing disaster risks through systematic efforts to analyse and reduce causal factors of disasters.
Global Assessment Report on DRR 2023 (GAR- DRR 2023)	<ul style="list-style-type: none"> Theme of report is “Mapping Resilience for Sustainable Development Goals”. Key highlights of report Number of recorded disasters has increased fivefold over past 50 years. Global best practices for resilience include India’s Heat action plans in cities to deal with heatwaves; Sahel’s Great Green Wall to counteract desertification etc.



ENGLISH MEDIUM
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- ☞ 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, 2023 to April, 2024
- ☞ Live and online recorded classes that will help distance learning students and who prefers flexibility in class timing

One Year CURRENT AFFAIRS

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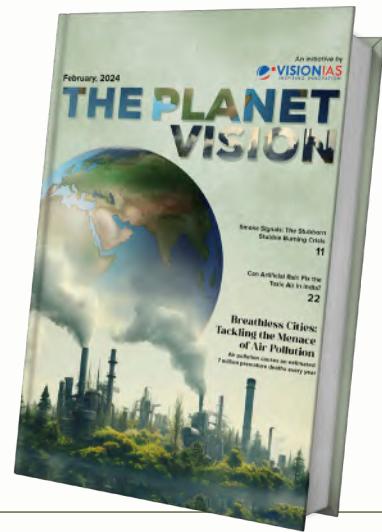




THE PLANET VISION

In a world facing unprecedented environmental challenges, staying informed and empowered is more crucial than ever. **VisionIAS** brings you '**The Planet Vision**', a simplified, informative, and interactive magazine to delve into the complexities of the environment.

With the belief, that individual efforts and awareness are the key to a sustainable future, the magazine seeks to inspire and educate people to **develop a deeper understanding and appreciation for the environment, nature & planet.**



Objectives of 'The Planet Vision'



Sensitise the young generation: Highlighting pressing environmental issues and their multifaceted impacts.



Inspire Action and Promote Sustainable Lifestyle: Inspiring stories and case studies to motivate readers to make environmentally conscious choices.



Bridge Environmental Science and Public Understanding: Presenting complex scientific concepts in a simple and interactive manner.



Showcase Solutions: Spotlight innovative technologies, projects, and initiatives that offer solutions to environmental challenges.



Highlight Local Efforts: Showcase local conservation efforts, community initiatives, and grassroots projects that make a positive impact on the environment.

Who is the magazine for?

The Magazine is designed for students, eco-conscious individuals, educators, environmentalists, and anyone who cares about the health of our planet.

Key elements of the 'The Planet Vision'



Cover Stories: Thought-provoking articles about a critical ongoing environmental issue, along with the mitigation strategies adopted at the national and international levels.



Briefing and Developments: Stay informed about the latest environmental news, trends, and solutions.



Protect and Preserve: Inspirational stories of local conservation efforts.



Environment and You: Illustrating ways to make environmentally conscious choices in everyday life.



Green Tech: New and emerging technologies in the field of environment.



Interactive elements:

- Snapshot:** Telling a story through capturing images.

- Quizzes and crosswords:** To test your understanding and knowledge as a reader.

“

Look deep into nature, and then you will understand everything better. ”

-Albert Einstein



Scan the QR code, to download and read the Magazine:

6. GEOGRAPHY

6.1. EL NIÑO SOUTHERN OSCILLATION (ENSO)

Why in the news?

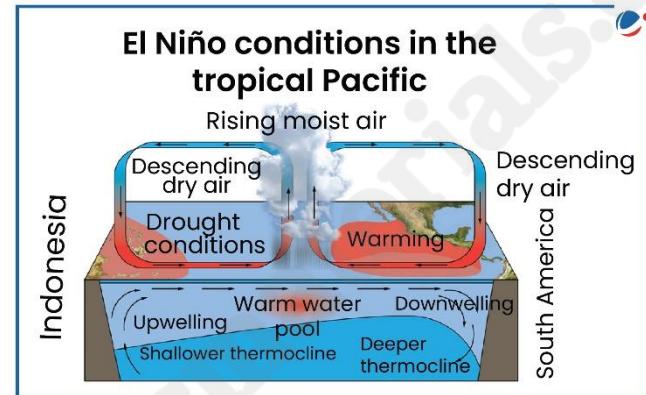
Nature's Scientific Report revealed the **regional and temporal variability of Indian summer monsoon** in relation to El Niño southern oscillation (ENSO).

About ENSO

- A single climate phenomenon
- Characterised by **the periodic warming and cooling of sea surface temperatures in the central and eastern tropical Pacific Ocean.**
- Has 3 phases:
 - **El Niño** (Occurs every 2-7 years): Associated with **the warming of the ocean surface temperatures in the central and eastern tropical Pacific Ocean.**
 - ✓ **Impacts:** Deficient rainfall over Indian subcontinent and Asia, rise in global monthly mean ocean temperatures
 - **La Niña:** Cooling of ocean surface or below-average sea surface temperatures (SST), in central and eastern tropical Pacific Ocean.
 - ✓ **Impacts:** Enhances monsoon rainfall.
 - **Neutral:** Neither El Niño nor La Niña

El Niño-monsoon relationship

- **Inverse relationship between ENSO and Indian monsoon rainfall.**
- **El Niño-monsoon connection:**
 - Strengthened from moderate to strong during 1901-1940
 - Remained stable until 1980 & consistently weakened from 1981-2018.
- **Reasons for weakening trend**
 - Increased surface **warming over Eurasia**
 - Strengthening and **pole ward shift of the jet streams** over the North Atlantic
 - Increased **GHG** concentration
 - **Shift in the surface wind circulation pattern** over the Indo-Pacific region.
- Location of the El Niño event within the Pacific Ocean also affects Indian monsoon.
 - **Warming in the central Pacific Ocean has more pronounced influence** than warming in the eastern Pacific Ocean.
 - **El Niño** induces a subsidence or downward movement of air, which in turn acts to suppress monsoon rainfall.
- **Other factors that affect Indian summer monsoon rainfall -**
 - **Indian Ocean Dipole (IOD)**
 - **Pacific Decadal Oscillation (PDO)**
 - **Atlantic Meridional Oscillation (AMO)**
 - **Atlantic Zonal Mode (AZM)**



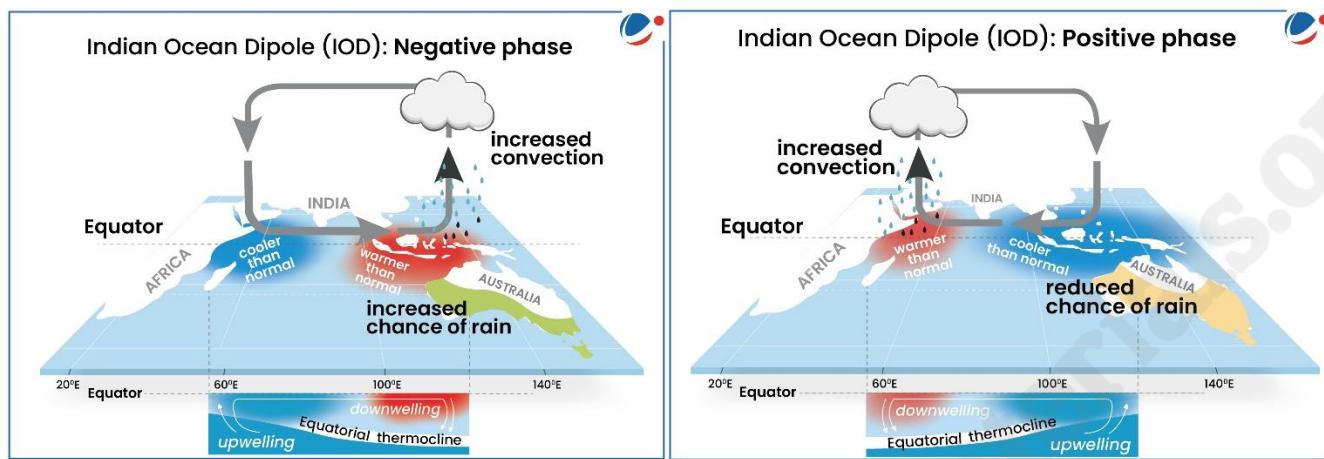
6.2. INDIAN OCEAN DIPOLE (IOD)

Why in the news?

As per UN Office for the Coordination of Humanitarian Affairs (UNOCHA), El Niño and a **positive IOD** are associated with **above-normal rains and flooding**.

About IOD

- Refers to the **difference in sea surface temperature** between the **eastern and western sides of the Indian Ocean**.
- Also known as **Indian Nino**.
- Has **3 phases**:
 - Positive:** Western side is **warmer** than the eastern side.
 - Helps rainfall along **Indian subcontinent** and **African coast** while **suppresses rainfall** over **Indonesia, Southeast Asia and Australia**.
 - Negative:** Cooler western side and warmer eastern side.
 - Results in greater precipitation in **Australia** and drier conditions in **East Africa**.
 - Neutral:** Temperatures **close to normal** across the Indian Ocean.
- IOD has a link with **El Nino Southern Oscillations (ENSO)** through an **extension of the Walker Circulation** (air flow in equatorial Pacific) to the west and associated warm water flow from Pacific to Indian Ocean.



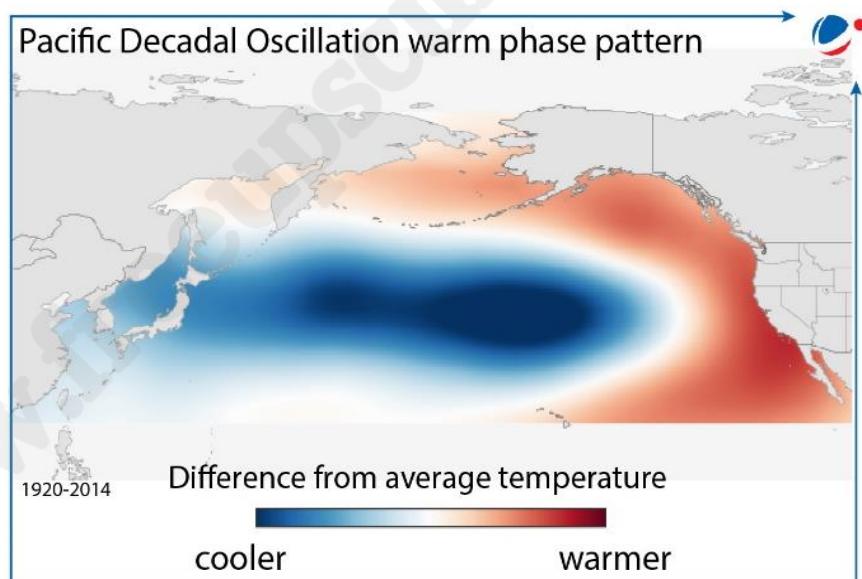
6.3. PACIFIC DECADAL OSCILLATION (PDO)

Why in the news?

As per a study, a combination of **global warming and the Pacific Decadal Oscillation (PDO)** could make **cyclones more frequent**.

About PDO

- Refers to long-term ocean fluctuation in **Pacific Ocean**.
- 2 phases:**
 - Cool or Negative Phase:** Lower than normal **sea-surface heights/ocean temperatures** in the **eastern equatorial Pacific**.
 - And a warm **horseshoe pattern** of higher-than-normal **sea-surface heights** connecting the **north, west and southern Pacific** (refer to image).
 - Warm or positive phase:** West Pacific Ocean becomes cool and the wedge in the **east warms**.
- Waxes and wanes approximately every 20 to 30 years.
- However, in the **recent time**, the '**warm**' and '**cold**' phases have been much shorter.



Relationship between PDO, ENSO and global warming

- **Negative PDO along with La Niña phase:** Creates suitable condition for the tropical cyclones.
 - PDO entered a **cooler or negative phase in 2019**.
 - If it remains so, it could mean **more tropical cyclones** in the **post-monsoon months** that originate near the equator.
- **PDO event can go hand-in-hand with impacts of ENSO:** Associated **impacts can be amplified if both phenomena in same phase.**
 - ENSO (El Niño phase) with a **positive PDO** generally **not good for the Indian monsoon**.
- **Negative phases of PDO linked to times of slower warming:**
 - Tend to increase mixing of colder, deep ocean waters with warmer surface waters. R
 - Reduces the rate of **global warming** caused by increasing greenhouse gas emissions.

6.4. GEOLOGY OF HIMALAYAS

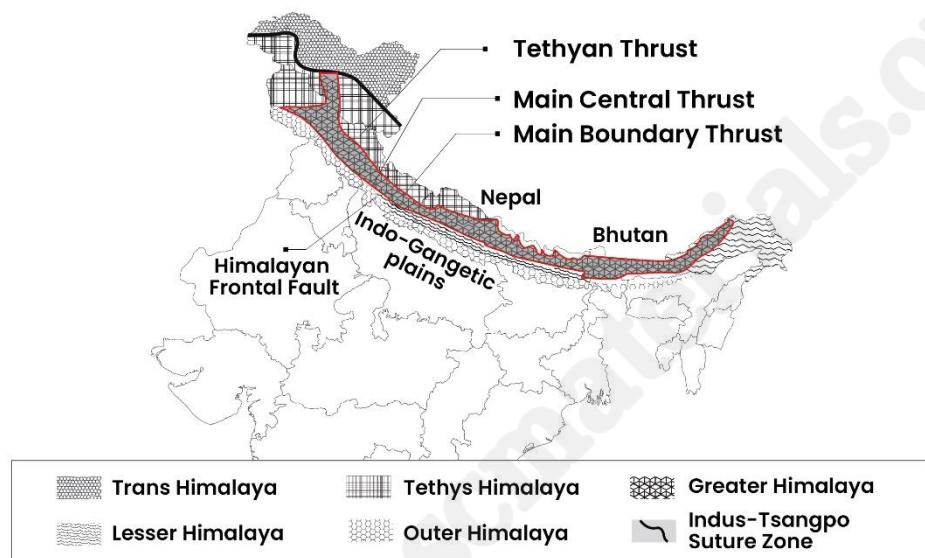
Why in the news?

Jammu & Kashmir and Ladakh hit by **several mild-intensity** earthquakes within 24 hours.

Reasons for Earthquake

- **Ongoing collision of Indian tectonic plate with Eurasian plate.**
 - Indian plate is diving under (subduction) the **Eurasian plate** in north-northeast direction.
- **Geology of the Himalayas** on its southern side is **characterised by three major tectonic units:**
 - **Main Central Thrust (MCT)**
 - **Main Boundary Thrust (MBT)**
 - **Himalayan Frontal Thrust (HFT) or Main Frontal Thrust (MFT).**
- There is **about 700 km stretch in Central Himalayas** where **MFT has shown no sign of any rupturing** for several centuries, which is referred to as "**Central seismic gap**".
 - **Seismic gap regions:** High risk areas for large earthquakes in the future.

Major Faults in Himalayas



About Main Central Thrust (MCT)

- **Highest and oldest Thrust.**
- A north-dipping fault and marks **tectonic contact between higher and lesser Himalayas**.
 - Lesser and sub-Himalayas are separated by MBT, and HFT constitutes southern-most and youngest thrust.
 - In the current era, **both MBT and HFT faults are considered more active** compared to MCT.
- All these three faults **conjoin along basal detachment plane**—called décollement in geophysical language—called Main Himalayan Thrust (MHT).

6.5. WATER, ICE, SOCIETY, AND ECOSYSTEMS (WISE) REPORT

Why in news?

The International Centre for Integrated Mountain Development (ICIMOD) released Water, Ice, Society, and Ecosystems (WISE) report for the Hindu Kush Himalaya (HKH).

More on News

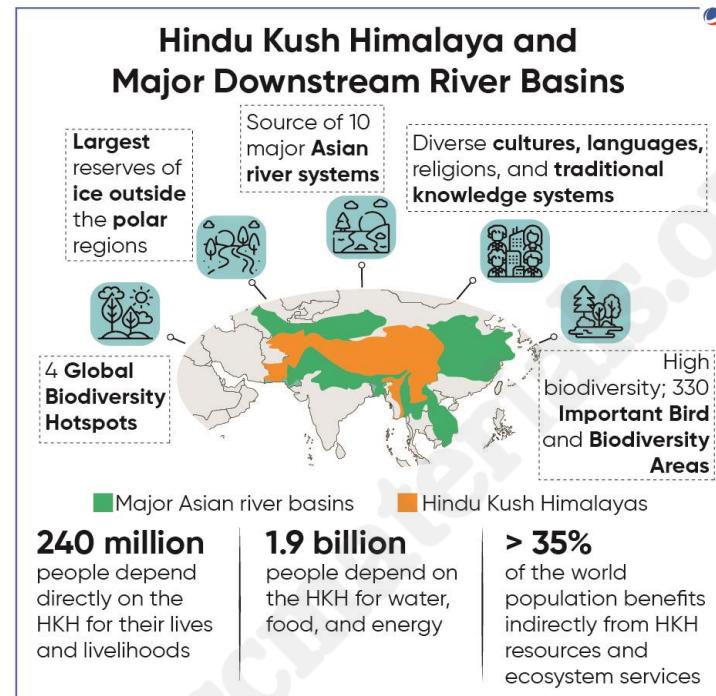
- Report highlighted impacts of climate change on HKH:
 - Glaciers disappeared 65% faster in the 2010s** than in the previous decade.
 - With accelerated glacier melt, '**peak water**' (stage in which the supply of fresh snow water due to glacier melt will be the highest ever) will be reached around mid-century and then is expected to decrease by the end of the century.

About ICIMOD

- An intergovernmental knowledge and development organization (established in 1983)
- Focuses on climate and environmental risks, green economies, and sustainable action.
- Members:** Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan

About Hindu Kush Himalayan (HKH) region

- Spans an area of approximately 4.3 million square km in **Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan**.
- Hosts world's highest peaks like **Mount Everest** and **Kanchenjunga**.
- Known as 'Third Pole or Water Tower of Asia' as it holds largest ice reserves outside of polar regions.
- Has **young and rising mountains**, highly vulnerable to multiple hazards such as earthquakes and landslides.



Related News: Building Adaptation and Resilience in the Hindu Kush Himalayas Initiative

- Asian Development Bank (ADB) launched the "Building Adaptation and Resilience in the Hindu Kush Himalayas Initiative".
- It was result of shared commitment and strong collaboration between **ADB, Nepal, and Bhutan**.
- Initiative will combine **cutting edge risk assessment and risk management tools**, such as insurance and risk transfer, to help guide investment decisions for large scale infrastructure.

6.6. ATLANTIFICATION

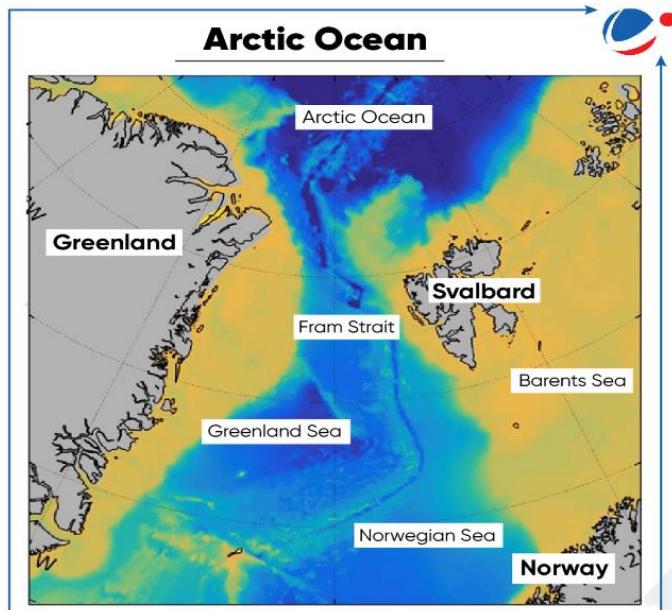
Why in the News?

Atlantification is making the Arctic Ocean saltier and warmer.

About Atlantification

- Process wherein **warm water from Atlantic is being advected into Arctic Ocean in increasing amounts**.
- Makes parts of Barents Sea to more closely resemble the Atlantic.

- **Normal Situation**
 - Top of the Arctic Ocean covered by sea ice.
 - Below this, a layer of freshwater, followed by a deeper layer of warmer, saltier water gets delivered to Arctic from Atlantic.
 - Layers are held intact due to differences in water salinity, protecting sea ice from being melted by incoming warm water from Atlantic.
- However, rapid decline in arctic ice covers causes the oceans to mix together driving Atlantification.
 - Once sparked, Atlantification causes further melting of sea ice leading to more Atlantification.
- **One of the reasons:** Process called Arctic Dipole
 - Associated with anticyclonic winds over North America and cyclonic winds over Eurasia which alternates in an approximately 15-year cycle.
- Positive phase of Arctic Dipole contributes to slowing Arctic sea-ice loss whereas negative phase accelerates sea-ice decline.



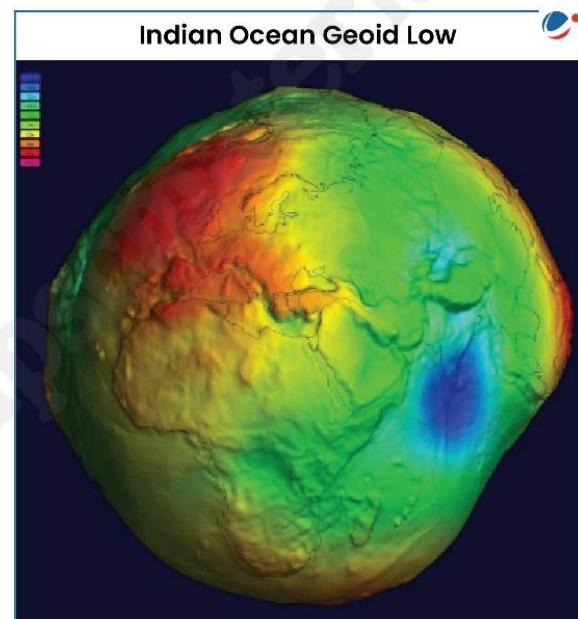
6.7. INDIAN OCEAN GEOID LOW (IOGL)

Why in the news?

Researchers from IISc, Bengaluru have identified the cause of an over three million square kilometres-wide 'gravity hole' - Known as the Indian Ocean Geoid Low (IOGL).

About IOGL

- **Geoids:** Anomalies on Earth's undulating map.
 - Earth is not a true sphere and is flatter on poles and bulges along equator.
 - Leads to variation in gravitational pull making earth's shape irregular.
- **Location of IOGL:** Just south of Sri Lanka.
- **Earth's gravitational pull is weakest at this point.**
- Sea level here is 100 metres lower than global average.
- **Cause:** Plumes of molten rock rising along the edges of Tethys Ocean bed.
- **Called lowest geoid anomaly on Earth.**
- **Process:**
 - Hot material from African super plume (Earth's mantle) carries heat from near the core to the crust which gets deflected eastwards.
 - Lighter elements in upper to mid-mantle under IOGL leads to low gravity in this area.



6.8. AURORA

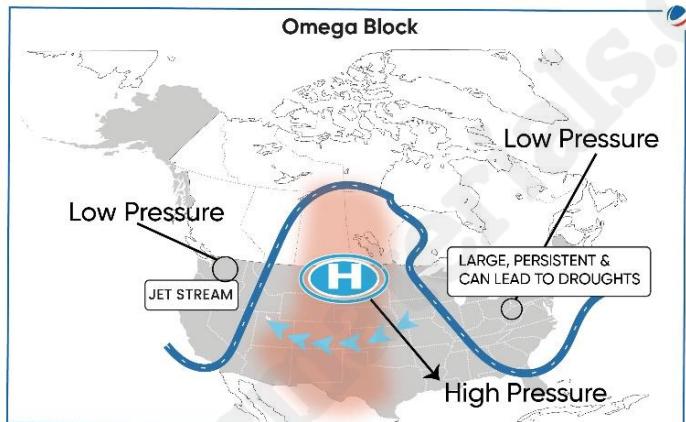
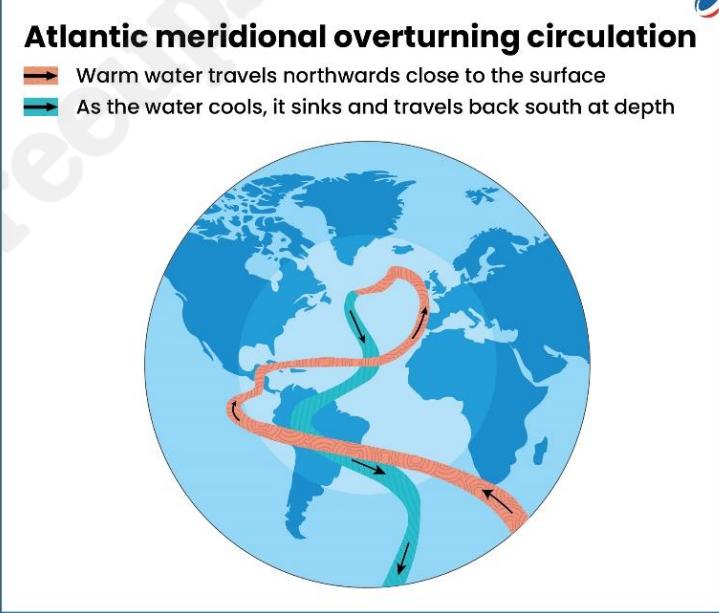
Why in the News?

The Indian Astronomical Observatory (IAO) situated at nearly 14,800 feet above sea level at **Mount Saraswati in the Hanle Valley of Changthang, Ladakh** successfully documented rare Aurora phenomenon.

About Aurora

- Patterns of bright lights in the sky caused by **Geomagnetic storms**.
- Seen when **particles ejected by the Sun (during coronal mass ejection) interact with the magnetic field around the Earth**.
- **Usually visible near poles**.
- Occur at any time of the day but can't be seen with the naked eye unless it's dark.
- Shape of Earth's magnetic field creates **two auroral ovals**:
 - Northern lights (**aurora borealis**) in Northern Hemisphere
 - Southern lights (**aurora australis**) in Southern Hemisphere
- **Conditions for Aurora light:** A Clear Sky, No Clouds, Total darkness.
- **About IAO: India's only dark sky reserve-** An area where measures are taken to reduce artificial light pollution to observe sky at night.

6.9. OTHER TERMS IN NEWS

Terms	Details
Omega Blocking	<ul style="list-style-type: none"> • Study says, recent floods in the Mediterranean regions were caused by low-pressure systems forming around an Omega Block centred over the Netherlands. • Omega block resembling Ω occurs when two low-pressure systems become cut off from the main flow of the jet stream, sandwiching a high-pressure system between them. • It is also linked to other extreme events such as Pakistan floods, heatwaves in France & Germany. 
Atlantic Meridional Overturning Circulation (AMOC)	<ul style="list-style-type: none"> • Study says AMOC will collapse with 95% certainty between 2025 and 2095. • AMOC: System of ocean currents in the Atlantic Ocean that circulates heat from the tropics towards the North Pole and disseminates cold, saline, dense waters towards the Tropics and towards the South Pole. <p>Atlantic meridional overturning circulation</p> <p>→ Warm water travels northwards close to the surface ← As the water cools, it sinks and travels back south at depth</p> 

	<ul style="list-style-type: none"> • Consequences of slowing AMOC: <ul style="list-style-type: none"> ○ Rise in Sea level rise across the U.S. East Coast. ○ Cooling of the northern hemisphere ○ Decreased rainfall over Europe
Blue Hole	<ul style="list-style-type: none"> • Scientists have uncovered blue hole (known as Taam Ja /deep water) off the coast of the Yucatan Peninsula in Mexico. ○ Yucatan Peninsula is located in Central America, separating the Gulf of Mexico and the Caribbean Sea and includes parts of Mexico, Guatemala and Belize • Blue Hole: Massive underwater sinkhole • Considered hotspots of microbial biodiversity. • Believed to be formed in the Ice Age (sea level was 100–120 m lower than current levels). • Get their names from their indigo centers and light blue perimeters. • Deepest blue hole on earth: Dragon Hole or Longdong in the South China Sea.
Ureilite	<ul style="list-style-type: none"> • As per a study Dhala crater of Madhya Pradesh was result of collision of a meteorite, called Ureilite. • Ureilites are a rare class of primitive meteorites present on Earth. • Consist of silicate rock, mostly olivine and pyroxene, carbon (diamond or graphite), metal sulphides. • Meteor impact craters in India also found in Ramgarh (Rajasthan) and Lonar (Maharashtra).
Khazan Land	<ul style="list-style-type: none"> • NGT highlighted the failure of authorities to follow environmental rules for construction on Khazan land. • Khazan Land <ul style="list-style-type: none"> ○ Coastal wetlands of Goa and is a low-lying, saline water-logged area influenced by tidal flows. ○ Acts as main drainage system for floodwater. ○ Reclaimed from mangrove forest through an intricate system of dykes, sluice gates and canals. ○ Uses in agriculture, aquaculture and salt panning.
Diel Vertical Migration (DVM)	<ul style="list-style-type: none"> • DVM is synchronised movement of deep-sea marine animals up and down in oceanic water column over a daily cycle. • Free-floating zooplanktons swim up to food-rich surface waters at night to feed when light is scarce and they are “hidden” from predators and return to the depths before sun rises. • DVM plays a pivotal role in sequestering carbon where animals remove substantial amounts of carbon from Upper Ocean as they feed on surface-dwelling plankton and carry carbon with them when they return to deeper waters.
Katabatic and Anabatic winds	<ul style="list-style-type: none"> • Study says Katabatic winds play a role in cooling Himalayas. • Katabatic winds: Cool, denser air moving downhill due to gravity. • Affects local climates, even reducing humidity in the air and blowing away snow. • Anabatic wind: Warm wind that blows up a mountain slope due to a warmer temperature on mountain slope compared to the temperature in air column influencing cloud formation and precipitation patterns.
Chilla-i-Kalan began in Kashmir	<ul style="list-style-type: none"> • Chilla-i-Kalan is a Persian term that means ‘major cold’ (40 days) of harsh winter in Kashmir. <ul style="list-style-type: none"> ○ Followed by Chillai Khurd or small cold (20 days) 10-day-long ‘Chillai Bacha’ or baby cold (10 days).
Winter solstice 2023	<ul style="list-style-type: none"> • It occurs on December 22, the shortest day occurs when direct sunlight hits the Tropic of Capricorn in the southern hemisphere.

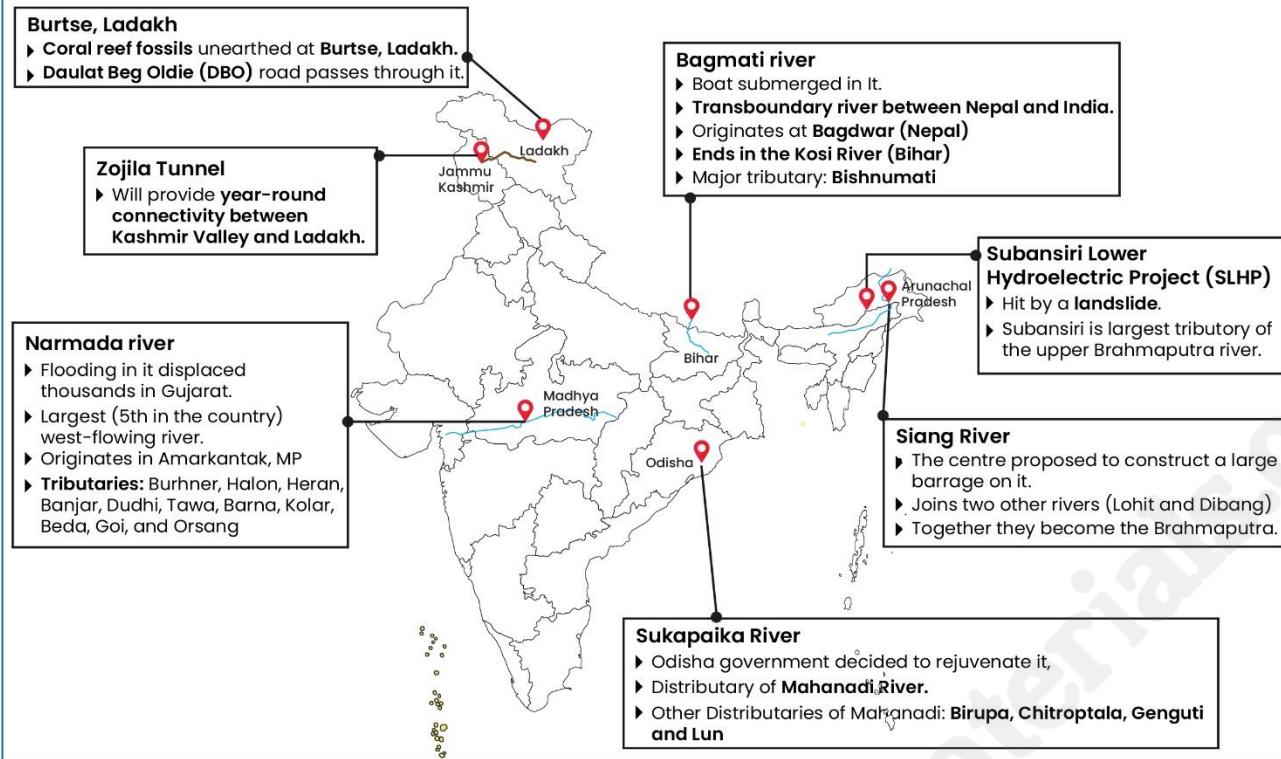
	<ul style="list-style-type: none"> • Earth's 23.5-degree tilt along with its spin, and orbit cause sunlight duration variations at different locations throughout the year. • Leads to- <ul style="list-style-type: none"> ○ Equinox: When sun is directly over the equator and it occurs on - 21 March and 23 September. ○ Solstice: Two types-Winter and Summer Solstice • Summer Solstice occurs on 21st June when direct sunlight is over the Tropic of cancer in the Northern hemisphere. 	
Phreatomagmatic eruptions	<ul style="list-style-type: none"> • A new island emerged Off Japan after an underwater volcano eruption near Iwoto Island in the western Pacific. • Scientists said it was formed due to phreatomagmatic eruptions. • They are hazardous eruption in which both magma and water interacts explosively, leading to concurrent ejection of steam and pyroclastic fragments. 	
E Prime layer	<ul style="list-style-type: none"> • Study says a new layer called "E prime layer" at the outermost part of Earth's core is a result of surface water penetrating deep into the planet which alters the composition of the metallic liquid core's outermost region. • Research suggests that tectonic plates carrying surface water have transported it deep into the Earth over billions of years. • This led to the formation of a hydrogen-rich, silicon-depleted layer at the outer core. 	
Ring of fire	<ul style="list-style-type: none"> • Ring of fire will occur on the upcoming solar eclipse in October. • During an Eclipse when the moon obstructs the sun but does not fully cover the disk of the sun, leaving a thin outer ring often called a "ring of fire." <ul style="list-style-type: none"> ○ Solar Eclipse occurs when the moon travels between Earth and the sun, obstructing the view of the sun's face. <p>Note: The concept is different from the Ring of Fire (Circum-Pacific Belt) characterized by active volcanoes and frequent earthquakes.</p>	
Sundargarh Natural Arch	<ul style="list-style-type: none"> • The Arch has been awarded the 'Geo Heritage tag' by Geological Survey of India • It is a geological feature located in the Chhengapahar Reserve Forest of Odisha • To be the biggest natural arch of the country (Height 30m) to receive the Geo Heritage tag. • Geo Heritage Tag: Sites of rare and unique geological, geo-morphological, mineralogical significance, including caves and natural rock sculptures of national and international interest. <ul style="list-style-type: none"> ○ Declared by Geological Survey of India 	
Magnetospheric substorm	<ul style="list-style-type: none"> • Study of energetic ion variations during magnetospheric substorm intervals can help improve accuracy of space weather forecasting. • Magnetospheric substorm: A short-lived process in which a portion of the energy, extracted by interaction between solar wind and Earth's magnetosphere, is released. 	

	<ul style="list-style-type: none"> • Depends on Interplanetary Magnetic Field (IMF), solar wind velocity, and on solar wind dynamic pressure. • Average duration: about 2-4 hours. • Southward direction of IMF is a necessary prerequisite for substorm occurrence
Groundwater Extraction Tilted Earth's Spin	<ul style="list-style-type: none"> • A study has found that Groundwater pumping has tilted the planet nearly 80 centimetres east between 1993 and 2010 alone. • Planet's geographic north and south poles, where its axis intersects the surface, are not fixed. • The axis and hence the poles fluctuate due to variations in Earth's mass distribution.
Shelf Cloud	<ul style="list-style-type: none"> • A shelf cloud was recently witnessed in Uttarakhand. • Shelf clouds: Also known as Arcus clouds • Often associated with powerful storm systems and are often reported as wall clouds, funnel clouds, or rotation. • Sometimes seen beneath cumulonimbus clouds, the dense, towering vertical clouds that cause intense rain. • Formed when a cold downdraft from a cumulonimbus cloud reaches the ground; the cold air may spread rapidly along the ground, pushing existing warm moist air upwards. <ul style="list-style-type: none"> ○ As this air rises, water vapour condenses into the patterns associated with shelf clouds.
Homo naledi	<ul style="list-style-type: none"> • New evidence suggests that Homo naledi, an extinct human species, may have buried their dead and carved meaningful symbols in a cave. <ul style="list-style-type: none"> ○ The burials are older than any known Homo sapiens burials by at least 100,000 years. • Features of Homo naledi <ul style="list-style-type: none"> ○ Walked fully upright and had hands that were similar to ours. ○ Shoulders were built for climbing. ○ Teeth were shaped like that of older primates. ○ Brain size was just one-third of that of modern humans. • Humankind's earliest ancestors: Ardipithecines, Australopithecines, Homo habilis, Homo ergaster/erectus, Homo neanderthalensis, Denisovans
Sun Halo/22-degree Halo	<ul style="list-style-type: none"> • Sun halo was witnessed in North India. • About Sun Halo: Multi-colored ring that appears like a rainbow circling the star. • Also called 22-degree halo (as radius of the circle is always ~22 degrees). • Formation: <ul style="list-style-type: none"> ○ Refraction/bending when sunlight enters the ice crystals in the thin cirrus clouds. ○ Causes the sun's rays to separate into their component colours (because of dispersion), creating a spectrum which is visible as halo. • Conditions: Crystals oriented and positioned with respect to one's eye. • Used for weather forecasting in earlier times.
Argoland	<ul style="list-style-type: none"> • Researchers have discovered Argoland, a landmass that detached from western Australia 155 million years ago. • Considered to be an integral part of the supercontinent Gondwana. • Lost due to the tectonic pressure which stretched the landmass and drove it away spreading it over Southeast Asia. • Dispersed parts have formed various archipelagos of the Southeast Asia.

6.10. PLACES IN NEWS

6.10.1. GEOGRAPHICAL FEATURES (INDIA)

Places and Rivers in News: India



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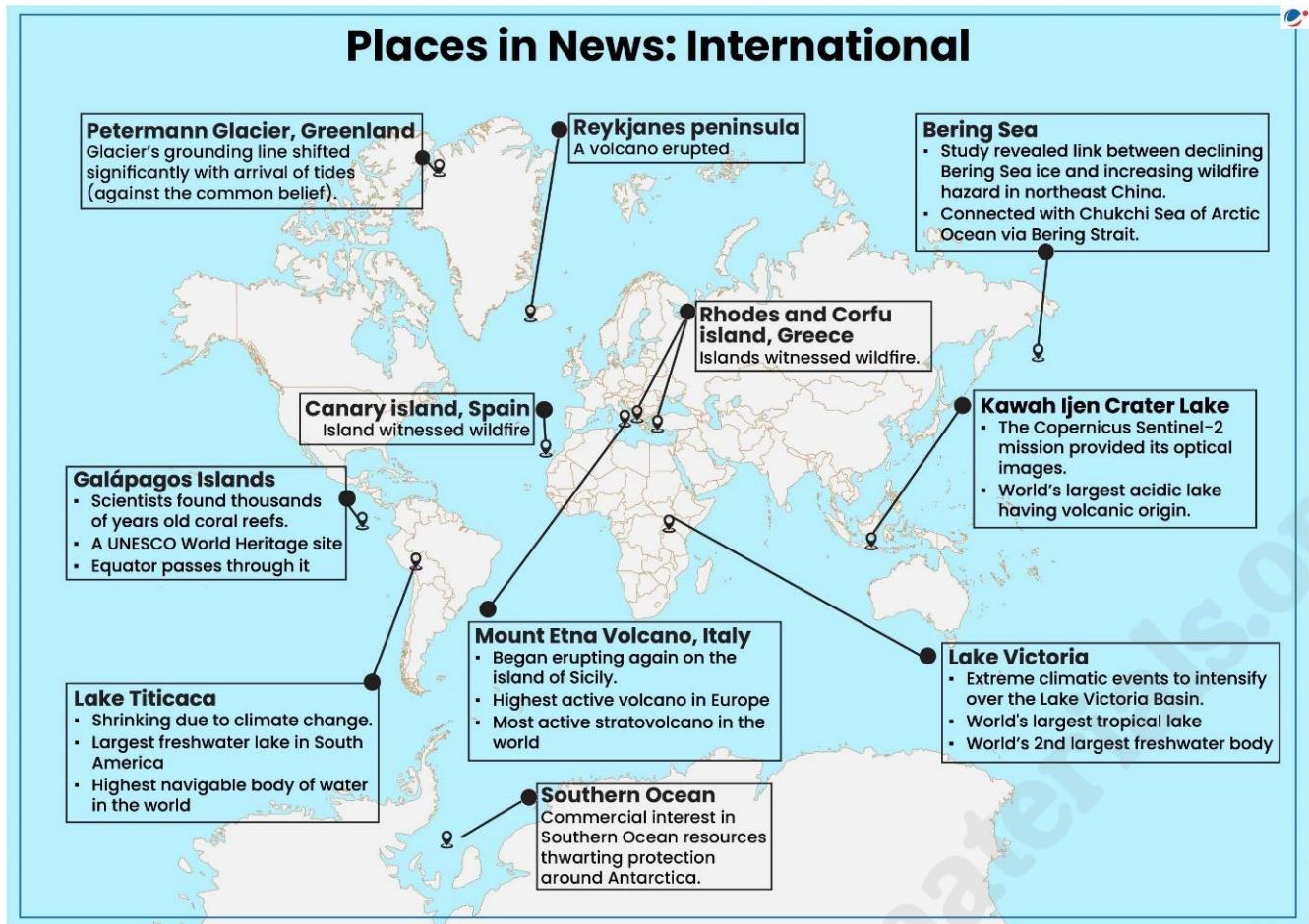
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improvement



Interactive session with Toppers and Bureaucrats
for preparation insights and motivation

6.10.2. GEOGRAPHICAL FEATURES (INTERNATIONAL)

Places in News: International



6.10.3. COUNTRIES IN NEWS

Countries in News



Vanuatu (Capital: Port-Vila)

- UNGA adopted a resolution proposed by Vanuatu to seek an opinion from the International Court of Justice (ICJ) to protect climate systems and people affected by climate change.



Dominica (Capital: Roseau)

- Announced to create the world's first sperm whale reserve.
- Has world's 2nd largest hot spring lake (Boiling Lake).



Tuvalu (Capital: Funafuti)

- Australia inked an agreement with Tuvalu to offer residency to its citizens **displaced by climate change**.
- Volcanic** in origin and includes both **atolls and reef islands**.



Papua new Guinea (Capital: Port Moresby)

- Relief of \$1 million was announced by India for the volcanic eruption at Mount Ulawun affected people.



Peru (Capital: Lima)

- Lost more than half of its glacier surface in last six decades.



Slovenia (Capital: Ljubljana)

- The 23rd meeting of Barcelona Convention (protection of the Mediterranean Sea against pollution) took place.



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