VISIONIAS
INSPIRING INNOVATION

ENVIRONMENT

Classroom Study Material

(April 2024 to October 2024)

PT 365

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ENVIRONMENT

Table of Contents

Note to Students

Dear Students,

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

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

Summarised Infographics: Topics such as:
- Key concepts and processes related to environment
- Key information of major species.

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

Overview: Provides a brief overview of key facts related to topics such as Plastic pollution, Renewable energy, etc. It will aid in quick revision.

Compilation of Species and Protected Areas: Important Species and Protected Areas that have been in news are covered at the end of the documents for easier reading.

Thumbnails: Pictorial and interactive thumbnails of important information such as:
- Protection status of a species.
- Whether a site is listed under Ramsar Convention.
- Whether a Protected Area is recognised by CA|TS etc.

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

Institutions/Organizations in News: Important information about major Institutions and Organizations has been provided in the form of infographic along with their reports/Indices.

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

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

1. BIODIVERSITY

1.1. WILDLIFE AND CONSERVATION

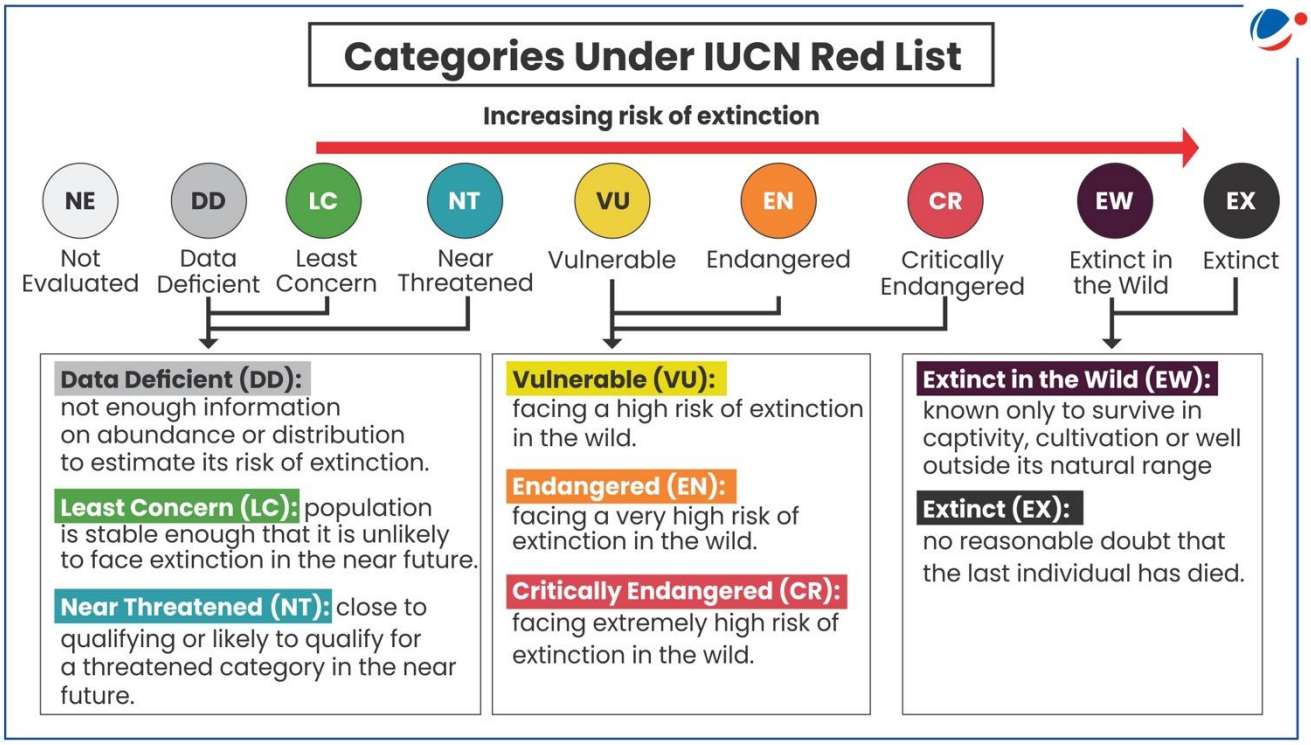
1.1.1. RED LIST OF THREATENED SPECIES

Why in the News?

Recently, IUCN updated its red list of Threatened species.

About red List of Threatened Species

Provides **information about** animal, plant, and fungus species which are at risk of extinction into nine categories. **(Refer to the infographic below).**



Key Updates: Species with Changed Status

Species	Updated status	Location & Other specification
La Gomera giant lizard (Gallotia bravoana)	Endangered (Previously Critically Endangered)	**Canary Island (Spain)**
Copiapoa cacti	82% of species at risk of extinction	**Ornamental Cacti, endemic to** Atacama coastal desert in Chile
Gran Canaria giant lizard	Critically Endangered (Previously Least Concern)	Endemic Reptile in Canary Island **(Spain)**
Gran Canaria skink	Endangered (Previously Least Concern)	In the Canary Islands, Spain
Ibiza wall lizard	Endangered (Previously Near Threatened)	Islands of Ibiza and Formentera (Spain)
Bornean Elephant	Endangered	Smallest Elephant with wider face found in Borneo and Sumatra Island

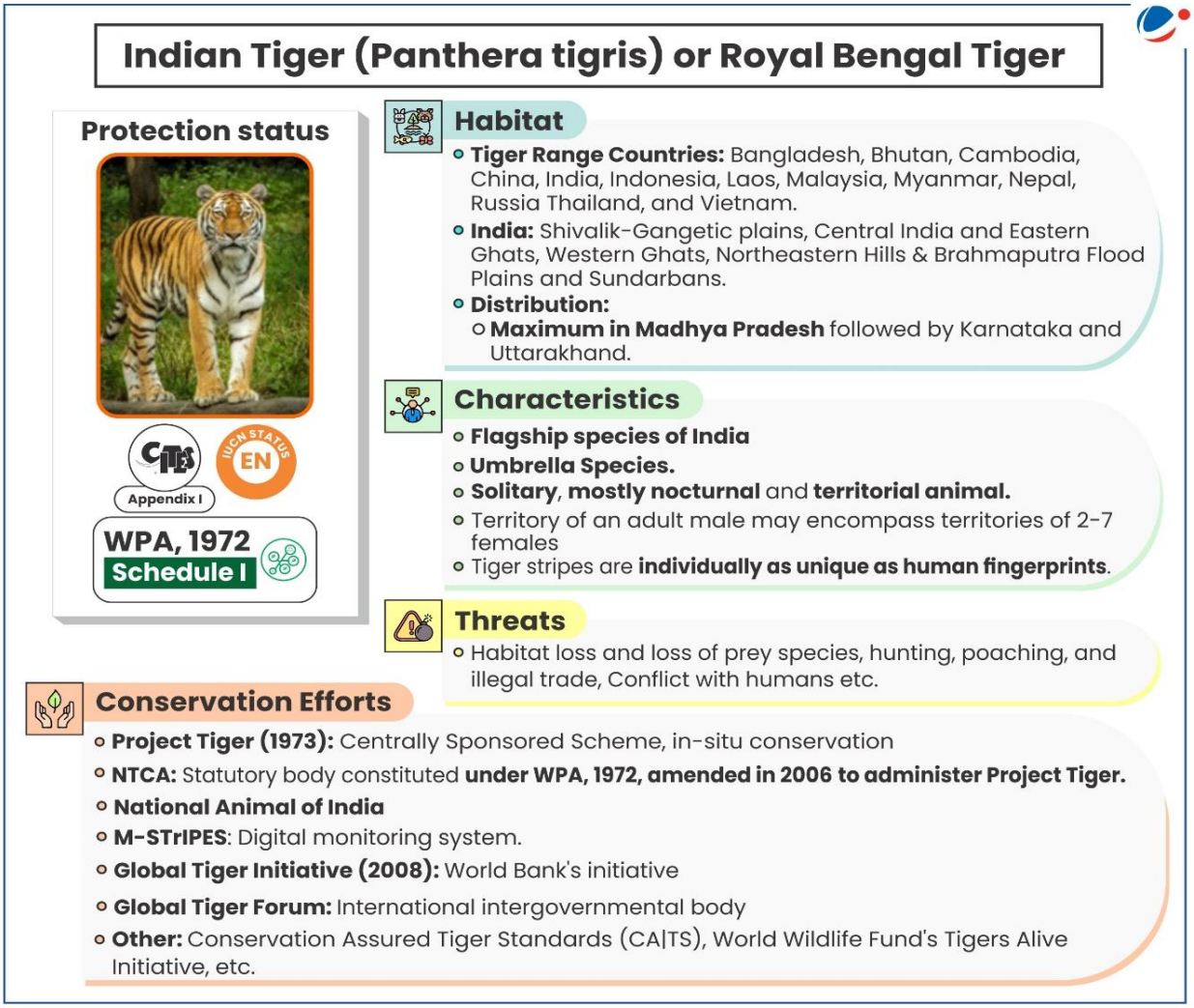
1.1.2. SUSTAINABLE FINANCE FOR TIGER LANDSCAPES CONFERENCE (SFTLC)

Why in the news?

Sustainable Finance for Tiger Landscapes Conference (SFTLC) was hosted by the **Bhutan government** and supported by the **Tiger Conservation Coalition (TCC).**

About SFTLC and TCC

- SFTLC seeks to increase support for **tiger protection and its landscape** by using **new financial strategies** and global partnerships as stated in the **Paro statement.**
  - Seeks to mobilize **US$1 billion** in additional funding by **2034**.
- **Tiger Conservation Coalition is Independent group of organizations** brings together leading biologists and experts in wildlife with focus on achieving tiger conservation.
  - **Members' organizations:** International Union for Conservation of Nature, United Nations Development Programme, the Wildlife Conservation Society, the World Wide Fund for Nature, etc.
- **Sustainable financing initiatives launched in SFTLC-**
  - **Tiger Landscapes Investment Fund**: Presented by the UNDP. Uses **Nature-positive business approach.**
  - **Tiger Bonds:** By the Asian Development Bank to engage private sector investors.



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

Related terms

Tiger Landscape

- It includes large blocks of ecologically connected areas of suitable tiger habitat, currently, they comprise less than 8% of area originally occupied in Asia.
- **Landscapes in India:** Shivalik Hills and Gangetic Plain; North East Hills and Brahmaputra Flood plains; Sundarbans Landscape; Central India & Easter Ghats Landscape; Western Ghats Landscape.

1.1.3. INTERNATIONAL BIG CAT ALLIANCE (IBCA)

Why in the news?

Union Cabinet approved the proposal of India to become a member of IBCA by signing and ratification of the Framework Agreement.

About IBCA

- **Launched**: By India on **50th years of India's Project Tiger** in **2023**.
  - Apart from India, **Nicaragua, Eswatini and Somalia** have also joined.
- **HQ:** India
- **Aim: Strengthen global cooperation** for the **conservation of seven big cat species** (tiger, lion, leopard, snow leopard, cheetah, jaguar and puma) and their habitats.
  - India inhabits all cats except **Puma and Jaguar.**
- **Multi-country and multi-agency coalition:** Participants consist of 95 big cat range countries, non-range countries interested in big cat conservation, conservation partners and related scientific organizations.
  - **All UN member countries are eligible** for becoming the member of IBCA.
  - **Nine International Organizations** have also consented to be partner organization.
- **Funding:** Support of Rs. 150 crores for five years from 2023-24 to 2027-28.

Conservation Status of Big Cats in India

- **IUCN Status: Endangered** (Tiger)**, Vulnerable** (Lion, Cheetah, Snow Leopard, Leopard)**, Near Threatened** (Jaguar) and **Least concern** (Puma)
- **All five big cats in India are listed in** Schedule 1 and 4 of Wildlife Protection Act and **CITES Appendix**

1.1.4. ELEPHANT CENSUS, 2023

Why in the News?

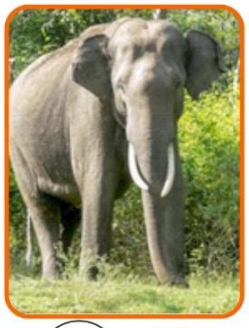
Recently, **synchronized elephant population census 2023** has been done in the Southern States.

Key Findings

- **Karnataka tops among the Southern States** with **over 6000 elephants.**
- **High death rate (40%) among Juvenile elephants** (aged 10 and below) attributed to the **Elephant Endotheliotropic Herpesviruses (EEHVs)**.

Indian Elephant (Elephas maximus)

Protection status



CITES Appendix I

IUCN STATUS EN

WPA, 1972 Schedule I

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 over **60% of the world's elephant population**
- **Highest population in Karnataka**, followed by Assam and Kerala.
  - **Kumki elephants:** Term used in India for captive Asian elephants that are trained to be used in operations to trap wild elephants.

Characteristics

- **Highly intelligent animals** with strong family bonds with sophisticated forms of **communication.**
- One of three **subspecies of Asian elephants**, the other two being the Sumatran and Sri Lankan elephants.
- **Life span:** 60-70 years.
- **Gestation period:** 20-22 months (longest gestation period of all mammals).
- **Leader of an elephant group:** Female.

Threats

- **Habitat Fragmentation** and degradation, expansion of agriculture and industry, **human-elephant conflict, poaching**, etc.

Conservation Measures

- **Project Elephant:** Launched in **1992**
- **33 Elephant Reserves** in 14 major Elephant states.

Difference between Asian Elephant and African Elephant

	Asian Elephant	African Elephant
Indicators		
IUCN Status	IUCN STATUS EN	IUCN STATUS EN Savanna elephant; IUCN STATUS CR Forest elephant

Indicators	Asian Elephant	African 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.

1.1.5. STATE OF THE RHINO 2024 REPORT

Why in the news?

International Rhino Foundation (IRF) released the State of the Rhino, 2024 Report.

More on the news

- IRF, initially called International Black Rhino Foundation in 1991, is dedicated to **survival of world's rhino species**.
- **Key findings of report**
  - With **all five species combined**, there are just **under 28,000 rhinos left in world.**
  - **Rhino poaching in Africa increased by 4%** from 2022 to 2023.
  - **Number of white rhinos increased** but greater one-horned rhino (Indian Rhino) number remained same.

About Rhino

- **Five species of rhino:** 2 African (White Rhino, Black Rhino) and 3 Asian (Indian rhino, Sumatran Rhino, and Javan Rhino).
- **Rhino conservation initiatives:** National Rhino Conservation Strategy 2019 to conserve Indian rhino; New Delhi Declaration on Asian Rhinos 2019; Indian Rhino Vision 2020 etc.

Difference between African Rhino and Asian Rhino

Features	African Rhino	Asian Rhino
Size	• **White Rhino** is **second-largest land mammals** after elephants.	• **Indian Rhino** is **largest of all Asian rhino** species.
Appearance and Behaviour	• Less armoured look • More aggressive • **2 horns** • **Poor swimmers** and they can drown in deep water (so they wallow in mud) • Fights with their horns	• More **armoured look** • **Less aggressive** • **2 horns** (Sumatran rhino) and **1 horn** (Indian Rhino and Javan rhinos) • **Good swimmers** • Fights with its bottom teeth

	• Feed low to the ground	• Graze on tall grasses, shrubs, leaves.
Habitat	• Grasslands, savannas and shrublands; deserts	• Tropical and subtropical grasslands and savannahs, Tropical moist forests
Conservation status (IUCN)	**White Rhino** 	**Indian Rhino** 
	Black Rhino 	**Sumatran Rhino and Javan Rhino** 

1.1.6. GREAT INDIAN BUSTARD

Why in the News?

Ministry of Environment, Forest and Climate Change (MoEFCC) approved funds for next phase (from 2024 to 2029) of Bustard Recovery Program.

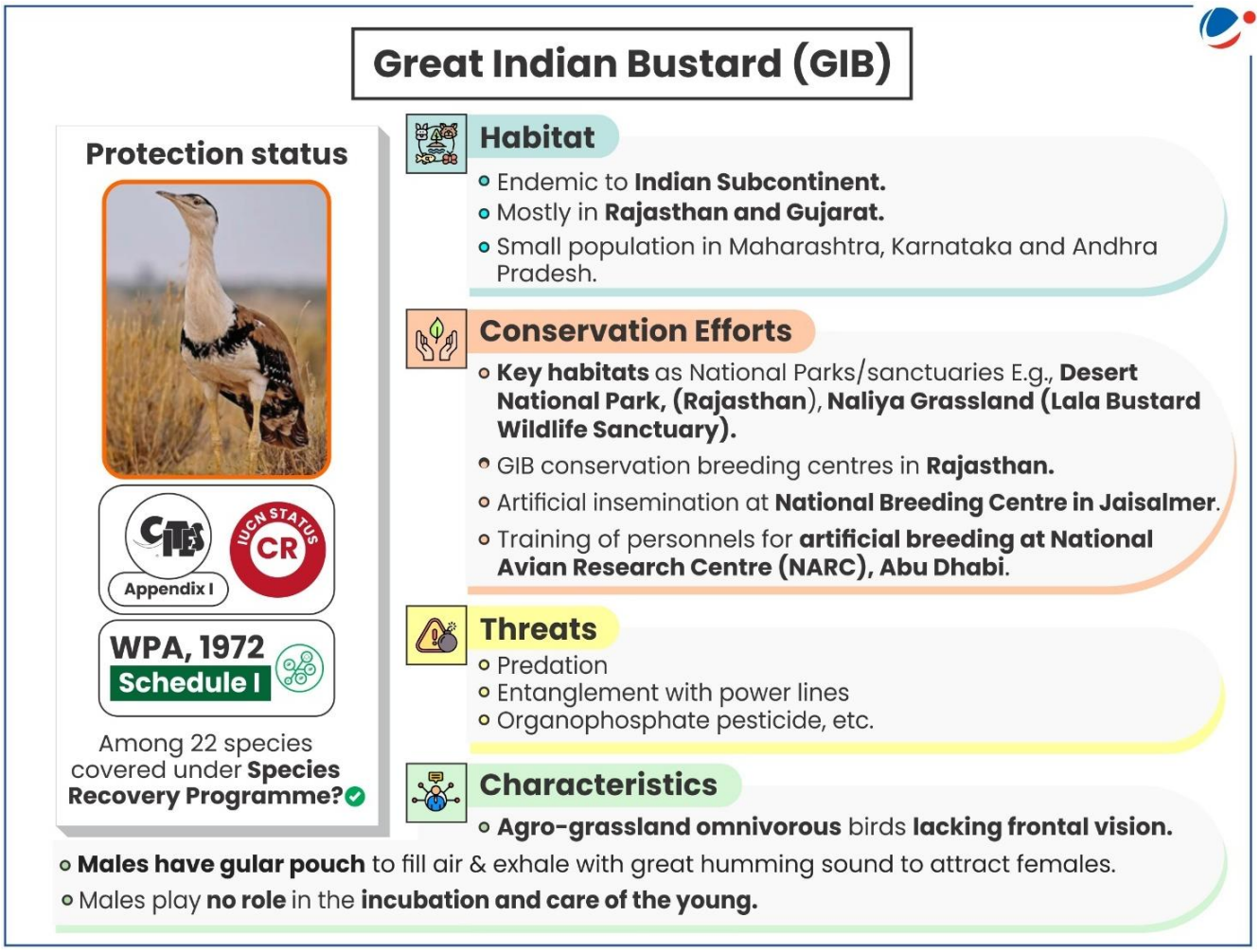
Bustard Recovery Program

- **Coverage of species: Great Indian Bustard (GIB)** and **Lesser Florican** (2 of the 4 bustard species)**.** Other two are **Bengal Florican; Macqueen's Bustard.**
- **Background: First started in 2013**, changed to **Bustard Recovery Project** in 2016.
  - **Extended till 2033.**
- **Project implemented by:** Wildlife Institute of India
- **Funding agency:** National **Compensatory Afforestation Fund Management and Planning Authority (CAMPA)** Authority
- **Partner agencies:** Ministry of Environment, Forest & Climate Change Rajasthan Forest Department Gujarat & Maharashtra Forest Departments
- **Project Objectives:** Conservation Breeding (Secure ex-situ population), Applied Research, Capacity-Building and Outreach, Pilot Implementation of Surgical Habitat Management.
- **Collaborating agencies:**
  - **Bombay Natural History Society:** Established in **1883**.
  - **Others:** International Fund for Houbara Conservation / Reneco; The Corbett Foundation; Humane Society International; Jivdaya Charitable Trust; The Grasslands Trust.

About Lesser Florican (Sypheotides indicus)

- **Smallest bird of the bustard family (Otididae).**
- **Protection status:**

- **Habitat:** Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh.
- **Threats:** Pesticide usage in breeding grounds; Mismanagement of agro-grasslands, etc.



Related News

Supreme Court order on Ban on power lines

- Recently, the Supreme Court **modified its earlier order** regarding **restrictions on setting up of overhead transmission lines**.
- **Judgement of the SC**
  - **Removed blanket direction for undergrounding high voltage and low voltage power lines** in the entire region.
  - **Constituted an Expert Committee** to determine the **scope, feasibility, and extent of overhead and underground electric lines** in the area identified as priority areas.

1.1.7. CROCODILE CONSERVATION PROJECT

Why in the News?

Recently, Crocodile Conservation Project completed its 50 years.

About Crocodile Conservation Project

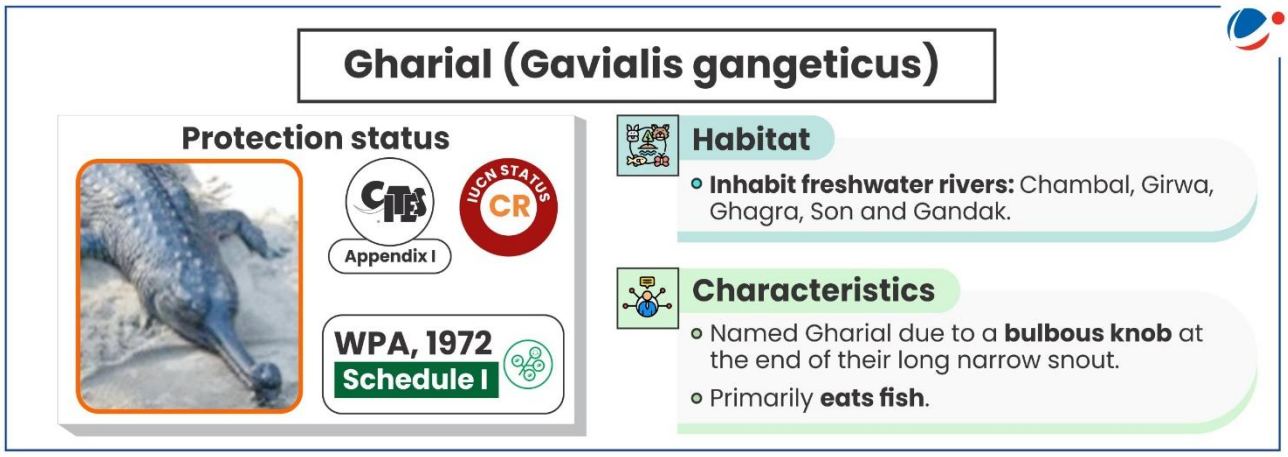
India launched its **Crocodile Conservation Project** in Odisha's **Bhitarkanika National Park** in 1975 with the assistance of United Nations Development Programme (UNDP) and the UN's Food and Agriculture Organisation (FAO).

About Bhitarkanika National Park

- It is a **Ramsar site,** located in **Odisha,** and is the **India's second largest mangrove ecosystem** after the Sunderbans.
- It is essentially a network of **creeks and canals** which are inundated with waters from rivers **Brahmani, Baitarani, Dhamra and Patasala**.
- Home to **largest congregation of Saltwater Crocodile** along with water monitor lizard, pythons, hyenas etc.

About Crocodiles

- Crocodiles are largest surviving species of the **vertebrate class Reptilia**.
- **Habitat:** Except for one saltwater species, crocodiles live **mainly in freshwater swamps, lakes and rivers**.
- **Behaviour:** Nocturnal animals and are poikilothermic (regulate their body temperature only to limited degree).



1.1.8. FUNGA: RECOGNITION AND CONSERVATION

Why in the news?

The Fungi Foundation through UN Biodiversity 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

- **Meaning:** Refers to the levels of diversity of fungi in any given place. (Fungi is one of five kingdoms in the classification of organisms given by R.H. Whittaker).
- **Diversity:** Vary from single-celled organisms to complex multicellular organisms.
- **Distribution:** From tropical, temperate to arctic regions in both terrestrial and aquatic ecosystems.
- **Characteristics:**
  - Have a **Cell wall with Chitin**
  - **Mode of nutrition**: Heterotrophic (Saprophytic/Parasitic)
  - **Body organization**: Multicellular/Loose tissue

Significance of Fungi

- **Mycorrhizal**: Mutually beneficial associations with the roots of plants for trees' growth.
- **Carbon reservoirs**: Storing carbon.
- **Decomposition and nutrient cycling**: Act as **decomposers** converting debris to humus.

- **Mycoremediation**: Assist in the **degradation** of contaminants such as plastics.
- **Medicine**: Antibiotic (Penicillin) and Potential Psychotherapy (Psilocybin) etc.
- **Focus in International Organisation**
  - IUCN Species Survival Commission Fungal Conservation Committee (FunCC)
  - Global Fungal Red List Initiative.
  - Chile is the only country that considers Fungi in its law for conservation.

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
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

1.1.9. WORLD NETWORK OF BIOSPHERE RESERVES (WNBR)

Why in the News?

UN Educational, Scientific and Cultural Organization (UNESCO) added **11 new biosphere reserves** from countries like Colombia, etc. under the **Man and Biosphere (MAB) Programme**.

More on the News

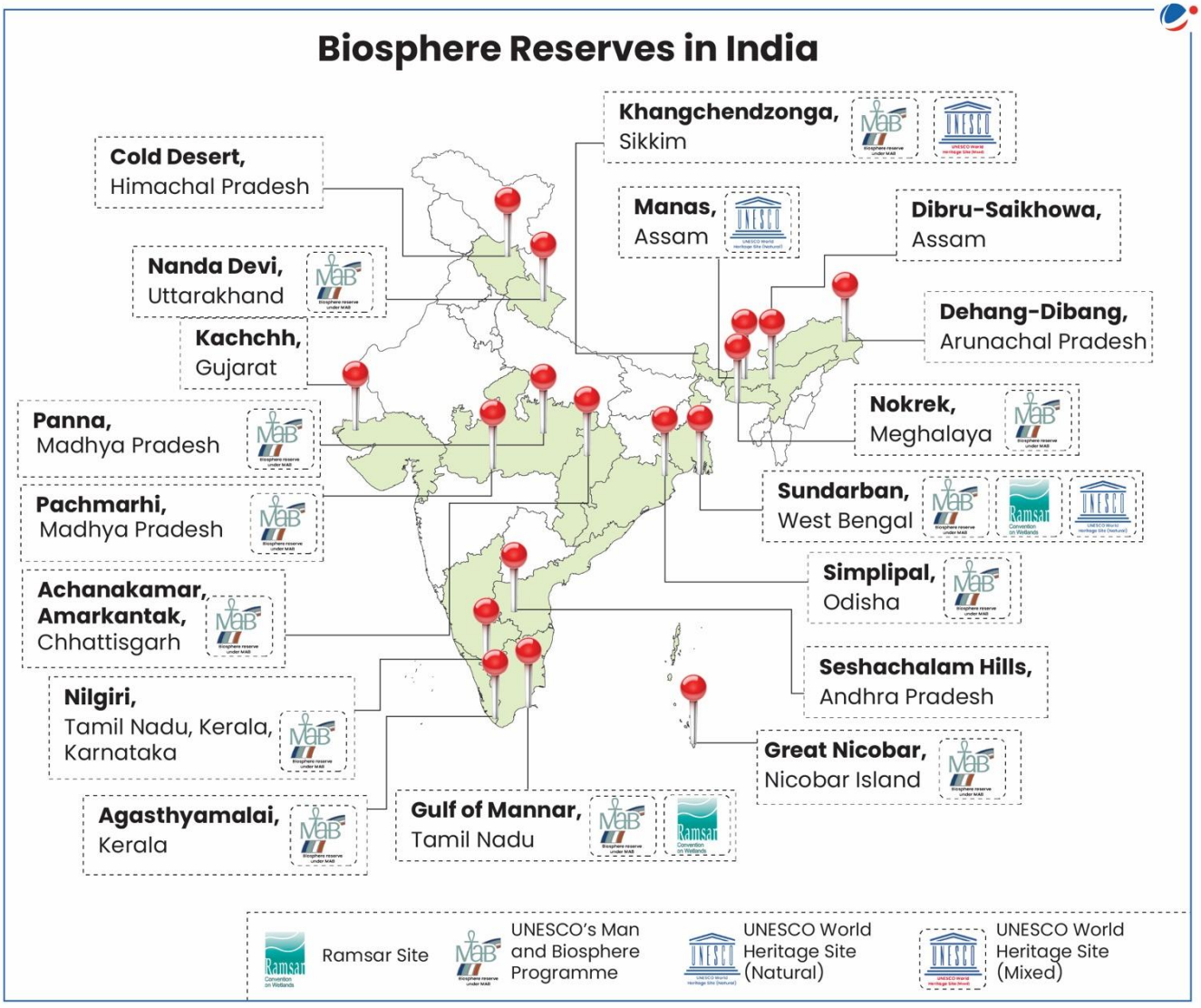
- WNBR now totals **759 sites in 136 countries.**

About MAB Programme

- Launched in **1971** as an **intergovernmental scientific programme.**
- **Aim**: Establish a scientific basis for enhancing relationship between people and environments.
- Out of 18 biosphere reserve in India, **12 are recognised under it (refer to map).**
  - **Niligiri Biosphere Reserves** was first to be recognized.

About Biosphere Reserves (in situ conservation)

- Areas representing **diverse natural and cultural landscapes** across terrestrial, coastal, or marine ecosystems.
- Consists of **three main zones**-
  - **Core areas:** Strictly protected zone
  - **Buffer zones:** Used for activities compatible with sound ecological practices that can reinforce scientific research, etc.
  - **Transition area:** Communities foster socio-culturally and ecologically sustainable activities.



1.1.10. ECO SENSITIVE AREAS

Why in the News?

Karnataka government rejected the Kasturirangan committee report on the protection of the fragile Western Ghats region from environmental degradation.

About Kasturirangan committee

- Proposes that 37% of the total area of Western Ghats, roughly **60,000 square kilometres** as Eco-sensitive Area (ESA).
- Out of total are of proposed ESA, **maximum** is in **Karnataka followed by Maharashtra**.

Eco Sensitive Areas/Zones

Defined as **areas/zones** with identified environmental resources having incomparable values requiring special attention for their conservation" because of its landscape, wildlife, biodiversity, historical and natural values. **(National Environment Policy, 2006)**

- Notified by central government under **the Environment (Protection) Act, 1986.**
- **Purpose**
  - Protect environment and **avoid its degradation** due to anthropogenic activities.

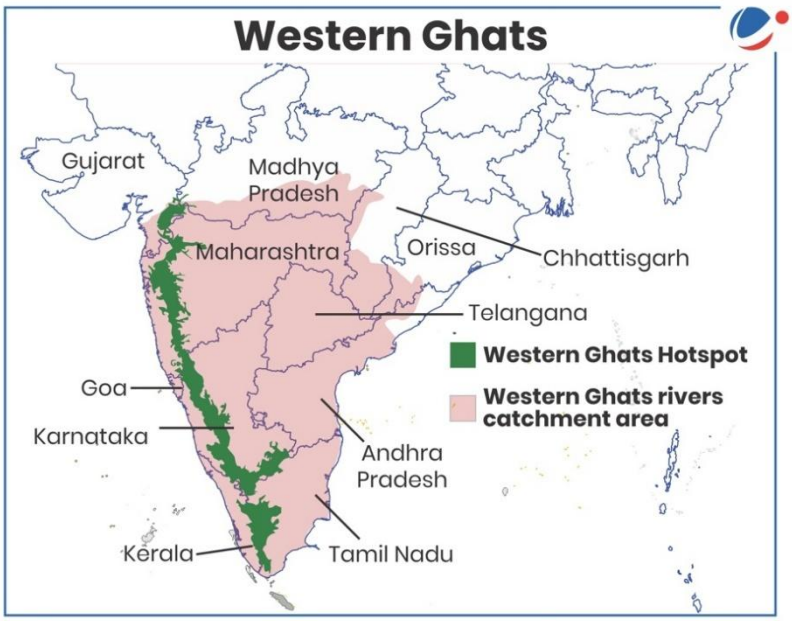
- Create a kind of **barrier/ shock absorber** for the specialised ecosystem (PAs).
- Act as **transition zone** from areas of higher protection to areas involving lesser protection.
- Activities in the ESZ are generally **regulated and not prohibitory** in nature.

- **ESZ Guidelines classify activities under three categories:**
  - **Prohibited:** Commercial Mining, Setting of industries causing pollution, etc.
  - **Regulated:** Felling of Trees, Establishment of hotels and resorts, etc.
  - **Permitted:** Ongoing agriculture and horticulture practices by local communities, dairy farming, etc.

About Western Ghats

Geographical features

- **Passes:** Palghat Gap; Thal and Bhor ghat
- **Elevation:** Progressively **increases from north to south.** (Highest Peak: Anamudi)
- **Forests: 4 major types (evergreen, semi-evergreen, and moist deciduous, and dry deciduous).**
- **Minerals:** Rich in iron, manganese and bauxite ores



Other key information:

- **Regional names: Sahyadri** (Maharashtra), **Nilgiri hills** (Karnataka and Tamil Nadu), **Anaimalai hills** and **Cardamom hills** (Kerala and Tamil Nadu).
- One of **the world's eight 'hottest hotspots'** of biological diversity.
- Covers **6%** of the land area of **India with** more than **30% of all plant, fish, herpeto-fauna, bird, and mammal** species found in India.
- Declared **UNESCO Word heritage site in 2012.**
- **Endemic species:** Nilgiri Tahr and the Lion-tailed

Steps taken for Protecting Western Ghats

- **Western Ghats Ecology Expert Panel (WGEEP) (2011)** or **The Madhav Gadgil committee:**
  - Recommended designating the entire region as an **'Ecologically Sensitive Area'.**
  - Divides into 3 zones: **ESZ1 (very high sensitivity), ESZ2(high sensitivity) and ESZ 3 (moderate sensitivity).**
- **High Level Working Group (HLWG) headed by Dr. K. Kasturirangan:** Recommends color coding of industries; extending entry 20 (Economic Planning) of the concurrent list to regulate development within ecological framework, etc.
- **6th iteration of a draft notification of Western Ghats Eco-sensitive Area,** declaring 56,825.7 sq km of the Western Ghats an ecologically sensitive area by Central Government.
- **Brahmagiri hills case:** National Green Tribunal (NGT) asked Environment Ministry to finalise a deadline for declaring the Western Ghats an eco-sensitive zone.

1.1.11. OTHER RELATED NEWS

1.1.11.1. INTERGOVERNMENTAL PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES)

IPBES won Blue Planet Prize for 2024 that is **awarded annually** by Japan based Asahi Glass Foundation.

About IPBES

- Established in Panama City in 2012, it is an independent intergovernmental body to **strengthen science-policy interface for biodiversity and ecosystem services**.
- It is **not a UN body.** However, United Nations Environment Programme provides secretariat services to IPBES.
- **Secretariat**: Bonn, Germany
- Currently, it has **more than 145 member States (including India).** All States Members of UN are eligible for IPBES membership

1.1.11.2. INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS (IDWH)

Recently, Union Cabinet approved continuation of Centrally Sponsored Scheme of Integrated Development of Wildlife Habitats (IDWH) for the 15th Finance Commission cycle.

About IDWH

- **Objective: Centrally sponsored umbrella scheme** by Ministry of Environment.
- **Components of IDWH**
  - **Support to protected areas** (national parks, wildlife sanctuaries, conservation reserves, and community reserves).
  - Protection of **wildlife outside protected areas**.
  - **Recovery programs** for saving critically endangered species and habitats.
    - So far, **22 species** have been identified under the Species recovery program.
- **Sub-schemes Under IDWH:** Project Tiger (1973), Project Dolphin and Project Lion and Project Elephant (1992)

1.1.11.3. PEOPLE'S BIODIVERSITY REGISTER (PBR)

Thazhakara panchayat in **Kerala** recently published their updated **PBR**.

About PBR

- **Statutory recognition:** The **Biological Diversity Act (2002), Biodiversity Management Committee (BMC)** to prepare PBR in consultation with local people
- **Purpose:** To **document** and **safeguard** bioresources and associated knowledge.
- **Information in PBR:**
  - Availability and knowledge of **local biological resources**, their **medicinal or any other use.**
  - **Any other traditional knowledge** associated with them.
- **Relevance:**
  - Supports claims **of local ownership of biodiversity & traditional knowledge.**
  - Helps **sustainable resource management.**

1.1.11.4. ENVIRONMENTAL PERFORMANCE INDEX (EPI), 2024

Recently, EPI 2024 has been published by Yale Center for Environmental Law & Policy.

About EPI, 2024

- Using **58 performance indicators across 11 issue categories**, EPI **ranks 180 countries** on climate change performance, environmental health, and ecosystem vitality.
- **Estonia** tops the list.

- **India-related Findings:**
  - India has been **ranked 176.**
  - In 2022, India surpassed China as the **world's largest emitter of anthropogenic SO_2.**

1.1.11.5. NATURE CONSERVATION INDEX (NCI)

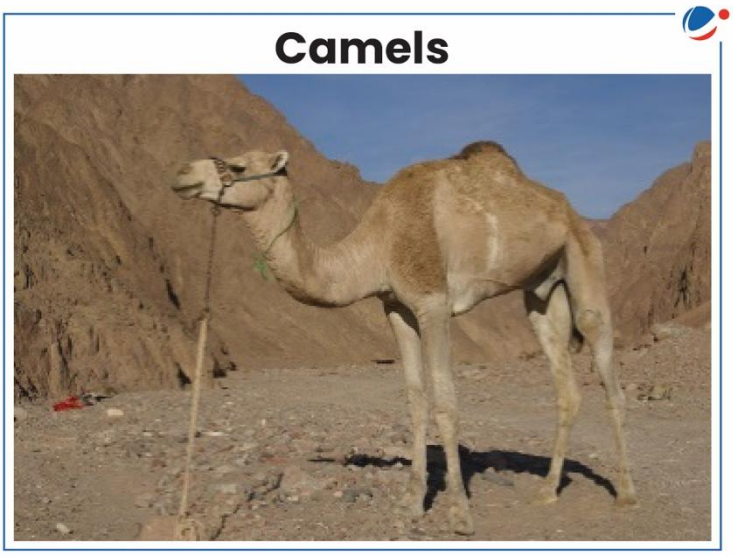
The Nature Conservation Index (2024) was released by **Goldman Sonnenfeldt School of Sustainability and Climate Change**.

About NCI

- **India's Rank: 176 out of 180 countries.**
- It evaluates conservation efforts using **four markers: Land management, Threats to biodiversity, Capacity and governance, and Future trends.**

1.1.11.6. CAMELS

UN declared 2024 as **International Year of Camelids** (members of camel family) to build awareness of untapped potential of camelids.



About camels

- Camels are found in Africa and Asia.
- **Types: Dromedary** or **Arabian camel** (single hump) and **Bactrian camel** (two humps).
- Domesticated by people, Mammals, Herbivores, **survive in hot conditions** (Draught animal).
- **Camels in India**
  - **State animal of Rajasthan.**
  - **Kharai Camel swim long distances** (3 km at a time) in sea to **eat Mangroves**; found in Kutch (Gujarat).
  - **Bactrian camels** are found in Ladakh's Nubra Valley.
  - **Dromedaries camel** are found in hot deserts (Rajasthan, Gujarat).
- **Other types of camelids**: Llama; Alpaca; Alpaca; Guanaco; Vicuña etc.

1.2. FORESTS

1.2.1. UN-REDD

Why in the News?

United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD) report titled **"Raising Ambition, Accelerating Action: Towards Enhanced Nationally Determined Contributions for Forests**" has been launched.

Key-findings of report

- **Only 8 of the top 20 countries** with highest rate of tropical deforestation have **quantified targets** on forests in **Nationally Determined Contributions (NDCs**) plan.
- **11 of the NDCs** contain quantified targets relating to afforestation and, reforestation, mitigating climate change requires **reducing deforestation first.**

About UN-REDD

- Flagship **UN knowledge and advisory programme on forests and climate**, with focus on advancing the Paris Agreement.
  - It is the largest international **provider of REDD+ assistance**,
- **Genesis:** It was launched in **2008** and builds on the technical expertise of **Food and Agriculture Organization (FAO), United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP).**
- **Partner Countries**: 65, **including India**.

About REDD+

- The framework is commonly referred to as the **Warsaw Framework for REDD+ (WFR)** adopted at 19th session of the **Conference of Parties (COP 19) to the UNFCCC** in 2013.
- REDD+ goes beyond simply deforestation and forest degradation and includes the **role of conservation, sustainable management of forests and enhancement of forest carbon stocks**.

1.2.2. INTERNATIONAL ARRANGEMENT ON FORESTS (IAF)

Why in the news?

Recently, the **19th Session of the United Nations Forum on Forests (UNFF) under the International Arrangement on Forests (IAF)** concluded.

Key takeaways of the UNFF19 meeting:

- World is **off track** to achieve the **Global Forest Goals by 2030.**
- Members reaffirmed the **UN Strategic Plan for Forests 2017-2030 (UNSPF)**
- India tabled its significant **increase in forest cover** in the past 10 years through a **scientific approach to Sustainable Forest Management (SFM).**
  - **Total forest and tree cover** has **increased** by 2261 sq km., taking the total to **24.62%** of the total geographic area. (ISFR 2019-2021 assessment)
  - **17 states have more than 33%** of their area under forest cover.

UN Strategic Plan for Forests under UNFF (2017-2030)

- Forged at a special session of the UN Forum on Forests held in **2017** and provides an ambitious vision for **global forests in 2030.**
- All members of UN are members of UNFF (Including India).
- Contains a set of **six Global Forest Goals** and 26 associated targets achieved by **2030**, which are **voluntary and universal**.
- It includes a target **to increase forest area by 3% worldwide by 2030**, signifying an increase of 120 million hectares,
- It builds on the **vision of the 2030 Agenda**.
- **Report: Global Forest Goals (GFGs),** flagship UN report on forests.

International Arrangement on Forests (IAF)

- **About: Established in 2000** as a **successor to the Intergovernmental Panel on Forests (1995-97) and the Intergovernmental Forum on Forests (1997-2000).**
- **Objectives: Promote the management, conservation and sustainable development** of all types of forests and to strengthen long-term political commitment to this end.

- **Five Components**
  - **United Nations Forum on Forests (UNFF):** Established in 2000 as a functional commission of the UN Economic and Social Council (ECOSOC), facilitates **Sustainable Forest Management (SFM).**
  - **Collaborative Partnership on Forests (CPF):** Innovative **voluntary interagency partnership** on forests, established in **2001**
    - It comprises of **16 international organizations** like the IUCN, CITES, FAO etc.
  - **The Global Forest Financing Facilitation Network (GFFFN)**
  - **UN Trust Fund**: Supports the activities of the UNFF and other components of the International Arrangement on Forests (IAF). The contributions are **voluntary**.
  - **UNFF Secretariat:** Also serves as the secretariat for CPF.

Related News
International Forest Governance (IFG)

- A non-profit organisation has released report titled **International Forest Governance (IFG): A Critical Review of Trends, Drawbacks, and New Approaches**.
- It is the **first global synthesis report** on IFG since 2010, summarises the most significant developments on IFG after 2010.
- Report has been released in the backdrop of the 19th session of the **UN Forum on Forests (UNFF19).**
- IFG is comprised of the **policy**, **legal** and **institutional frameworks** for international decision-making on forests. Its stakeholders include-

1.2.3. MANGROVES CONSERVATION

Why in the news?

Recently, the **IUCN Red List of Mangroves Ecosystems** indicated that about **50% of the ecosystems examined** were classified as vulnerable, endangered, or critically endangered.

More on the news

- **IUCN Red List of Mangroves Ecosystems** assessed 36 regions across 44 countries.
  - It is one of the **headline indicators for the Kunming-Montreal Global Biodiversity Framework** under the Convention on Biological Diversity **(CBD).**
- **The mangrove ecosystems of south India**, Sri Lanka, the Maldives and Northwest Atlantic were identified as **critically endangered**.
- **Status of Indian Mangroves:** Andaman and Bay of Bengal (Least Concern), South India (Critically Endangered), West India (Vulnerable).

About Mangroves and Ecosystem services provided

- **About:** Located primarily on **tropical, subtropical, and warm temperate coasts** covering approximately **15%** of the world's **coastlines.**
- **Services provided by Mangroves:** Carbon Sequestration (~11 billion tonnes, 3 times of amount stored in tropical forests of same size); Biodiversity Conservation, disaster risk reduction, etc.

Status of Mangroves in India

- Mangroves in Lakshadweep archipelago and on coast of Tamil Nadu are critically endangered. **(State of the World's Mangroves 2024 by Global Mangrove Alliance)**
- **India State of Forest Report (ISFR) 2023 by the Forest Survey of India (FSI):** Mangrove cover in India has increased by 17 sq km (0.34%) compared to the previous assessment.
- **Major Locations in India:** Andaman and Nicobar Islands; Sunderbans of West Bengal; Mahanadi, Godavari and Krishna deltas etc.

India's Initiatives for Mangrove Conservation:

- **MISHTI (Mangrove Initiative for Shoreline Habitats & Tangible Incomes):** Under the Ministry of Environment, Forest and Climate Change (MOEF & CC).

- **Sustainable Aquaculture In Mangrove Ecosystem (SAIME) initiative:** Building **aquaculture farms** using **IMA (integrated mangrove aquaculture)** systems.
- **Magical Mangroves campaign**: **WWF India** has enjoined citizens in nine coastal states on mangrove conservation.
- **National Coastal Mission Programme on 'Conservation and Management of Mangroves and Coral Reefs'.**

Global Initiatives

- **Mangrove Breakthrough:** Launched at **UNFCCC COP27 in Sharm el-Sheikh, Egypt**, by the United Nations High Level Climate Champions and the **Global Mangrove Alliance.**
- Target of securing the future of over **15 million hectares of mangroves globally by 2030, underpinned by $4bn of sustainable finance**.

1.2.4. OTHER RELATED NEWS

1.2.4.1. FOREST ADVISORY COMMITTEE (FAC)

FAC has **exempted surveys involving drilling and felling of up to 100 trees** for hydro and other developmental projects in forest areas.

About Forest Advisory Committee (FAC)

- **Statutory body** under Forest (Conservation) Act, 1980 under MoEF&CC.
- Approves **diversion of forest land** for non-forest purposes.
- Assesses **land request validity**, evaluates impact minimization plans, and considers **potential damage to local ecology and wildlife habitats**.
- Role of FAC is **recommendatory** in nature so far as diversion of forest land for purpose of non-forestry use is concerned.

1.2.4.2. FOREST ECOSYSTEM RESTORATION INITIATIVE

Secretariat of the Convention on Biological Diversity (CBD) marks the **10th anniversary** of the Forest Ecosystem Restoration Initiative (FERI).

About FERI

- Launched as a partnership between the **Korea Forest Service (KFS) and the CBD Secretariat**.
- Implemented by **CBD Secretariat**.
- Designed to assist developing countries in **operationalizing national targets and plans** in line with **Aichi Biodiversity Targets 5, 14 and 15**.
- Supports the implementation of the **Kunming-Montreal Global Biodiversity Framework (KMGBF).**
- **FERI's initiatives:**
  - Adoption of a Short-Term Action Plan on Ecosystem Restoration (**STAPER), at COP13** in 2016.
  - **WePlan – Forests Platform:** A decision support tool for tropical forest ecosystem restoration.

1.2.4.3. EU'S NATURE RESTORATION PLAN (NRP)

European Union approves **NRP**, first of its kind.

About NRP

- It is a continent-wide and comprehensive law that forms part of the **EU's European Green Deal** (aims for net zero emissions of greenhouse gases by 2050).
- **Key Features**
  - **Aim:** Contains **binding** restoration targets for long-term recovery of nature in EU's land and sea areas.
    - > It seeks to recover at least **20% of the EU's land and sea** areas by **2030,** and **all ecosystems in need** of **restoration** by **2050.**

- **Focus areas:** Covers the existing legislation (for wetlands, forests, grasslands, etc.), pollinating insects, forest ecosystem, etc.
- **Implementation:** Through **National Restoration Plans** of the EU countries.

1.2.4.4. EUROPEAN UNION DEFORESTATION REGULATION (EUDR)

The European Commission has proposed to **extend the implementation of the EUDR, by one year.**

About EUDR

- Aims to ensure that a set of key goods placed on the EU market will no longer contribute to **deforestation and forest degradation in the EU and elsewhere in the world.**
- Applies to a wide range of products **including palm oil, soy, beef, cocoa, and timber.**
- Requires companies to **verify the origin of the products.**
- Will act as a barrier for countries who **export to the EU.**

1.3. WETLANDS, COASTLAND AND OCEANS

1.3.1. HIGH SEAS TREATY

Why in the news?

Union Cabinet approved the signing of the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement (**High Seas Treaty**).

What are High Seas?

- As per UN Convention on Laws of the Seas (UNCLOS) demarcation, **high seas are** all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State.
- **UNCLOS demarcates different zones** of the oceans as:
  - **Territorial Sea:** Upto **12** nautical miles from baseline.
  - **Contiguous Zone:** Upto **24** natical miles from baseline and acts as buffer zone; limited sovereignty
  - **Exclusive Economic Zone (EEZ):** Upto **200** nautical miles from baseline; no sovereignty of coastal state.
- **Global Commons:** High Seas (~64%) are considered **global commons** (belong to no one and everyone enjoys equal rights there).

BBNJ Agreement

- **Name:** Agreement on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction.
  - International treaty under the **United Nations Convention on the Law of the Sea (UNCLOS).**
  - It will be the **third implementation agreement** under UNCLOS if and when it enters into force, alongside:
    - **1994 Part XI Implementation Agreement** (exploration and extraction of mineral resources)
    - **1995 UN Fish Stocks Agreement** (conservation and management of migratory fish stocks).
- **Adoption:** 2023 and is **open for signature** for two years.
  - It will be an **international legally binding treaty** .
  - **91 countries have signed**, and eight Parties have ratified (June 2024).
- **Objective:** Conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction.
- **Ministry of Earth Sciences** will spearhead its implementation in India.

Key Provisions of BBNJ Agreement

- **Application:** Areas Beyond National Jurisdiction (ABNJ), including high seas. (**not applicable to any warship, military aircraft or naval auxiliary**).

- **Only Part-II** (dealing with Marine Genetic Resources),applies to any **government vessel in non-commercial service**.

- **Institutional Arrangement:** Treaty establishes:
  - **Conference of Parties (COP): Main decision-making body**
  - **Scientific and Technical Body (STB)**
  - **Clearing-House Mechanism (CHM):** Open-access centralized platform.
  - **Subject-Matter Committees.**
  - **Financial Mechanism:** Includes voluntary trust fund; special trust fund and Gobal Facility Fund.

Four Substantive Elements of BBNJ Treaty

- **Marine Genetic Resources (MGR), including the fair and equitable sharing of benefits**
  - MGR Mechanism also considers the rights and obligations associated with traditional knowledge of Indigenous Peoples and local communities.
  - No country must claim or exercise sovereignty over MGRs of ABNJ.
- **Measures such as Area-Based Management Tools (ABMT), including Marine Protected Areas (MPA)**
  - **ABMT** establishes well-connected networks of Marine Protected Areas.
  - To date, the largest international MPA is in **Antarctica's Ross Sea.**
- **Environmental Impact Assessments (EIAs)**
- **Capacity-Building and the Transfer of Marine Technology**

UN Convention on Laws of the Seas (UNCLOS)

- **About:** Comprehensive international law for legitimate behaviour on, and use of, seas and oceans everywhere.
  - Adopted in 1982 and enforced in 1994.
  - Almost **Universal Acceptance (170 state parties** including India).
- **Provisions:** Defines rights and duties of nations regarding activities in the oceans, addresses issues on sovereignty, etc.
- Establishes **International Seabed Authority (ISA)**

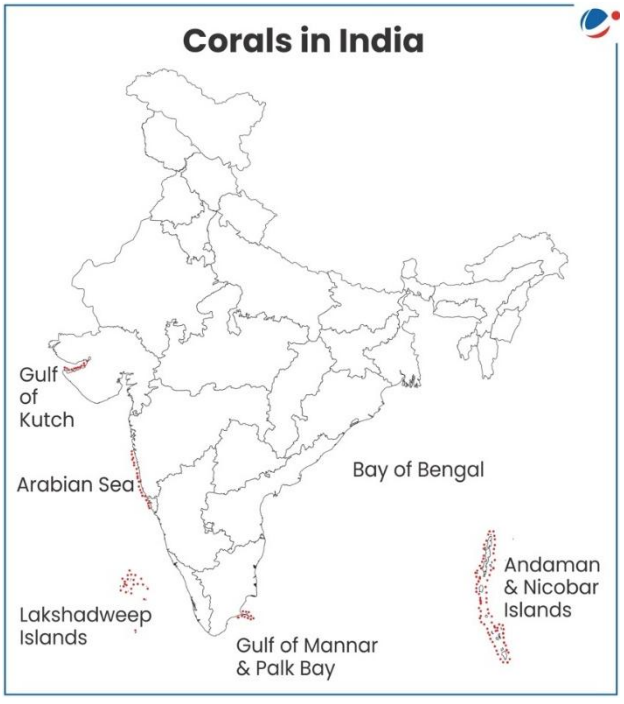
1.3.2. CORAL BLEACHING

Why in the news?

Recently, widespread coral bleaching has been seen along the Indian coast largely affecting Lakshadweep, Gulf of Munnar, Palk Bay and Andaman and Nicobar Islands.

More about the instances of bleaching

- **Lakshadweep Islands:** Made up of **coral atolls,** is at significant risk.
  - Bleaching is seen across almost all species like **Acropora muricata** and **Porites cylindrica** in the Kavaratti Islands.
  - Species that are often more **stress-tolerant**, such as **Porites lutea** and **Pavona varians** have also begun to bleach in Lakshadweep.
- **Gulf of Mannar:** The live coral cover in the **Gulf of Mannar** decreased from 37% to 27.3% between 2005 and 2021.
- **Goa:** Coral bleaching has started but is limited to one species, **Goniopora**.



About Corals and Coral Bleaching

- Corals are **invertebrate animals** belonging to a large group of animals called **Cnidaria**.
  - Generally classified as "**hard coral**" (reef building corals having rock-like calcareous skeleton) or **"soft coral"**.
  - Coral reefs are formed by polyps of hard corals, which establish **symbiotic relationship with microscopic algae, called zooxanthellae,** which give them their characteristic colours.
- **Growth Conditions for Coral Reefs:** Warm (23–29°C), salty (32-42 ppt), clear, shallow marine waters with stable temperatures and abundant sunlight.
- **Significance of reefs:** Often called **rainforests of the ocean** due to high biodiversity and productivity, support around **25% of marine life**, minimize **storm impact**, promote **tourism**, act as **carbon sink** etc.
- **Coral Bleaching:** When corals are **stressed by changes in conditions** such as temperature, light, or nutrients, they expel symbiotic algae, causing them to turn **completely white**.
  - Presently, **2023-2024** is being named as the **fourth global mass coral bleaching event**.
  - **Factors Responsible:** Increased Ocean temperature due to climate change, runoff and pollution, extreme low tides, Ocean acidification, **Biological invasion, Epizootics** (**Pathogen-induced bleaching**), etc.

Initiatives taken for coral conservation in India

- **Legal:** Acts like the **Coastal Regulation Zone (CRZ) Notification of 1991** issued under the broad **Environment Protection Act, 1986** , **Coral Species** are listed under **Schedule-I of the Indian Wildlife (Protection), Act, 1972.**
- **Coral Reef Recovery Project-Mithapur (Gulf of Kachchh and Gujarat's Marine National Park):** Launched in **2008** by **Wildlife Trust of India (WTI)** and Gujarat Forest Department.
- **Zoological Survey of India (ZSI) with the Gujarat Forest Department** successfully restored coral reefs **in the Gulf of Kachchh**.
  - Restoration of a branching coral species (**staghorn corals**) that had gone extinct about 10,000 years ago to the Gulf of Kachchh was successful.
  - It used **biorock technology.**

Global Initiatives

- **International Coral Reef Initiative (ICRI)**:
  - Founded in **1994** at the First Conference of the Parties of the Convention on Biological Diversity.
  - **India** is a member of the ICRI.
- **World Coral Conservatory project**: It creates a bank of corals in aquariums across Europe
- Coral Research and Development Accelerator Platform by G20

Related News
Artificial Reefs

- **300 artificial reefs** were deployed off the coast of Rameshwaram (Tamil Nadu).
- **About Artificial Reefs**
  - These are **technology interventions** used to rehabilitate or improve natural habitats.
  - They are placed on the sea bed with a fixed scientific design and functions as a **self-sustaining production system.**
  - They mimic the characteristics of a natural reef.
  - **Materials Used:** Rocks, cinder blocks, wood, old tires, limestone, steel, concrete.
  - **Department of Fisheries** is promoting it under **Pradhan Mantri Matsya Sampada Yojana** for rejuvenating coastal fisheries

1.3.3. RAMSAR SITES

Why in the news?

Recently, new wetlands from India were added to the Ramsar list taking the total number of sites to 85.

About the added sites

Wetland	Specifications
Nagi and Nakti bird sanctuaries (Bihar)	• Both are **man-made reservoirs** (Nagi dam and Nakti dam) and feature **dry deciduous forests surrounded by hills.** • Although Nagi lies in the Gangetic Plains of India, it has a **landscape reminiscent of the Deccan Plateau.** • They are recognized as an **Important Bird and Biodiversity Area (IBA)** by BirdLife International.
Nanjarayan Bird Sanctuary (Tamil Nadu)	• **Nanjarayan Lake a large shallow wetland** named after **King Nanjarayan** (who restored and repaired it). • It depends on **heavy rain water flow from Nallar drainage.**
Kazhuveli Bird Sanctuary (Tamil Nadu)	• **Brackish shallow lake** located on Coromandel Coast in North of Pondicherry. • **Connected to Bay of Bengal** by brackish Uppukalli creek and Yedayanthittu estuary. • **Lies in Central Asian Flyway** of migratory species.
Tawa Reservoir (Madhya Pradesh)	• Located **inside Satpura Tiger Reserve** and **borders Satpura National Park and Bori Wildlife Sanctuary.** • Constructed at **confluence of Tawa and Denwa rivers.**

About Wetlands

- An **area of land that is saturated with water.**
- **Wetland must meet at least 1 of 9 criteria** like **regularly supports 20,000 or more water birds**, or conserving **biological diversity** etc.
- **Significance:**
  - **Biodiversity Hotspots**: Wetlands cover only 6% of Earth's surface but support ~40% of global biodiversity.
  - **Function as its kidneys of the Earth**, as aquatic plants absorb heavy metals and excess nutrients.
  - **Others:** Nutrient Cycling, Carbon Sequestration, etc.

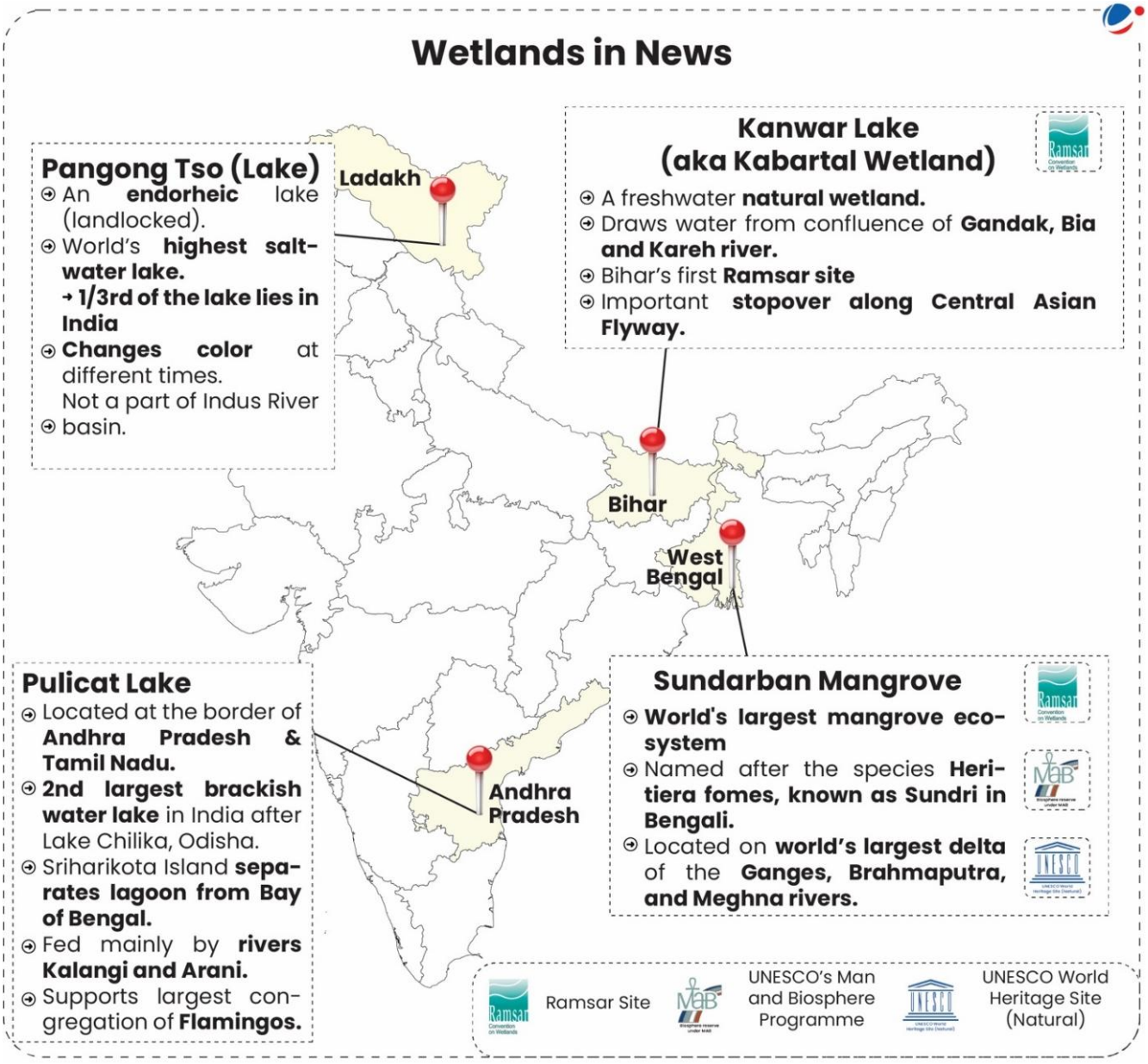
Ramsar Convention

- An **intergovernmental treaty** for the **conservation and wise use of wetlands** and their resources.
- Adopted at **Ramsar (Irani) in 1971** and came into force in **1975.**
- India became a party in **1982**
- **'List of wetlands of international importance'** or the **Ramsar List** contains wetlands which hold **significant value for humanity as a whole.**

Ramsar list

- **Wetlands in the Ramsar list meet at least one of nine criteria** as defined under the conventions .
- Contracting Parties are **expected to manage their Ramsar Sites** to maintain their ecological character.
- **Montreux Record:** Ramsar sites where changes in ecological character have occurred, are occurring, or are likely to occur as a result of technological developments, pollution or other human interference.
  - **Loktak (Manipur) and Keoladeo National Park (Rajasthan) of India** are included in it.
- **Tamil Nadu has maximum Ramsar Sites**, followed by Uttar Pradesh.

1.3.4. OTHER WETLANDS IN NEWS



1.3.5. OTHER RELATED NEWS

1.3.5.1. UNITED NATIONS WATER CONVENTION SPRING INITIATIVE

UN-backed network Principles for Responsible Investment (PRI) has launched **"Spring", a new initiative** to halt or reverse nature loss by 2030.

About Spring Initiative

- **Supported by a coalition of 200 investors** managing a combined $15trn in assets.
- **Objective:** To address systemic risk of nature loss to societies and long-term portfolio value creation by enhancing corporate practices on forest loss and land degradation.

1.5.3.2. SHALLOW AQUIFER MANAGEMENT (SAM)

SAM pilot models was **recently launched in Telangana.**

About SAM

- It is a **sustainable urban water management technique**
- It **involves drilling shallow water borewells to pump out water**.
- The underneath layers are recharged during rainfall causing rise in water tables.
- It is part of **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme** of the Ministry of Housing and Urban Affairs.
- **National Aquifer Mapping and Management program (NAQUIM)** aims to characterize aquifers and develop plans for Ground Water management.

1.3.5.3. FISHMIP INITIATIVE

According to the FishMIP, **global projections of exploitable fish biomass** show a **more than 10% decline.**

About FishMIP initiative

- **Genesis:** Fisheries and Marine Ecosystem Model Intercomparison Project was launched in 2013.
- **Global Network**: It is an **international network** of more than 100 marine ecosystem modellers and researchers around the world.
- **Relations with UN:** It is **working with FAO** to understand the **long-term impacts of climate change** on **marine ecosystems and fisheries**
- **FishMIP2.0:** Established in 2024 to increase the **reliability of modelling projections.**

1.3.6. TERMS IN THE NEWS

1.3.6.1. PLANKTON CRASH

- **Noctiluca scintillans**, a type of phytoplankton, turn **a red color when in large numbers experienced a crash,** leading to t**he release of colored pigment from their cells.**
- These pigments then **stick to rocks and the sea floor**, forming **a biofilm-like layer and causing 'red tides.**
- Plankton crashes happen due **to a lack of nutrients or lack of CO2** in th**e earlier part of the production cycle**.
- Plankton may also die later in the cycle due to **sudden change in water quality.**

1.3.6.2. GAPE LIMITATION

- Concept in ecology that refers to the **physical constraint on the size of prey** that a predator can consume. This limitation is primarily determined by the size of the **predator's mouth or "gape".**
- Hence, **Small predators can only eat small prey, while bigger predators can eat bigger prey**.
- **Importance of Gape limitation:** Shaping Food Webs, drives adaptions; regulates predator-prey balance; predicts environmental changes, etc.

1.3.6.3. MEGAFAUNA

- It describes animals above a certain weight threshold (generally above 50 kg).
- Megafauna may be classified based on their dietary type as **megaherbivores** (plant-eaters), **megacarnivores** (meat-eaters), **and megaomnivores** (who eat both plants and meat).
- **Anthropogenic pressures** on megafauna since the Late Pleistocene have resulted in **dramatic losses**, especially in the megaherbivores and megacarnivores.
- Some **extinct megafaunal species** include woolly mammoths, sabre-toothed tigers, giant sloths etc.

1.3.6.4. STROMATOLITES

- They refer to a range of **microbial communities that are associated with layers of rock.**
- They are partially responsible for the **Great Oxygenation Event,** which changed the composition of **our atmosphere by introducing oxygen.**

- They are typically relegated to **extreme environmental niches, thus are found Rarely and are sparsely** scattered across the globe.
- **Recently,** the first discovery of **living shallow-marine stromatolites** was made in the Middle East near the Red Sea.

1.3.6.5. ENVIRONMENTAL DNA (EDNA)

- eDNA is organismal DNA that is **released in the environment from cellular material shed by organisms** (via skin, excrement, etc.) into **aquatic or terrestrial environments.**
- eDNA is **increasingly being used** to **detect the presence of species and assess biodiversity in an ecosystem**
  - Unlike conventional methods, eDNA approach is **reliable, and accurate, and can be done at a low cost.**
- This information can be used to inform the **IUCN Red List of Threatened Species** and other conservation tools.

1.3.6.6. SPECIATION

- A speciation is a **lineage-splitting event** that produces two or more separate species. This process generates biodiversity.
- **Modes of Speciation**
  - **Allopatric**: New species formed from geographically isolated populations.
  - **Peripatric**: New species formed from a small population isolated at the edge of a larger population.
  - **Parapatric**: New species formed from a continuously distributed population.
  - **Sympatric**: New species formed from within the range of the ancestral population.
    - > It can happen even when populations live in the same area without geographical barriers.
    - > Asiatic lions & Bengal tigers co-existed for so long in the Subcontinent due to **Sympatric Speciation.**

1.3.6.7. BIOLUMINESCENCE

- It is **property of a living organism to emit light.**
- Light emitted is **produced by energy released from enzyme-catalysed oxidation reactions** in organisms.
  - It requires two unique chemicals: **luciferin** and either **luciferase or photoprotein.**
- **Spectral range of light emission** of bioluminescent organisms spans from **blue to red light**.
- **Species exhibiting Bioluminescence:** Sponges, jellyfish, hatchet fish, worms, Sea Walnuts, fireflies, fungi, bacteria, deep-sea shrimps, etc.
- **Functions of Bioluminescence**: Counter-illumination (Camouflage against predatory animals), etc.

1.3.6.8. FACTORY FARMING

- **Factory Farming** refers to a system of **raising livestock and poultry** in **high-density facilities** under **controlled conditions** to maximize production efficiency and output of dairy products at lower cost.
- **Impacts of Factory Farming:** Antibiotic resistance; zoonotic diseases, Environmental Degradation; Health, etc.

1.3.6.9. WOODY ENCROACHMENT

- It is the **increase of tree and shrub cover** and is widespread across most ecosystems.
- It entails the **conversion of open habitats to habitats with greater tree cover** and/or shrub density.
- It results in **homogenisation of an ecosystem**, meaning a diverse, multi-layered ecosystem turns into a uniform layer of woody plants.
- Its occurrence in open ecosystems like savannahs and grasslands reduces **native grassland birds**.

1.3.6.10. GREEN WATER AND BLUE WATER

- **Green water** refers to moisture in soils and vegetation.
  - **Part of the hydrologic cycle**: Green water is absorbed by roots, used by plants, and released back to the atmosphere through the **process of transpiration.**
  - It is vital for generating rainfall, mitigating climate change, etc.
- **Blue water** is about encompassing surface and groundwater, found in lakes, rivers, and reservoirs.
  - Blue water is recharged by precipitation

1.4. ORGANIZATIONS IN NEWS

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

HQ: Geneva, Switzerland

- It is an **internationally legally binding** agreement between governments to ensure that **international trade** in specimens of wild animals and plants **does not threaten the survive of the species.**

Genesis: Drafted in 1963 following an IUCN resolution, came to force in 1975.

Parties: 184 (**India** is a member)

Cites Appendices: Contains list of species accorded **different levels or types of protection** from over-exploitation.

CITES Appendices

Appendix I	Appendix II	Appendix III
Appendix I: Species are **threatened with** extinction. International **commercial trade is prohibited**	**Appendix II:** Species **are not currently threatened** but may become so without controlled trade. Trade requires **an export permit or re-export certificate;** no import permit is generally needed	**Appendix III:** Species are **listed at a Party's request to** prevent unsustainable or illegal exploitation. Trade requires **appropriate permits or certificates.**

Reports/Indices

CITES Rosewoods: The Global Picture report
World Wildlife Trade Report

1.4.2. INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN)

HQ: Gland, Switzerland

IUCN (International Union for Conservation of Nature) is 1st global environmental organization focused on nature conservation and sustainable resource use.

Genesis: Established in **1948.**

Membership: Governments, NGOs, and research institutions.

Objective: Promotes biodiversity conservation, sustainable development, and influences environmental policy globally.

Key Initiatives:

- **IUCN Green List:** Recognizes effective conservation areas.
- **World Conservation Congress:** Global platform for conservation dialogue.
- **Nature-Based Solutions (NbS):** Uses nature to tackle challenges like climate change.

Reports/Indices

Agriculture and Conservation: Explores complex relationship between agriculture and conservation.

Key findings:

- Agriculture **directly threatens 34% of species** assessed on the IUCN Red List of Threatened Species.
- About **17% of species** on IUCN Red List have agriculture documented as a habitat.

Protected Planet Report: Evaluates protected area effectiveness

Nature-Based Solutions for Climate Change: Promotes nature in climate solutions.

1.4.3. WORLD WILDLIFE FUND (WWF)

HQ: Gland, Switzerland

- 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.**

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/Indices

Living Planet Report

Key findings:

- Wildlife **population declined by 73%** over the past 50 years (1970–2020).
  - Freshwater populations have suffered heaviest declines followed by terrestrial and marine populations.
- Adopting India's consumption patterns worldwide would need **less than one Earth by 2050.**

2. CLIMATE CHANGE

2.1. NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)

Nationally Determined Contributions (NDCs)

India's Nationally Determined Contributions (NDCs)

- Each Party to the Paris Agreement is required to **establish an NDC** and update it every **5 years**.
- India submitted its **first NDC in 2015**, **updated in 2022**.

Quantitative Targets for 2030

Target Parameter	Previous NDC, 2015	Updated NDC, 2022	Progress
Reduce the emissions intensity of its GDP from 2005 level	33 to 35%	45%	Achieved **Reduced by 33%** between 2005-2019
Cumulative electric power installed capacity from non-fossil fuel-based energy	40%	50%	Achieved **43.81%** (October 2023)
Create additional carbon sink through additional forest and tree cover	**2.5 to 3 billion tonnes of Co_2** equivalent	**Same as 2015**	-

NOTE: India's in its **updated NDC, 2022** has included a component of **mass movement for 'LIFE'– 'Lifestyle for Environment'** as a key to achieving one of its Qualitative targets.

Related concepts

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 Long-Term Low-Carbon Development Strategy (LT-LCDC)

- LT-LDC are submitted to UNFCCC.
- India submitted it in 2022 mentions that financial resources will be required to **install renewable power plants, upgrade the transmission grid**, and **introduce energy storage systems, etc.**

2.2. INTERNATIONAL CONFERENCES, CONVENTIONS AND INITIATIVES

2.2.1. UNFCCC COP29

Why in the News?

COP29 of United Nations Framework Convention on Climate Change (UNFCCC)was held in **Baku, Azerbaijan,** ending with **the Baku Climate Unity Pact** and various agreements.

About Conference of the Parties (COP)

- COP is the **UNFCCC's highest decision-making body**, where **UNFCCC members** annually **review climate progress and negotiate commitments**.
- COP30 will occur **in Belém, Brazil, in November 2025.**
- **First CoP meeting** was held in **Berlin, Germany, 1995.**

Key Outcomes of COP29

Themes	Details
New Collective Quantified Goal on Climate Finance (NCQG) or **Baku Finance Goal**	• **Goals for financing climate action in developing countries**: ○ **Triple finance** to **USD 300 billion annually by 2035** (previous goal: 100 billion). ○ Efforts to mobilize **$1.3 trillion annually by 2035** from **public and private sources.**
Carbon Markets and Article 6	• **Finalized the rules for Article 6** (related to **international carbon markets)** of the Paris Agreement.
Transparency	• All **transparency negotiating items concluded**, including **Enhanced Transparency Framework (ETF).** ○ ETF establishes a system for countries to report on their climate actions, including GHG emissions, mitigation and adaptation efforts, etc. • **1st submissions of Biennial Transparency Reports (BTRs)** by 13 counties under the Paris Agreement. ○ BTRs are the regular reports submitted by countries under **ETF.** • **Baku Declaration on Global Climate Transparency** and **Baku Global Climate Transparency Platform** launched to support the full implementation of the ETF.
Adaptation	• Launched the **Baku Adaptation Road Map (to advance implementation of adaption as per Article 7 of the Paris Agreement)** and **Baku High-Level Dialogue on Adaptation** to enhance **UAE Framework for Global Climate Resilience** implementation. • Establishing a **support program** for implementing **National Adaptation Plans (NAPs) for Least Developed Countries (LDCs).** ○ NAPs are comprehensive documents outlining a country's **medium- and long-term strategies and priorities** for adapting impacts of climate change.
Indigenous Peoples and Local Communities	• Adopted the **Baku Workplan** and renewed the **mandate of the Facilitative Working Group (FWG)** of the Local Communities and Indigenous Peoples Platform (LCIPP). ○ FWG was established at **COP24 in Katowice** to further operationalize LCIPP. • Implementation of the Workplan will **begin in 2025 with 3 Focus areas:** knowledge exchange; Capacity building for engagement; integrating diverse values and knowledge systems into climate policies.
Gender and climate change	• Extended the enhanced **Lima Work Programme on Gender and Climate Change** for another 10 years. ○ **Lima Work Programme on Gender** (established in COP 20, 2014) to **include gender considerations** under **the Convention and Paris Agreement.** ○ At **COP 25** Parties agreed a **5-year enhanced Lima work programme on gender and its gender action plan** was launched.

Issues pending

- **Deadlock on Mitigation Work Programme (MWP):** Divisions persist over fossil fuels' role, with the Global Stocktake assessment becoming a point of controversy in measuring climate progress.
- Next round of Nationally Determined Contributions (NDCs) has been **postponed** ahead of COP30.

About United Nations Framework Convention on Climate Change (UNFCCC)

- **Genesis**: Adopted in 1992 at the Earth Summit in Rio de Janeiro and entered into force in 1994. **Headquarters:** Bonn, Germany.
- **Objective**: Stabilize greenhouse gas (GHG) concentrations in the atmosphere to prevent dangerous anthropogenic interference with the climate system.
- **Membership**: 198 Parties, including India.

- **Key Agreements**:
  - **Kyoto Protocol (1997):** Binding commitments for developed nations to reduce GHG emissions.
  - **Paris Agreement (2015):** Global accord to limit temperature rise below 2°C, aiming for 1.5°C.

2.2.2. KEY INITIATIVES/DECLARATIONS LAUNCHED AT COP29

Initiative	Launched by	Aim and other details
Reducing Methane from Organic Waste Declaration	UNEP-convened Climate and Clean Air Coalition (CCAC)	• **Aim:** Set sectoral **targets to reduce methane from organic waste**. • Support the implementation of **2021 Global Methane Pledge (GMP), launched at COP26.** • **Signatories:** 35 countries **(excluding India**), representing 47% of global methane emissions from organic waste.
Global Energy Storage and Grids Pledge	COP29 Presidency	• **Aim**: Sets targets for 2030. • Deploying **1,500 GW of energy storage** in the power sector globally (more than six times the level of 2022). • **Global grid deployment goal** of **adding or refurbishing 25 million kilometers** of grids.
Green Energy Pledge, Green Energy Zones and Corridors	COP29 Presidency in partnership with UNIDO, UNECE and UNESCAP	• **Aim:** Promoting **green energy zones** for tackling climate change, • Green energy zones act as **centralized hubs** for high-quality variable renewable energy resources, renewable energy infrastructure and storage.
Hydrogen Declaration	COP29 Presidency	• **Aim:** Accelerate production and use of clean hydrogen • **Non-legally binding document** not requiring changes to participating countries' national law.
Baku Harmoniya Climate Initiative for Farmers	COP29 Presidency in partnership with Food and Agriculture Organization (FAO)	• **Aim:** Acknowledge fundamental role of farmers as agents of climate action. • **Hosted by FAO** as part of the **Food and Agriculture for Sustainable Transformation (FAST)** Partnership. • **FAST is a multi-stakeholder platform established at COP27 (2022)** to strengthen quantity and quality of **climate finance in agrifood systems.**
Climate Finance Action Fund (CFAF)	Azerbaijan	• **Aim: Support climate projects in developing countries**, meeting next generation **NDCs to keep within 1.5-degree C.** • It will be capitalised with **contributions from fossil fuel producing countries** and **companies across oil, gas and coal**. • Become **operationalised post conclusion of initial fundraising round ($1 billion)**, when 10 contributing countries committed as shareholders. • **Headquarter**: Baku, Azerbaijan.
Baku Initiative for Climate Finance, Investment and Trade (BICFIT) Dialogue	COP29 Presidency, co-facilitated by UN Trade and Development (UNCTAD) and UN Development Program (UNDP)	• **Aim**: Advance national ambitions and actions through **utilization of climate finance, investment, and trade** as per UNFCCC and the Paris Agreement.
Global Matchmaking	UN Industrial Development Organization	• **Aim**: Accelerate the decarbonization of heavy-emitting industries in emerging and developing economies.

Platform (GMP)	(UNIDO) and the Climate Club	• **Function**: Connects industries with technical and financial solutions • **Role**: Single-point gateway to raise decarbonization requests.
Declaration on Green Digital Action	COP29 Presidency with the Climate Technology Centre & Network, Technology Mechanism, and International Telecommunication	• **Aim:** Harnessing digital technologies to accelerate climate action, promote sustainable development, bridge digital divide.
Continuity Coalition for Climate and Health	COP 29 Presidency with the UAE, Egypt, UK, Brazil, and World Health Organisation (WHO)	• **Aim:** To advance the implementation of health commitments from previous COPs and integrate health into climate action.
Baku Dialogue on Water for Climate Action	COP29 Presidency in partnership with UNEP, UNECE, and WMO	• **Aim:** Build collaboration between COPs on water and its interplay with climate change, biodiversity loss, pollution and desertification.
1.5° Partnership for Action on Climate Transition (PACT) Programme	United Nations Development Program (UNDP)'s **Financial Centres for Sustainability (FC4S).**	• **Aim:** Foster stronger collaboration between the **private sector and governments** for achieving the **1.5°C-aligned Nationally Determined Contributions (NDCs)** by **2025.** ○ Mobilizing the **financial sector** and supporting the creation of **Transition Plans** ○ Work through **local financial centres** including **FC4S members.**
Other Initiatives • **COP29 Declaration on Enhanced Climate Action in Tourism:** Aims to mobilize the tourism sector to reduce its carbon footprint, enhance climate resilience, and promote sustainable practices. • **Global Energy Efficiency Alliance:** Launched by **UAE** to double global energy efficiency rates by 2030 • **Hydro4NetZero-LAC initiative:** Aims to develop and modernise sustainable hydropower infrastructure. • **Global Alliance for Pumped Storage (GAPS):** Launched with over 30 governments and international agencies. • **'Raising Ambition and Accelerating Delivery of Climate Finance'** Report published by Independent High-Level Expert Group on Climate Finance. ○ **Global Investment Required** for climate action around **$6.3–6.7 trillion per year by 2030.**		

2.2.3. INDIA AT COP29

Why in the News?

India clarified its climate negotiation stance at UNFCCC-COP29.

India's stance

- **Proposed a goal of $1.3 trillion annually under NCQG**, with $600 billion coming from grants or equivalent resources.
- **Opposed changes** to the scope of the **Mitigation Work Programme (MWP)** and attempts **to alter temperature goals** in the Paris Agreement.
- India asserted that **developed countries should provide financial and technological support** to developing countries for just transition.

- Opposed follow-up mechanisms for **Global Stocktake (GST)** outcomes, Criticized the UAE dialogue text for its lack of connection to finance, imbalance, and mitigation-centric language.
    - 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**.
- Called **for clear indicators to measure progress** on adaptation, **Opposed the use of third-party databases**, **Supported the establishment of the Baku Road Map**

India at COP29 Side-events:

- **Disaster Resilient Infrastructure**: With CDRI, focused on climate-resilient infrastructure; $8M for 12 **Small Island Developing States** (SIDS) projects announced.
- **LeadIT Meet**: Co-hosted with Sweden, aimed at accelerating low-carbon industry transitions.
- **Energy Transitions with the Global south**: With ISA, spotlighted solar energy's role in developing nations' energy shift.
- **Others**: India-Sweden Industry Transition Partnership (ITP), etc.

2.2.4. ARTICLE 6

Why in the News?

After a decade of negotiations, the rules for **carbon trading under Article 6 of the Paris Agreement** have been finalized.

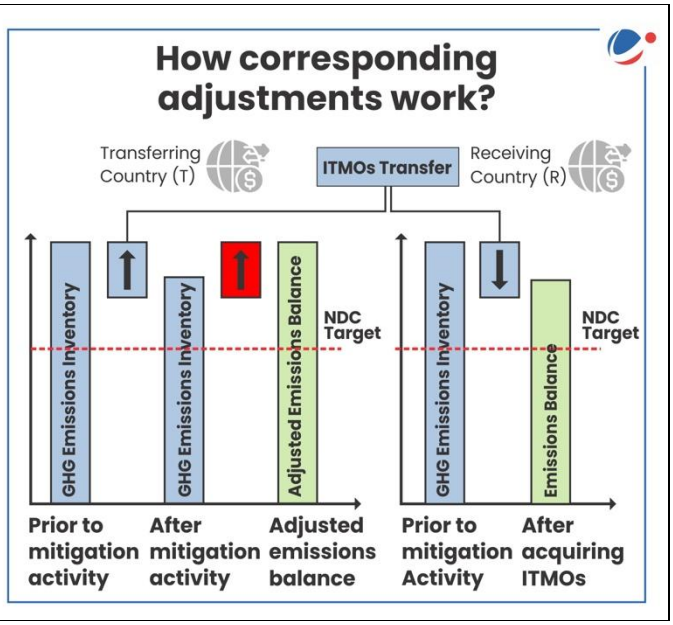
About Article 6 of the Paris Agreement

- Provides mechanisms for countries to cooperate in achieving their Nationally Determined Contributions (NDCs) through carbon markets, **consisting of two market-based and one non-market-based approach.**
- **Carbon Market** is **a trading system** where entities **buy carbon credits to offset their GHGs** by supporting projects that reduce or remove emissions.
    - **One tradable carbon credit generally equals one metric tonne of carbon dioxide,** or the equivalent amount of a different greenhouse gas reduced, sequestered or avoided.
    - Carbon trading was **introduced by Kyoto Protocol** in 1997.

Mechanisms under Article 6		
Market based approaches		**Non-Market based approach**
Article 6.2	**Article 6.4**	**Article 6.8**
• **Decentralized approach** for **bilateral cooperation** • Trading of **International Transferred Mitigation outcomes (ITMOs)** (emissions reductions that result from mitigation actions) • **Corresponding adjustment in NDCs** are made on trade of ITMOs.	• **Centralized approach** termed as **Paris Agreement Crediting Mechanism (PACM).** • **Establishes a global carbon market.** • Uses **Baseline-and-crediting** mechanism	• Introduces **non-market approaches to promote mitigation and adaptation** • **No trading of emission reductions** is involved. • Involves **more than one participating Party.**

About Corresponding adjustment (Article 6.2)

- Changes made in a countries' emissions levels to reflect the **transfer (export) or acquisition (import)** of ITMOs.
- Made for 3 different cases based on different types of targets and measures in NDCs:
  - **GHG metrics**: E.g., economy-wide annual levels of GHG emissions
  - **Non-GHG metrics**: E.g., installed capacity of renewable energy in MW
  - **Policies and measures** within a country's NDCs



Difference between Carbon trading of Kyoto Protocol and Paris Agreement

Aspect	Kyoto Protocol	Paris Agreement (Article 6)
Scope of Participation	**Limited to developed countries (Annex I)** with project hosting by developing countries.	**Inclusive of all countries.**
Adaptation Funding	**Share of proceeds from CDM projects** directed to the Adaptation Fund.	**5% of proceeds from Article 6.4 transactions** allocated to the Global Adaptation Fund.
Market Scope	Focused **on project-based mechanisms like Clean Development Mechanism (CDM) and Joint Implementation (JI).**	**Combines market-based and non-market-based approaches**.
Legacy Credits	**Allowed use of older credits** from inactive projects, causing oversupply concerns.	Restricts legacy credit use; **only post-2013** credits.

2.2.5. CLIMATE FINANCE

Why in the News?

Developing countries are disappointed with the enhanced **New Collective Quantified Goal (NCQG)** on climate finance.

About NCQG

- **Proposed at COP21 for setting a new climate finance goal post-2025**, following the unmet $100 billion annual target set in 2009.
- **Article 9 of the Paris Agreement mandates** developed countries to provide financial support to developing nations.

About Climate finance

- **It is local, national or transnational funding** from public, private and alternative sources to **support climate change mitigation and adaptation,** particularly in **developing countries** vulnerable to climate change (UNFCCC).
- **Key facts about climate finance**
  - 90% of climate finance goes to mitigation actions (UNDP).
  - **~ 94%** of existing climate investment is either through **debt or equity** (return seeking) (Climate Policy Initiative).

Global Financial mechanisms under UNFCCC	
Loss and Damage Fund (LDF)	• Established during **COP27 held in Egypt** and **operationalized in COP28, Dubai** to provide **financial assistance to countries vulnerable countries.**
Green Climate Fund (GCF)	• **Established in COP 16, 2010, for developed countries to mobilise US$ 100 billion per year by 2020 to** support developing countries realize their NDC ambitions.
Adaptation Fund	• **Established in 2001** to finance concrete adaptation projects and programmes in developing country Parties to the **Kyoto Protocol**. • **Receives 5% share of proceeds from new market-based UNFCCC mechanism** established by Article 6.4 of the Paris Agreement.
Special Climate Change Fund (SCCF)	• **Established in 2001 (COP7)** to finance projects on adaptation; technology transfer, etc. Administered by **Global Environment Facility (GEF).**
Least Developed Countries Fund (LDCF)	• Established in **2001 (COP7)** to assist **Least Developed Country Parties** for National Adaptation Programmes of Action (NAPAs). • Administered by **Global Environment Facility (GEF).**

Related News

Fund for responding to Loss and Damage

- The Board for Loss and Damage Fund decided to call fund as "**Fund to respond to Loss and Damage" (FrLD).**
  - Loss and damage refer to the negative consequences that arise from unavoidable risks of climate change, like rising sea levels, prolonged heatwaves, desertification, ocean acidification etc.
- **About FrLD**
  - Established in COP27 of UNFCCC in Sharm el-Sheikh (Egypt) in 2022.
  - **Host country for Board of the fund**: Philippines
  - **Purpose**: Help developing countries compensate for losses and damages.

2.2.6. GLOBAL ENVIRONMENT FACILITY (GEF)

Why in the news?

67th GEF Council approved $736.4 million funding.

Key Outcomes

- Funding has been mobilized for Projects from **the GEF Trust Fund, Least Developed Countries Fund (LDCF), and Global Biodiversity Framework Fund (GBFF)**, which together are part of the GEF family of funds.
- Includes Projects like **Great Green Wall (GGW), Sustainable Cities Integrated Program (SCIP) etc**.
  - **GGW** focused on **restoring landscapes and ecosystems across the Sahel region of Africa**.
  - **SCIP** is a 20-country program aim to catalyze **urban system transformation.**
- Also includes **2 Indian Projects**-
  - **Enhancing the conservation and sustainable use of biodiversity** to meet commitment to the Kunming-Montreal Global Biodiversity Framework targets.
  - **CoHABITAT –** Conservation and sustainable management of wetlands forest and grassland to secure the population of migratory species along the Central Asian Flyway in India.
- These projects are **implemented by the UNDP** along with Indian Ministry of Environment, Forest, and Climate Change acting as the executive agency.

About Global Environment Facility (GEF)

- Partnership of 18 agencies to address world's most challenging environmental issues.
- **Genesis**: Established in 1992 during the eve of Rio Earth Summit.
- **Governance**: GEF Council is the main governing body.

- **Functions**: Serves as financial mechanism to **five conventions**
  - United Nations Framework Convention on Climate Change (UNFCCC)
  - Convention on Biological Diversity (CBD)
  - United Nations Convention to Combat Desertification (UNCCD)
  - Stockholm Convention on Persistent Organic Pollutants
  - Minamata Convention on Mercury
- **GEF Trustee**: World Bank
- **Member countries**: 186 countries (including India).
- **Secretariat**: Washington, D.C (US).
- **Key Initiatives and Focus Areas**:
  - **Small Grants Programme (SGP**): Supports community-led initiatives in conservation.
  - **Least Developed Countries Fund (LDCF):** Supports adaptation projects in vulnerable nations.
  - **Special Climate Change Fund (SCCF**): Focuses on addressing climate variability.
  - **PlanetGOLD**: Aims to reduce mercury use in artisanal and small-scale gold mining.
  - **Blue Nature Alliance:** conserves Ocean and marine biodiversity.

2.2.7. ANTARCTIC TREATY

Why in News?

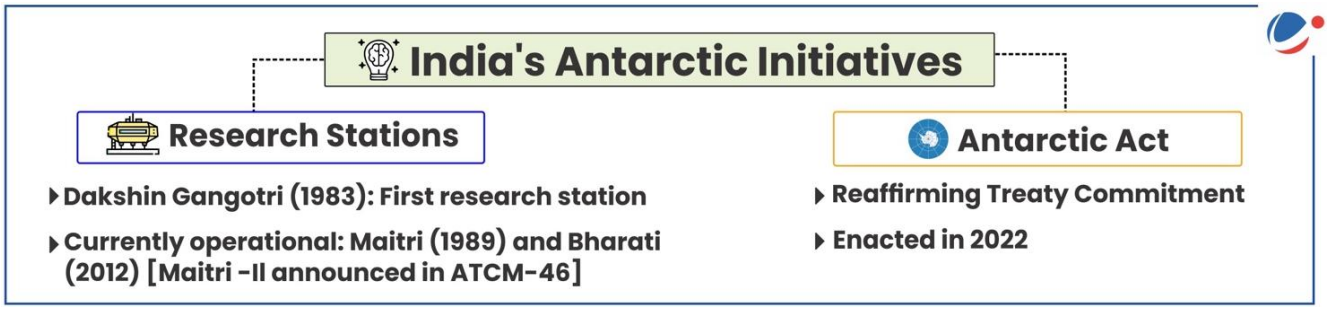
46th **Antarctic Treaty Consultative Meeting (ATCM)** and 26th **Committee on Environmental Protection (CEP)** concluded in India.

More in the news

- These were hosted by the **National Centre for Polar and Ocean Research (NCPOR), Ministry of Earth Sciences**, Government of India.
  - NCPOR was established as an autonomous **Research and Development Institution** in **1998.**
- Measures, Decisions and Resolutions, adopted at the ATCM, **give effect to the principles of the Antarctic Treaty.**

About Antarctic Treaty

- **Genesis:** Signed in Washington, in **1959** by **12 countries** & **entered into force in 1961**.
- **Members:** 57 out of which 29 are consultative parties (participate in the decision-making).
  - **India has been a Consultative Party** since 1983.
- **Applicability:** The area south of 60° South latitude.
- **Key provisions**
  - Antarctica shall be used for **peaceful purposes only.**
  - **Facilitate international scientific cooperation in Antarctica.**
  - **Prohibits nuclear explosions, radioactive waste disposal, and military deployments** in Antarctica.
- **Other efforts to safeguard Antarctica**
  - **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 Antarctic Treaty (Madrid Protocol), 1991 (Signed by India)**



2.2.8. OTHER INITIATIVES IN THE NEWS

2.2.8.1. CLIMATE TECHNOLOGY CENTRE AND NETWORK (CTCN)

CTCN marks its **10th anniversary.**

About CTCN

- **Headquarters:** Copenhagen, Denmark.
- Established in 2014, it is the **implementation arm of Technology Mechanism of the United Nations Framework Convention on Climate Change.**
- It is hosted by the **UN Environment Programme**.
- It promotes accelerated **transfer of environmentally sound technologies** for low carbon and climate resilient development at the request of developing countries.

2.2.8.2. CLIMATE PROMISE INITIATIVE

UN Development Programme unveiled **Climate Promise 2025**, next stage of its Climate Promise Initiative.

About Climate Promise Initiative

- It is an **initiative to support developing countries on their climate action**.
- It is **world's largest offer of support** to developing countries on **NDC (Nationally Determined Contribution) enhancement and implementation.**
  - **Each Party to Paris Agreement** is required to establish an NDC, which includes targets for mitigating the greenhouse gas emissions and for adapting to climate impacts.
- Climate Promise 2025 aims to **align next generation of developing countries' NDCs** to the goals of 2015 Paris Climate Agreement.

2.2.8.3. GREENING EDUCATION PARTNERSHIP

UNESCO launched two new tools – new Greening Curriculum Guidance (GCG) and new Green School Quality Standards (GSQS) – under **Greening Education Partnership**.

About Greening Education Partnership

- It is a **global initiative** comprising 80 member states and supports countries to tackle the **climate crisis by harnessing the critical role of education.**
- **New GCG:** A practical manual providing, for the first time, a **common understanding of what climate education should consist of** and how countries can mainstream environmental topics across curricula, with detailed expected learning outcomes.
- **New GSQS**: It sets the **minimum requirements on how to create a green school** by promoting an action-oriented approach.

2.2.8.4. CLIMATE POLICY INITIATIVE (CPI)

CPI released '**Global Landscape of Climate Finance 2024'** during UNFCCC COP29.

About CPI

- An independent, not-for-profit organization with deep expertise in finance and policy.
- It was **founded in 2009** to support nations building low-carbon economies to develop and implement effective climate, energy, and land use policies.
- **Key Findings of report:**
  - **Climate flows are likely to have surpassed USD 1.5tn in 2023,** with key increases in renewable energy (RE) and low-carbon transport.
  - **Fossil fuel investment and consumer fossil fuel subsidies continued to increase** annually since 2020.

2.2.8.5. SCIENCE BASED TARGETS INITIATIVE (SBTI)

Climate experts **voiced concerns regarding SBTi's decision** allowing companies to offset greenhouse gas emissions from their value chain.

About SBTi

- SBTi is a **corporate climate action organization that enables companies and financial institutions worldwide** to combat the climate crisis.
- It **develops standards, tools, and guidance** to meet corporate climate targets.
- It is incorporated **as a charity.**
- **SBTi's partners include,** Carbon Disclosure Project (CDP)**,** United Nations Global Compact, We Mean Business Coalition, World Resources Institute (WRI), and World Wide Fund for Nature (WWF).

2.2.8.6. NATIONAL INFORMATION SYSTEM FOR CLIMATE AND ENVIRONMENT STUDIES (NICES) PROGRAMME

NICES programme has invited Indian researchers to join in combating climate change.

About NICES Programme

- Conceptualized in 2012, it is operated by **Indian Space Research Organisation** (**ISRO)** and **Department of Space** along with **other ministries** under framework of **National Action Plan on Climate Change**.
- Its objective is **generation and dissemination of long-term Essential Climate Variables,** derived from Indian and other Earth Observation satellites, which are crucial for characterizing Earth's climate.
- Now, aims to **enhance participation of academia and research institutions** in addressing climate change-related challenges through multidisciplinary scientific investigations

2.2.8.7. INTERNATIONAL NETWORK FOR TERRESTRIAL RESEARCH AND MONITORING IN THE ARCTIC (INTERACT)

INTERACT is a project of large **network of research stations** focused on the Arctic and surrounding regions.

About INTERACT

- Research stations spread across various countries including northern Europe, Russia, US, Canada, Greenland, Iceland, Faroe Islands and Scotland.
- The project is **funded by the EU.**
- **Objective**: Build capacity for **identifying, understanding, predicting and responding to diverse environmental changes** throughout the wide environmental and land-use envelopes of the Arctic.

2.2.8.8. MYAC (ONE MILLION YOUTH ACTIONS CHALLENGE)

1MYAC (One Million Youth Actions Challenge) is promoted by **the One UN Climate Change Learning Partnership (UN CC: Learn)**

About 1MYAC

- Aims to **encourage youth aged 10 to 30 years old** to take concrete actions for a more **sustainable future.**
- It works to **promote four Sustainable Development Goals (SDGs)**
  - It includes SDG 6 (**clean water and sanitation**), SDG 12 **(responsible consumption and production**), SDG 13 (**climate action**) and SDG 15 (**life on land)**.
- **UN CC: Learn** is a collaborative initiative of 36 multilateral organizations working together to help countries build the knowledge and skills they need to take action on climate change.

2.3. CLIMATE MITIGATION AND ADAPTATION

2.3.1. GREEN CREDIT RULE

Why In news?

Recently, the Ministry of Environment and Forests has issued **further guidelines on its Green Credit Programme (GCP).**

Key Provisions of the new guidelines

- Focus of work for plantation on degraded forest areas under GCP on their **eco-restoration.**
- Number of trees to be planted depends **on site characteristics and vary as per site conditions.**
- **Activities for eco-restoration not to be limited to the plantation of trees** and include other activities like Plantation of shrubs, herbs, grasses, Soil and moisture conservation works, Terracing, Rains water harvesting, etc.
- **Preference to indigenous species**.
- Cost estimates may be titled as **'Eco restoration of the identified degraded forests'**.
- ICFRE **instructs Forest Departments** to **conduct tree plantation within two years.**

About Green Credit (GC)

- A singular unit of an incentive provided for a specified activity, delivering **positive impact on the environment.** They **can be traded on a dedicated exchange**, **similar to carbon credits**.

Green Credit	Carbon Credit
• Under the **Green Credit Program (GCP)** operating under **The Environment (Protection) Act, 1986.**	• Under **the Carbon Credit Trading Scheme** under **The Energy Conservation Act, 2001.**
• Benefits **individuals and communities.**	• Primarily **benefit industries and corporations.**
• **Green credit activities may qualify for carbon credits**, leading to co-benefits like carbon emissions reduction, **but not vice versa.**	

About Green Credit Program (GCP)

- **Market-based mechanism for voluntary participation** to incentivise environment positive actions by different stakeholders.
- **Aim:** Aligned with **'LiFE'-'Lifestyle for Environment' initiative**; **Encourage industries, companies, and other entities** to meet their existing obligations or other obligations (voluntary).
- **Eligible Activities** include Tree plantations, Sustainable agriculture practices, etc.
- **Established:** Under **"The Environment (Protection) Act, 1986"** with **MoEFCC as Nodal Agency.**
- **Governance Structure**
  - An **inter-ministerial Steering Committee.**
  - **The Indian Council of Forestry Research and Education** (ICFRE) **serves as the GCP Administrator,** for program implementation, management, monitoring, and operation.
  - **Project Registration, Verification and Issuance of Green Credits** platforms established by ICFRE.

Other Carbon Market and Carbon Trading Mechanisms in India

- **Carbon Credits Trading Scheme (CCTS), 2023:** Introduced through amendments in the Energy Conservation (Amendment) Act, 2022, it establishes **Indian Carbon Market under two mechanisms**:
  - **Compliance mechanism:** Mandatory program for the energy-intensive industries where Government will set GHG emission intensity targets.
    - Initially includes 9 sectors like **Fertiliser, Iron & Steel, Pulp & Paper, Petrochemicals, Petroleum refinery, etc.**
  - **Offset mechanism:** A **voluntary project-based mechanism** for entities not covered under compliance mechanism.

- **Other Instruments:**
  - **Perform, Achieve and Trade (PAT) Scheme:** Mandates large energy-intensive industries to reduce their specific energy consumption.
    - > Industries that exceed their targets earn **energy saving certificates (ESCerts),** which can be traded with those who fall short.
    - > It will be transitioned gradually to the compliance mechanism under CCTS.
  - **Renewable Energy Certificates (REC) Scheme:** A market-based instrument to promote renewable energy and facilitate compliance of **renewable purchase obligations (RPO).**
    - > Value of **REC is equivalent to 1MWh of electricity.**

2.3.2. GREENWASHING

Why in the News?

Central Consumer Protection Authority (CCPA) has issued guidelines for 'Prevention and Regulation of Greenwashing and Misleading Environmental Claims, 2024'.

More on the News

- These guidelines are in furtherance to the **Guidelines for Prevention of Misleading Advertisement, 2022.**
- They shall be **in addition to and not in derogation of other laws.**

About Greenwashing

- Guidelines define it as any **deceptive or misleading practice**, which includes **concealing, omitting, or hiding relevant information,** by exaggerating, making vague, false, or **unsubstantiated environmental claims.**
- Also includes **use of misleading words,** symbols, or imagery, placing **emphasis on positive environmental** aspects while **downplaying or concealing harmful** attributes.

Key provisions of the guidelines

- **Applicability: All** environmental **claims, a manufacturer, service provide**r, product seller, advertiser, or to an advertising agency **or endorser** whose **service is availed for the advertisement** of such products.
- **Substantiation of Environmental claim:** All environmental claims shall be supported by **accessible verifiable evidence on independent studies and third-party certification.**
- **Adequate Disclosures:**
  - Ensure **all environmental claims in ads or communications** are **fully disclosed**, either directly or through technology like QR codes or web links (for easy accessibility).
  - Claims must **specify whether it refers to the good as a whole or part of it** or manufacturing process, packaging, etc.
  - **Avoid selectively presenting data** to favorably highlight environmental claims.
- **Aspirational or futuristic environmental claims:** Such claims may be made **only when clear and actionable plans** have been **developed** for achievement of objectives.

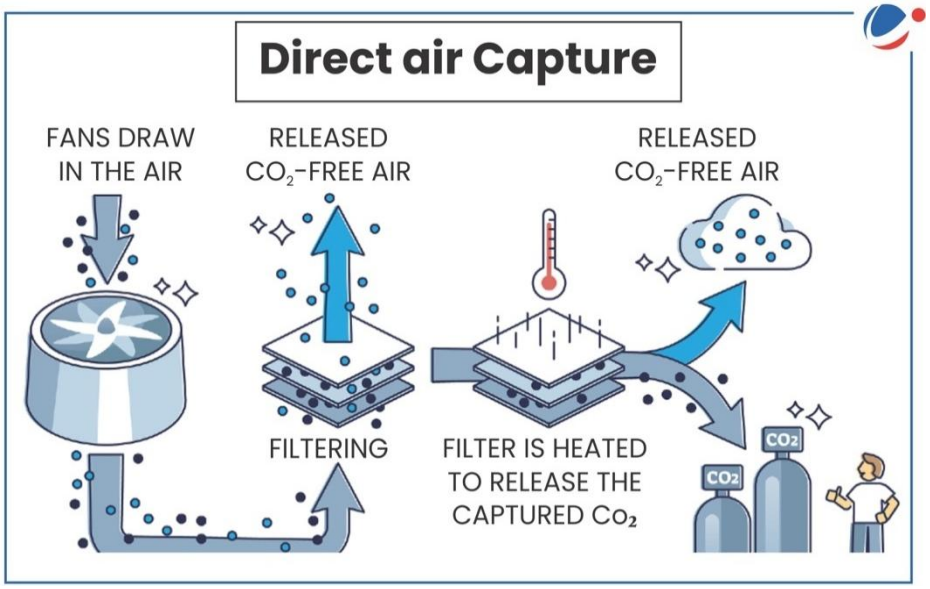
Other Initiatives taken to prevent Greenwashing

- **Bureau of Indian Standards (BIS): Eco-labelling of products and services** called IS/ISO 14024:1999.
- **Green Rating Project (GRP):** By **Centre for Science and Environment (CSE)** that rates industrial units for their environmental friendliness.
- **Indian Green Building Council (IGBC):** A **nonprofit organization** that has developed a r**ating system for green buildings.**
- **SEBI's Business Responsibility and Sustainability Report (BRSR):** It requires top 1000 listed companies to report their ESG (environmental, social and governance) performance in a standardized format.
- **Advertising Standards Council of India (ASCI):** It requires that advertisements making environmental/ green claims be specific, accurate, and not misleading.
- **Greenwashing TechSprint:** Organized by Global Financial Innovation Network (GFIN) to **develop a tool to help regulators** tackle greenwashing in financial services.
  - **Reserve Bank of India** was a participant.

2.3.3. DIRECT AIR CAPTURE AND STORAGE (DAC+S) PLANT

Why in News?

World's largest DAC+S plant, Mammoth, **started operation in Iceland.**



About DAC+S Technology

- A **Carbon Dioxide Removal (CDR) technology** which **captures CO_2 directly from atmosphere at any location**.
  - It is **distinct from carbon capture** which is generally carried out **at point of emissions**.
- **CO_2** can be **permanently stored in deep geological formations** (DAC+S) or **used** for various applications.

About CDR

- CDR refers to **anthropogenic activities that remove CO_2 from atmosphere** and **store it durably** in geological, terrestrial, or ocean reservoirs.
- According to IPCC Sixth Assessment Report, **CDR is a necessary element to achieve net-zero CO_2 and GHG emissions.**
- **Other CDR technologies:**
  - **Afforestation/Reforestation and Soil Carbon Sequestration:** Fixing atmospheric carbon in biomass and soils.
  - **Enhanced Weathering:** Mining of rocks containing minerals that **naturally absorb CO_2**.
  - **Ocean-based CDR:** Ocean fertilisation (adding nutrients to upper layers), ocean alkalinity enhancement (transformation of **CO_2** as biocarbonate/carbonate), coastal blue carbon management etc.
  - **Bioenergy with Carbon Capture and Storage (BECCS):** Using biomass as energy for CDR and storing biogenic carbon geologically.

2.3.4. CO_2-TO-METHANOL CONVERSION

Why in the news?

India's first CO_2-to-Methanol Pilot Plant has been proposed in Pune, Maharashtra

More on the news

- Plant with capacity of **1.4 tons per day** is being **implemented under Public-Private Partnership** with support from **Department of Science and Technology**.
- Plant in Pune will advance **indigenous Carbon Capture and Utilisation (CCU) technologies**.

About CO_2-to-Methanol Conversion

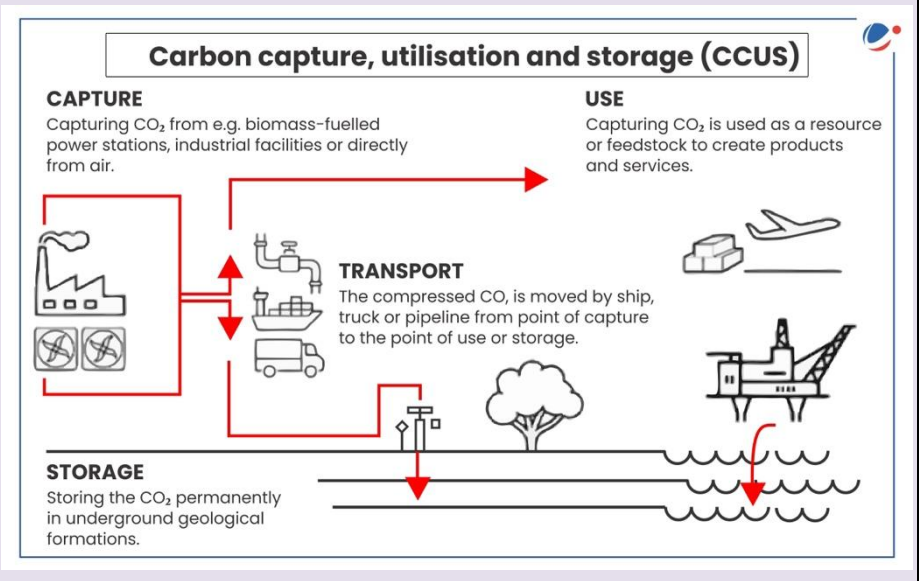
- CO_2-to-methanol involves **capturing carbon emissions before they enter atmosphere**, from industrial sources like power plants or directly from air.
- **Captured CO_2 is then hydrogenated** – reacted with hydrogen – to **produce methanol**.

About Methanol

- Also known as **wood alcohol**, it is a low **carbon, hydrogen carrier fuel** produced from **high ash coal, agricultural residue, CO_2 from thermal power plants and natural gas.**
- It can replace petrol/diesel in the **transport sector**, **energy sector** and **retail cooking** (replacing LPG [partially], kerosene and wood charcoal).
- **Initiatives in India for methanol production**
  - NITI Aayog's **'Methanol Economy' programme** is aimed at converting coal reserves and municipal solid waste into methanol.
  - Bureau of Indian Standards has notified **20% DME (Di-methyl Ether, a derivative of methanol) blending with LPG**
  - Notification for M-15, M-85, M-100 blends has been issued by the Ministry of Road, Transport and Highways.

About Carbon Capture, Utilization and Storage (CCUS)

- **Refers to Group of technologies** for **capturing** of CO_2 from large and stationary CO_2 emitting sources like fossil fuel-based power plants and other industries.
- It involves **transport of captured** CO_2 (by pipeline or through shipping, rail or trucks) to sites for **utilization in different applications, injections into geological formations or depleted oil/gas fields** for **permanent storage** and trapping of CO_2.



2.3.5. GREEN TUG TRANSITION PROGRAMME (GTTP)

Why in the news?

Union Minister of Port Shipping and Waterways launched the SOP for Green Tug Transition Programme (GTTP) **to drive the transition from conventional fuel-based harbour tugs to greener alternatives.**

About GTTP

- Announced in **2023**, is a key initiative under the '**Panch Karma Sankalp' (**5 major announcements) including-
- **30% financial support for the promotion of Green Shipping**,
- Single Window Portal to facilitate and monitor river and sea cruises, etc.
- **Aim:** To phase out conventional fuel-based harbour tugs **operating in Indian Major Ports** and replace them with green tugs.
- A **tug** is a particular **class of boat which helps mega-ships enter or leave a port**.

Emissions from Shipping sector

- **Global**: Accounts for **nearly 3% of world's CO_2 emissions.**
- **India: GHG emissions from maritime** (excluding military operations) contribute **1% of overall transport sector GHG emissions.**

Other Initiatives

Global

- **Revised Greenhouse Gas (GHG) Strategy by International Maritime Organization:** sectoral target of net-zero emissions by 2050.
- **Green Voyage 2050:** Support developing countries to reduce emission from ships, aligning with 2023 IMO GHG strategy.

Indian

- **Sagarmala Programme:** Port-led development, emphasis on green ports.
- **Maritime India Vision 2030:** Green Ports and Green Shipping in India

2.4. TERMS IN THE NEWS

2.4.1. CARBON FARMING

European Parliament and the European Council recently reached a **provisional agreement** on a regulation to establish the first **EU-level Carbon Removal Certification Framework.**

About Carbon Farming

- It uses **regenerative practices** to improve agriculture, restore ecosystems, and combat climate change by storing carbon and reducing emissions (Regenerative farming).
- **Common Methods**: Agroforestry, conservation farming (minimising soil disturbance), integrated nutrient management, Renewable Energy Production Grasslands Conservation, etc.

Key Initiatives Facilitating Carbon Farming

- **Global**
  - **4 per 1000 Initiative**: Encourages stakeholders to engage in a transition towards a regenerative, productive and highly resilient agriculture.
    - > It was launched during the UNFCCC COP21 (2015) in Paris.
  - **World Bank-supported initiatives:** E.g. Kenya's Agricultural Carbon Project.
- **India**
  - **Carbon Credit Trading Scheme (CCTS):** Launched by the Ministry of Power for trading of carbon credits among obligated entities.

- **National Mission on Sustainable Agriculture:** Promote agroforestry, micro irrigation, crop diversification, etc. by the government of India, to **encourage farmers to be part of the carbon trading in agriculture.**

2.4.2. CARBON BORDER ADJUSTMENT MECHANISMS

Kazan Declaration adopted by BRICS rejected CBAM, calling it discriminatory.

About Carbon Border Adjustment Mechanism (CBAM)

- It is European Union's (EU) policy to impose a **carbon tax** on imports of certain products from countries with less stringent climate policies. **E.g**. Steel.
- Carbon Border Tax aims to **prevent companies shifting production** to **less-regulated countries.**
- CBAM, **implemented in 2023,** moves from transitional phase to full enforcement by **2026.**

Other Initiatives by EU:

- European Parliament had also approved the **Net-Zero Industry Act**, that sets a target for Europe to produce **40% of its annual deployment needs in net-zero technologies by 2030**, based on National Energy and Climate Plans (NECPs).
- **Global Climate Change Alliance (GCCA)** is an initiative of the **European Union** to build a new alliance on climate change between the European Union and the poor developing countries.
  - In 2015, GCCA entered a new phase by becoming the **flagship initiative Global Climate Change Alliance Plus (GCCA+).**
  - 2015 Paris Agreement on Climate Change and the 2030 Agenda for Sustainable Development characterise this new phase.

2.4.3. KEELING CURVE

Global average concentration of carbon dioxide (CO2) was 4.7 parts per million (ppm) in March 2024 (higher than March 2023), signifying **large spike in Keeling Curve.**

About Keeling Curve

- It is the **record of atmospheric CO_2 from Mauna Loa Observatory (MLO),** since 1958.
  - MLO is a station that **measures the elements in atmosphere that contribute to climate change.**
  - It is **located in Hawaii on the side of Mauna Loa**, the world's largest active volcano.

2.4.4. GREENIUM (GREEN PREMIUM)

Indian sovereign green bonds hardly received any **Greenium** from private investor's according to Economic Survey 2023-24.

- **Green bonds** are debt instruments that fund specific projects/activities categorised as 'green' under national or international green taxonomies.

About Greenium

- It refers to **pricing benefits based on the logic** that investors are willing to pay extra or accept lower yields in exchange for sustainable impact (United Nations Development Programme (UNDP)).
- It is the **additional cost of choosing a clean technology** over one that emits more greenhouse gases.

2.4.5. TEAL CARBON

India's first 'teal carbon' study undertaken at **Keoladeo National Park (KNP)**.

About Teal Carbon

- Refers to **carbon stored in non-tidal freshwater wetlands**, encompassing carbon sequestered in vegetation, microbial biomass, and dissolved and particulate organic matter.

- It being a **color-based terminology,** reflects the classification of the organic carbon **based on its functions and location** rather than its physical properties.
- **Other types of carbon**
  - **Purple:** Carbon captured through the **air or industrial emissions.**
  - **Green:** Carbon **stored in terrestrial plants**.
  - **Black:** Carbon released through the **burning of fossil fuels.**
  - **Red:** Carbon released through **biological particles** on snow and ice that reduce albedo.
  - **Grey:** Carbon released through **industrial emissions**.

2.4.6. REPRESENTATIVE CONCENTRATION PATHWAYS (RCP)

- Intergovernmental Panel on Climate Change (IPCC) introduced RCPs in Fifth Assessment Report (AR5).
- It **describes four different 21st-century pathways of greenhouse gas (GHG)** emissions and atmospheric concentrations, air pollutant emissions and land use.

2.4.7. WATER CREDIT

- A **market-based mechanism** similar to carbon credits, which incentivises water conservation and quality improvement.
  - **Carbon credits** are generated by projects that have **reduced or avoided or removed carbon emissions**.
  - **Each credit represents one less tonne of carbon dioxide**, or another greenhouse gas equivalent, (CO_2e) in atmosphere.
- Individuals and entities can earn **tradable credits** by adopting water-saving measures.
  - These credits can then be **sold to others needing to offset their water usage or improve their water management practices.**

2.4.8. BIODIVERSITY CREDITS

- **Definition:** An economic instrument that allows private companies to finance activities, such as forest conservation or restoration.
- **Purpose:** To have a net-positive impact on nature and biodiversity.
- Unlike biodiversity offset, **biodiversity credits are not limited** to compensating for companies' negative and unavoidable impacts on nature.

2.4.9. GLACIAL GEOENGINEERING

- It is the **deliberate modification of the climate system around a glacier** to slow the melt of the ice shelf and reduce sea level rise.
- **Proposed Glacial Geoengineering Strategies**
  - **Ocean-heat transport interventions:** Setting **sediment berms or fibrous curtains** along the seabed in the front of ice shelves to **block the flow of warm circumpolar deep water**.
  - **Basal-hydrology interventions:** Slow the flow of streams that carry meltwater off the ice sheets by drilling holes into glacier beds.

2.5. ORGANIZATIONS IN NEWS

2.5.1. UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP)

HQ: Nairobi, Kenya

- 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.**

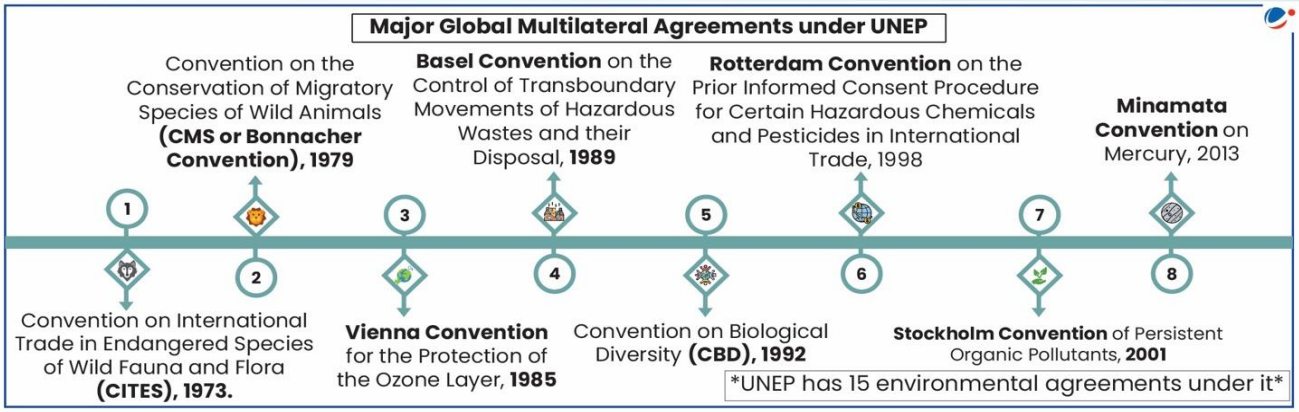
Members: 193 UN Member States **(including India)**
- Approve the programme of work and budget.

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.

Major Global Multilateral Agreements under UNEP



UNEP has 15 environmental agreements under it

Reports/Indices

Emissions Gap Report 2024
- **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:
- GHG emissions rose to a new high of **57 gigatons(Gt)** of CO2
- India ranks **3rd in total GHG emissions** [China (1st) & US (2nd)].

Adaptation Gap Report 2024
- Adaptation Gap is the difference between actually implemented adaptation and a societally set goal, reflecting resource limitations and competing priorities.

Key Findings:
- Adaptation gap is estimated at **US$187-359 billion per year.**
- International public adaptation finance flows to developing countries increased to US$27.5 billion in 2022.

Global Status Report for Buildings and Construction (Buildings-GSR) 2024
- Published jointly with **Global Alliance for Buildings and Construction (GlobalABC).**
  - **Founded at COP21,** it is leading global platform for all built environment stakeholders committed to zero-emission, efficient and resilient buildings and construction sector.

Key findings
- Building and Construction Sector (BCS) accounts for ~**21% of global GHG Emissions.**
- India is attributing **40% of its CO2 emissions to buildings.**

Navigating New Horizons, A Foresight Report

- Identifies various critical global shifts which accelerate the triple planetary crisis of pollution, biodiversity loss and climate change.

Key finding: Global polycrisis, i.e, multiple shocks such as wars, extreme weather, pandemics etc. faced today are interwoven and are a consequence of globalization.

2.5.2. WORLD METEOROLOGICAL ORGANIZATION (WMO)

HQ: Geneva (Switzerland)

- **A Specialized 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).**

Members: 193 members (Including **India**)

Reports/Indices

State of Global Climate Report 2023
Key Findings

- **2023 was the warmest year** on record
- Global average near-surface temperature at **1.45°C above** the pre-industrial baseline.
- GHG levels, surface temperatures, ocean heat and acidification, etc. reached record high.

WMO Ozone and UV Bulletin
Key findings

- **Ozone layer is recovering,** with ozone-depleting substances (ODS) decreasing.
- **Full recovery to 1980 levels** is expected by **2066** over Antarctica; by 2045 over the Arctic and **by 2040 for the rest of the world.**

Air Quality and Climate Bulletin

- Reports on the state of air quality and its **connections to climate change.**

Key findings

- **Global Particulate Matter (PM) hotspots:** Include agricultural areas in Central Africa, Pakistan, India, China and South-East Asia.

Other: State of Global Water Resources Report; Global Annual to Decadal Climate Update (2024-2028); Greenhouse Gas Bulletin (GGB) etc.

2.5.3. INTERNATIONAL CRYOSPHERE CLIMATE INITIATIVE

Operates as 2 entities-

International Cryosphere Climate Initiative

- **Global organization:** Non-profit organization in USA based in Burlington, Vermont.
- **ICCI-Europe:** Charitable organization under Swedish regulation based in Stockholm, Sweden.

Genesis: Founded in **2009** to address the impacts of climate change on the cryosphere (frozen regions of Earth).

Objective: Advocates for **reducing cryosphere warming** to mitigate global climate risks, including glacier melt, sea-level rise, and permafrost thaw.

Collaborations: Works with governments, NGOs, and climate organizations (e.g., UNFCCC, IPCC).

Reports/Indices

State of the Cryosphere 2024-Lost Ice, Global Damage

- Assesses the current state of the cryosphere (Frozen part) and its response to climate change.

Key Findings:

- Ice shelves in northern Greenland have **lost 35% of their total volume** since 1978.
- Rate of global sea-level rise has **doubled in the last 30 years.**

3. POLLUTION

3.1. AIR POLLUTION

3.1.1. AIR QUALITY MANAGEMENT EXCHANGE PLATFORM (AQMX)

Why in the news?

Climate and Clean Air Coalition (CCAC) launched an Air Quality Management Exchange Platform (AQMx) in the **backdrop of International Day of Clean Air for Blue Skies**.

More on the news

- **Led by UN Environment Programme (UNEP)**, this year's theme focuses on '**Invest in Clean Air Now'**.
- **CCAC was founded in 2012, and convened within UNEP**, CCAC is a **voluntary partnership** of more than 160 governments, intergovernmental organizations, and NGOs.
  - **India joined CCAC in 2019**.
  - It works to reduce powerful but **short-lived climate pollutants**– methane, black carbon, hydrofluorocarbons (HFCs), and tropospheric ozone – that drive both climate change and air pollution.

About Air Quality Management Exchange Platform (AQMx)

- It is a **one-stop-shop that provides the latest air quality management guidance** and tools proposed to **meet WHO Air Quality Guidelines interim targets**.
- It is a component of **CCAC Clean Air Flagship** and contributes to implementation of **UNEA-6 Resolution.**
  - **The United Nations Environment Assembly sixth session (UNPE 6) Resolution 10** was focused on promoting regional cooperation on air pollution to improve air quality globally

About WHO Air Quality Guidelines (AQG)

- They are a set of **evidence-based recommendations of limit values for specific air pollutants.**
- They recommend levels and interim targets for common air pollutants: PM, O_3, NO_2, SO_2, and CO.
- For instance, **24-hour mean of PM2.5** should **not exceed 15 µg/m^3** and **annual mean of PM2.5** should **not exceed 5 µg/m^3.**

Related news

Global Nitrous Oxide (N_2O) Assessment report

- It was published by CCAC and FAO
  - It is **first international report focused solely on N_2O** in more than a decade.
- **Key Finding:** Anthropogenic emissions of N_2O have increased globally by 40% since 1980 with ~75% originating from agriculture.
- **About Nitrous Oxide**
  - **Odorless, colorless, non-flammable gas** that supports combustion and occurs naturally in the environment.
  - Used for **anesthesia and other therapeutic benefits**.
  - Causes euphoria, hence nicknamed **'laughing gas'.**
  - Has a Global-warming potential **273 times that of CO_2** for a 100-year timescale

3.1.2. FLUE GAS DESULPHURIZATION

Why in the news?

Ministry of Environment, Forest & Climate Change made it **mandatory for all coal-based TPP** to install FGD system.

About FGD Technology

- FGD systems **can remove over 90% of SO_2 from the flue gas emissions** of coal-fired Thermal Power Plants (TPP)**.**
- **Majorly, three types of FGD systems – Dry Sorbent (Limestone) Injection, Wet Limestone Based, and Sea Water Based** – are adopted worldwide.

About SO_2

- It is a **colorless, reactive air pollutant with a strong odor**.
- **High concentrations of SO2** in the air generally lead to the formation of **other Sulfur Oxides (SOx).**
- SOx can react with other compounds in the atmosphere to form small particles, which contribute to **Particulate Matter (PM) pollution**.
- It irritates the skin and mucous membranes of the **eyes, nose, throat and lungs**.
- High concentration of **SO_2** can **cause inflammation and irritation of the respiratory system.**
- **Oxides of Sulphur and Nitrogen** react with rainwater and come down with the rain, results in **Acid Rain.**
- **Emission Source:** fossil fuel combustion, natural volcanic activity

3.2. WATER POLLUTION AND CONSERVATION

3.2.1. WATER CONSERVATION

Water Conservation in India

Status of water use in India

Groundwater Use in India

As per **Dynamic Groundwater Resource Assessment Report 2024** released by, Ministry of Jal Shakti, (assessment by Central Ground Water Board (CGWB) and States/UTs)

- **Recharge:** Total **annual groundwater recharge** has **decreased marginally** in 2024.
- **3.05 % assessment** units are **Critical.**
- **11.1% assessment** units are **Over-exploited.**
- **Concentration of Over-exploited units**: NorthWest (Punjab, Haryana, Delhi, Western UP); West (Rajasthan, Gujarat); South (Karnataka, TN, Telangana, Andhra Pradesh)

Water accessibility and use

- **18% of the world's population** but only 4% of its water resources.
- **Distribution of Freshwater:** Icecaps> Groundwater> Freshwater Lakes > Rivers
- **Urban:**
  - 31% households lack access to piped water
  - 67% not connected to a piped sewage discharge system.
- **Irrigation:** Largest user of India's water reserve, with usage of 78% of total reserve.

Traditional water storage systems in India

- **Jal Mandir** (Gujarat)
- **Khatri, Kuhl** (Himachal Pradesh)
- **Zabo** (Nagaland)
- **Eri, Ooranis** (Tamil Nadu)
- **Dongs** (Assam)
- **Katas, Bandhas** (Odisha and Madhya Pradesh)
- **Paar, Johad** (Rajasthan)
- **Pat** (Madhya Pradesh)

Central Government initiatives

- **Jal Jeevan Mission (JJM)**: Demand driven programme to maintain village water infrastructure.
- **Components of Prime Minister Krishi Sinchayee Yojana** like **Har Khet ko Pani** (micro-irrigation); **Per Drop More Crop** (precision water application devices like drips, sprinklers) etc.
- **Atal Bhujal Yojana:** Sustainable management of Ground water
- **"Catch The Rain" Jal Shakti Abhiyan:** To promote Rainwater harvesting & water conservation.
- **National Framework on Safe Reuse of Treated Water in 2022.**
- **Power Tariff Policy 2016:** Mandates all Thermal Power Plants to use treated sewage water from Sewage Treatment Plants (STPs) situated within 50 kms radius for non-potable purposes.
- **The National Water Policy-2012** mandates recycle and reuse of water & The National Guidelines on Zero Liquid Discharge (ZLD).

State government initiatives

- **Neeru-Chettu (Andhra Pradesh):** Rejuvenating and revitalising natural resources.
- **Jal Jeevan Hariyali (Bihar):** Identification, restoration, and renovation of all public water storage structures.
- **Jal Hi Jeevan Hai (Haryana):** Encouraging crop diversification and encouraging cultivation of lesser water intensive crops like Maize, Arhar, etc.
- **Mission Kakatiya (Telangana):** Reclamation of water tanks by restoring minor irrigation sources

3.2.2. JAL HI AMRIT

Why in the News?

'Jal hi Amrit' initiative has been launched under AMRUT 2.0 (Atal Mission for Rejuvenation and Urban Transformation 2.0) reforms during the 100 days agenda of the Government.

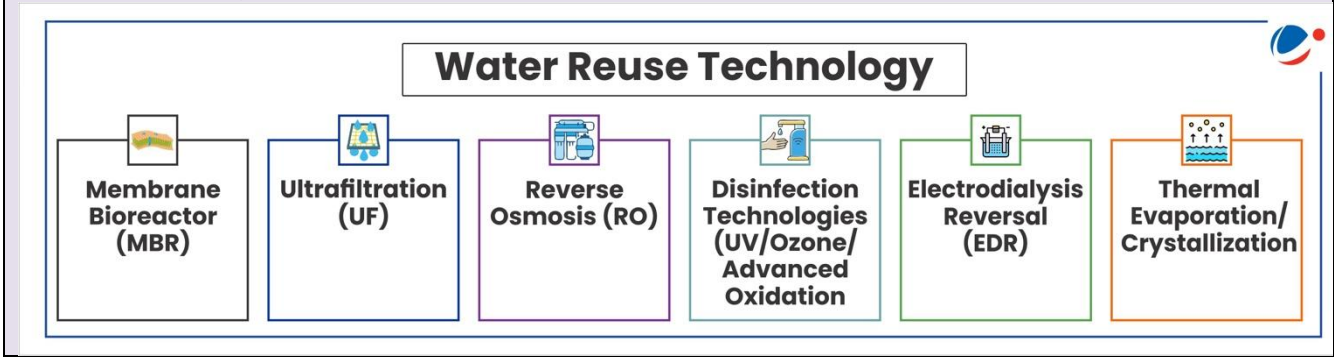
About Jal hi Amrit (JHA)

- **Background:** Building on the success of AMRUT 1.0, this second phase aims to create "Water-Secure Cities".
- **JHA initiative aims:**
  - **To incentivize States /UTs** for efficient management of **Sewage Treatment Plants (STPs),** also termed **Used Water Treatment Plants (UWTPs).**
  - **To produce** a continuous supply **of high-quality treated water**.
  - **To promote** a circular economy of water.
- **Purpose**: To foster inter-city competition, build treatment facility capacities, and incentivize high-quality treated water discharge through systematic improvements.
- **Strategy of rating-based incentives**: UWTPs will be **awarded Clean us** through **a Star Rating system**. Incentives **will be provided to urban local bodies (ULBs)/Parastatal agencies** based on a comprehensive evaluation process.

About AMRUT		
	AMRUT 1.0	**AMRUT 2.0**
Launch Year	2015	2021
Duration	Mission period from 2015-2020	Mission period from 2021-2026 (5 years)
Coverage	500 cities and towns	All statutory towns in the country
Focus Areas	Water supply, sewerage and septage management, storm water drainage, green spaces and parks, non-motorized urban transport	Universal coverage of water supply through functional taps to all households in all the statutory towns in the country, coverage of sewerage/ septage management in 500 cities.

About Water Recycling & Reuse

- **Water reuse** (also commonly known as water recycling) reclaims water from a variety of sources then treats and reuses it for beneficial purposes.
- **Sources of water for potential reuse**: Municipal wastewater, industry process and cooling water, stormwater, agriculture runoff and return flows, etc.



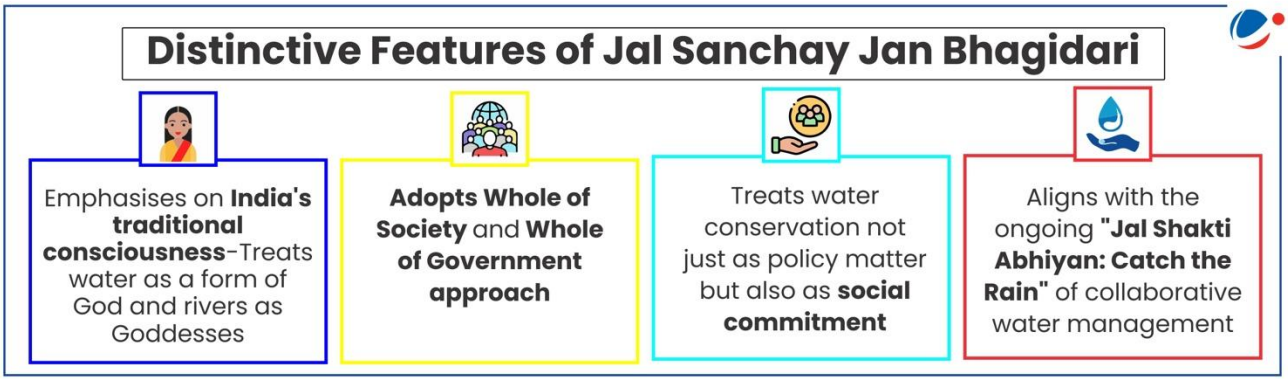
3.2.3. JAL SANCHAY JAN BHAGIDARI

Why in the News?

Jal Sanchay Jan Bhagidari initiative was launched from Surat, Gujarat.

About Jal Sanchay Jan Bhagidari initiative

- This initiative seeks to **conserve water with a strong emphasis on community partnership and ownership**,
- It aims to **construct around 24,800 rainwater harvesting structures** through community participation, ensuring long-term water sustainability across state.
- It is based on **the success of the Jal Sanchay initiative of Gujarat Government** that dealt with the mobilization of citizens, local bodies, industries and other stakeholders.
- **Ministry:** Ministry of Jal Shakti



3.2.4. OTHER RELATED NEWS

3.2.4.1. UNITED NATIONS WATER CONVENTION

Ivory Coast joined the United Nations Water Convention (Convention on the Protection and Use of Transboundary Watercourses and International Lakes).

United Nations Water Convention

- **Genesis:** Adopted in Helsinki (Finland) in 1992 and entered into force in 1996.
- **Legally binding**: Requires Parties to use transboundary waters reasonably and equitably and ensure their sustainable management.
- **Members:** India is not a party
- **UN Watercourses Convention** (UN Convention on the Law of the Non-Navigational Uses of International Watercourses) was adopted in 1997.
- **Indus Waters Treaty** (1960) aligns with it.

3.2.4.2. E-FLOW MONITORING

Union Jal Shakti Ministry launched an e-flow ecological monitoring system.

About E-flow Monitoring System

- E-flow refers to the flow required to meet the ecological functions of the flora and fauna in water body.
- Developed by **National Mission for Clean Ganga** (Namami Gange).
  - The Namami Gange program involves cleaning the Ganga and now includes its tributaries.
- It will allow **real-time analysis of the water quality** of the Ganga, Yamuna, and their tributaries.
- It will also allow **monitoring of the Namami Gange program** activities at the central level.

3.2.4.3. NATIONAL WATER AWARDS (NWA)

President of India presented **fifth NWA in New Delhi.**

About National Water Awards

- **Nodal Ministry:** Ministry of Jal Shakti.

- **Aim**: To create awareness among people about importance of water.
- **Presented in nine categories**: Best State, Best District, Best Village Panchayat, Best Urban Local Body (ULB), Best School/College, Best Industry, Best Water User Association, Best Institution (other than school/college), and Best Civil Society.
- **Odisha** is best state and **Surat, Gujarat** is Best ULB.

3.2.4.4. GLOBAL COMMISSION ON THE ECONOMICS OF WATER (GCEW)

Global Commission on the Economics of Water (GCEW) released 'The Economics of Water: Valuing the Hydrological Cycle as a Global Common Good' report.

About Global Commission on the Economics of Water (GCEW)

- **Genesis:** An independent commission launched in May 2022 with a two-year mandate.
- **Comprised of: Independent and diverse policymakers and researchers** focused on sustainable water-resource management.
- **Convening Entity:** Government of the Netherlands, with facilitation by Organization for Economic Co-operation and Development (OECD)

3.3. WASTE MANAGEMENT

3.3.1. GLOBAL FRAMEWORK ON CHEMICALS (GFC) FUND

Why in the news?

GFC Fund has launched its first project call for **targeting safe and sustainable management of chemicals and waste.**

About GFC Fund

- Setup during **fifth International Conference on Chemicals Management (**ICCM5**)** in 2023 in Bonn, Germany.
- It **complements existing financial mechanisms**, like Global Environment Facility etc. and funds that support biodiversity and climate action.
- **Objectives**:
  - **Support low-and middle-income countries**, including small island developing states, in addressing chemicals, including products and waste in line with international standards.
  - **Target medium-scale projects that strengthen national and regional abilities**.
- **Executive Board** takes operational decisions and oversees its functioning.
- **Composition:** 2 National representatives of each United Nations region; and Representatives of all donors and contributors.
- **Financial Support:** Selected projects will **receive voluntary funding of 300,000 to 800,000 USD for up to three years** to minimize harm from chemicals and waste.
- **About GFC: Multi-sectoral agreement** that outlines **set of 28 targets** to address chemicals and waste management including **prevention of illegal trade**, **elimination of highly hazardous pesticides in agriculture by 2035** etc.

Other Global Initiatives for sustainable management of chemical and wastes

- **Strategic Approach to International Chemicals Management (SAICM):** Global policy framework to minimize health and environmental impacts of chemicals throughout their lifecycle.
- **Basel Convention:** International treaty to regulate transboundary movement and disposal of hazardous wastes.
- **Stockholm Convention:** Global treaty dealing with the effects of persistent organic pollutants.

3.3.2. E-WASTE

Why in the news?

Recently, the **Global E-Waste Monitor 2024** was released**.**

More on the News

- The report is funded, and prepared in partnership, by the **United Nations Institute for Training and Research (UNITAR)** Sustainable Cycles (**SCYCLE) Programme**, **International Telecommunication Union (ITU)** and Fondation Carmignac.
  - SCYCLE, started in 2022, is a programme under the UNITAR **Division for Planet** to promote sustainable societies with sustainable production, consumption, and disposal patterns.

Key Highlights of the report

- **Collection and recycling:** 22.3% formally collected and recycled
- **Region wise e-waste per capita generated:** Highest in Europe, followed by Oceania and America.
- **Findings for India:** Ranked **3rd largest e-waste generator** (4,100 million kg generated), following only China and the USA.

About E-waste

- It includes electrical and electronic equipment, including solar photo-voltaic, **discarded as waste without the intent of reuse**, as well as rejects from manufacturing, refurbishment and repair processes.
- **Need for e-Waste management:** Environmental Risks; health hazards (contains over 1,000 toxic materials like mercury, lead); Economic benefits (recovery of precious materials like Gold, etc.)
- **Challenges associated with E-Waste in India: Informal recycling** (around 85% managed by unorganised sector); Inadequate infrastructure; Huge imports (80% meant for recycling is sent to developing countries by the developed ones).

E-waste Management in India

- **Hazardous waste (Management and Handling) Amendment Rules, 2003:** First time covered the Hazardous materials in e-waste composition.
- **E-waste (Management and Handling) Rules, 2011:** Introduced the concept of **Extended Producer Responsibility (EPR).**
  - EPR is an environmental policy approach in which a **producer's responsibility** for a product is **extended to the post-consumer stage** of a product's life cycle.
- **E-Waste (Management) Rules, 2016:** Introduced concept of **Producer responsibility Organization.**
- **E-Waste (Management) Rules, 2022:** aim to promote circular economy through EPR regime.
- **E-Waste (Management) Second Amendment Rules, 2023**: Its major provisions include-
  - It provides more clarity to the **exemption of reduction of harmful substances.**
  - Determination of **the conversion factor of EPR certification** generation.
  - Management of **refringent by the producers.**
- **E-Waste (Management) Amendment Rules, 2024:** Its major provisions include-
  - **Relaxation of timelines for filing of returns or reports:** By a manufacture, producer, refurbisher or recycler for a period not exceeding nine months.
  - **Central Government can** establish one or more platform for exchange or transfer of EPR certificates.
  - Exchange price of EPR certificate to be between **the highest and lowest prices fixed by central pollution control board.**

- **Technological Advancements:** Ministry of Electronics and Information Technology has developed indigenous technology for recovery of precious metals and plastics from e-waste.

Global initiatives/effort to check e-waste

- **The Basel Convention:** To check the movement of hazardous waste between countries, including e-waste.
- **The Global E-waste Statistics Partnership (GESP):** Collaboration between the United Nations University and the International Telecommunication Union.
- **E-waste Challenge:** A global initiative by the World Economic Forum.
- **R2 Code of Practices** include a tool responsible for promoting environmentally responsible practices in electronics recycling industry.

3.3.3. BATTERY WASTE MANAGEMENT

Why in the news?

Environmental Compensation Guidelines for Battery Waste Management was **issued by the Central Pollution Control Board** (CPCB) under the **Battery Waste Management Rules 2022**.

About Environmental Compensation (EC)

- **Power to CPCB: 2022 Rules** empower the CPCB to **impose and collect EC from producers and entities** involved in **refurbishment and recycling of waste battery**, in case of noncompliance of the rules.
- **Applicability:** It can also be levied on entities carrying out **activities without registration**, pro**viding false information wilful concealment of material facts** by the registered entities, etc., based on the **polluter pays principle**.
  - It shall also be levied on **Producer operating with respect to non-fulfilment of their Extended Producer Responsibility (EPR) targets**, responsibilities and obligations set out in these rules.
- **Additional EPR Obligation:** Payment of EC, however, **shall not absolve Producer of EPR obligation** set out under the rules.
  - For instance, **unfulfilled EPR obligation for a particular year will be carried forward** to the next year.

Key Highlights of the Guidelines issued

- EC to be levied is divided into **two regimes**:
  - **EC Regime 1 –** EC will be levied to the Producers for non-fulfilment of metal-wise (For Lead Acid Batteries and For Lithium-ion and Other Batteries) EPR Targets.
  - **EC regime 2 –** EC will be levied to any entity for non-compliances of BWM Rules, 2022 based on application fees.

About Battery Waste Management Rules, 2022

- **Coverage:** All types of batteries, viz **Electric Vehicle batteries, portable batteries, automotive batteries and industrial batteries** etc.
- Specify **Extended Producer Responsibility (EPR), where** producers ensure collection, recycling, and refurbishment of the waste batteries.
- EC imposed for non-fulfilment of EPR targets are based on the **Polluter Pays Principle (PPP).**
  - PPP is a practice in which those who **produce pollution bear the costs** of managing it to prevent damage to human health or the environment.
- Mandatory **phase in targets have been set for using recycled material** in new battery products to finally achieve 20% by 2030-31, for both Portable and EV batteries.

3.4. OTHER TYPES OF POLLUTION

3.4.1. PLASTIC POLLUTION

Plastic Pollution

Status plastic pollution (UNEP)

- Annual **plastic production has doubled** from 2000 to 2019.
- **India ranked 3rd globally**, contributing 5.5 million tonnes of single-use plastic (SUP) waste.

Most common types of plastics and its use

- **Polyethylene Terephthalate (PET or PETE)- beverage bottles**
- **High-Density Polyethylene** (HDPE)- detergent bottles
- **Polyvinyl Chloride (PVC or Vinyl)**- plumbing pipes
- **Low-Density Polyethylene** (LDPE)- bubble wrap
- **Polypropylene (PP)**- straws
- **Polystyrene (PS or Styrofoam)**-product packaging

Chemicals used in plastics and its human impact

- **Vinyl chloride monomer** in liquid and vapour form increases risk of liver and brain cancer.
- **Benzene and butadiene** cause leukemias and lymphomas.
- **Styrene** is neurotoxic and a possible human carcinogen.
- **Bisphenol A (BPA)** is a chemical used to make **polycarbonate plastic**.

Initiative Taken to curb plastic pollution

Global

- **Global Partnership on Plastic Pollution and Marine Litter (GPML),** launched at the United Nations Conference on Sustainable Development (Rio+20) Summit, 2012
- **International Convention for the Prevention of Pollution from Ships (MARPOL),** adopted by International Maritime Organization in 1973
- **Basel Convention:** To regulate movement and disposal of hazardous waste, including plastic waste.
- **Counter MEASURE II project**
- **UNEP Plastics Initiative**
- **UNEA's Resolution to "End Plastic Pollution."**
- **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".**

India

- **Plastic waste Management rules, 2016 notified under Environment Protection Act, 1986.**
- **Single-use plastics ban** with effect from 2022.
- **Extended Producer Responsibility (EPR)** for plastic under Plastic Waste Management Rules, 2016
- **Un-Plastic Collective**, co-founded by the Confederation of Indian Industry (CII), UNEP and WWF-India
- **Project REPLAN (Reducing PLAstic from Nature)** launched by Khadi and Village Industries Commission (KVIC)
- **LiFE Mission**
- **Ban on SUP products**, including plastic bags, straws, cups, and plates.
- **Campaigns** like "Beat Plastic Pollution" and "Plastic-Free India

3.4.1.1. MICROPLASTICS

Why in the news?

Recently researchers have found **the presence of microplastics within both canine and human testes**.

About Microplastic

- Microplastics are **small plastic pieces less than five millimeters long**, harmful to living organisms. There are **two categories of microplastics:**

- **Primary microplastics** are **tiny particles designed for commercial use,** such as cosmetics, clothing, etc. and microfibers shed from textiles.
- **Secondary microplastics** are particles that result from **breakdown of larger plastic items,** like water bottles.

- **Impacts**
  - **Environment**: Can be mistakenly consumed by marine organisms (toxic for them) and will disturb whole food chain.
  - **Human Health:** Gastrointestinal issues, Endocrine disruption, Respiratory problems, allergy etc.
  - Microplastics have been found in **human blood, lungs, breast milk, placentas and human testes**

3.4.1.2. PLASTIC OVERSHOOT DAY

Why in the News?

Plastic Overshoot Day 2024 report was released by **Earth Action.**

About Plastic Overshoot Day

- It marks the point when **amount of plastic waste exceeds the world's capacity to manage it,** resulting in environmental pollution**.**
- It is **determined based on a country's Mismanaged Waste Index (MWI).**
- MWI is the gap in **waste management capacity and plastic consumption**.
- **MWI of India is very high (68.62%).**

3.4.2. MERCURY POLLUTION

Why in The News?

UNEP has launched a **$134-million initiative to phase out mercury measuring devices** in healthcare project.

About Project

- **Aim**
  - **Phase out mercury thermometers** and **sphygmomanometers** at a rate of **20% annually,** and reduce mercury spillages.
  - **Encourage adoption of accurate, affordable and safe mercury-free alternatives**, while improving management of mercury-containing medical waste.
- **Member countries:** Albania, Burkina Faso, **India**, Montenegro, and Uganda**.**
- **Funding:** By **Global Environment Facility.**
- **Execution:** By **World Health Organization.**

About Mercury

- It is a **naturally occurring element** found in **air, water and soil**.
- It is the **only metal** which is found in **liquid state at room temperature**.
- It is a **persistent, bio-accumulative, toxic pollutant.**
- All humans are **exposed to low levels of mercury**.
- Several countries and international organizations have **established reference levels for** daily or weekly **methyl-mercury or mercury intakes that are estimated to be safe** (or without appreciable risk to health).
- **Sources**: Gold mining, Coal-based thermal power plant, Volcanic emissions, etc.
- **Effect:**
  - **Toxic effects on nervous, digestive** and immune systems, lungs, kidneys, skin and eyes.
  - **Minamata disease** is a **chronic neurological disorder** caused by **methyl-mercury**, a heavy metal with many industrial uses.
  - When released into environment, it **accumulates in water laid sediments** where it **converts into toxic methyl-mercury and enters food chain.**

Minamata Convention on Mercury

- **Adopted in 2013 at Kumamoto (Japan)** and 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 epicenter of Minamata disease)
- **Purpose:**
  - Ban on new mercury mines,
  - phase-out of existing ones,
  - phase-out and phase-down of mercury use in products and processes.
- **India ratified it in 2018.**

3.4.3. PERSISTENT ORGANIC POLLUTANTS (POPS)

Why in the news?

A comprehensive global study on Persistent Organic Pollutants was done by **UN Environment Programme (UNEP)** and funded by the **Global Environment Facility (GEF)**

Key Findings

- There is decline in use of **12 POPs** due to t**he regulatory actions taken** globally since 2004.
- Use of **DDT (dichloro-diphenyl-trichloroethane), a synthetic insecticide** has decreased in human milk samples by over 70% since 2004.
- Replacement POPs due to their similar properties (e.g., **per-and polyfluoroalkyl substances (PFAS)** were **detected at high levels.**

About POPs

- POPs are **chemical substances (carbon based)** that **persist** in the **environment.** They are pesticides, industrial chemicals, or unwanted by-products of industrial processes.
- They resist **photolytic**, **biological** and **chemical** degradation. E.g. Dieldrin, Endrin, Heptachlor, etc.
- **Key physical and chemical properties**-
  - **Often halogenated** and **characterised by low water solubility**
  - **Highly lipid soluble** (this facilitates bio-accumulation in living organisms)
  - **Semi-Volatile in nature (**enabling them to move long distances in the atmosphere before deposition occurs)
- **Impacts of POPs**: POPs are linked to cancer, liver damage, decreased fertility, and increased risk of asthma and thyroid disease due to their **endocrine disrupting properties.**

Stockholm Convention

- It is an **international legally binding** agreement on PoPs.
- Adopted in 2001 and entered into force in 2004.
- **India ratified** the Stockholm Convention **in 2006.**
- **Ministry of Environment, Forest and Climate Change (MoEFCC)** had notified the ' **Regulation of POP Rules, 2018** under the provisions of **Environment (Protection) Act, 1986.**
- **GEF** is the designated **interim financial mechanism** for the Convention.

3.4.4. POLLUTANTS IN NEWS

3.4.4.1. DCPA OR DACTHAL

The U. S. Environmental Protection Agency (EPA) banned the **weed-killing pesticide Dimethyl tetrachloroterephthalate, also known as DCPA or Dacthal.**

About DCPA

- It is used on crops such as **broccoli, brussels sprouts, cabbage and onions.**
- Fetuses exposed to it could suffer from **low birth weight, impaired brain development, decreased I.Q., and impaired motor skills later in life.**

3.4.4.2. BISPHENOL A (BPA)

Negotiations are being conducted under the aegis of UNEP to address plastic pollution including **BPA used in plastic packaging.**

About BPA

- Chemical used primarily in production of **polycarbonate plastics** and **epoxy resins.**
- **Polycarbonate plastics** are often used in containers that store food and beverages.
- **Epoxy resins are used to coat the inside of metal products**, such as food cans, bottle tops, etc.
- Exposure to BPA can have **health effects on brain and prostate gland of foetuses, infants and children.**

3.4.4.3. PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

New research suggests that exposure to PFAS may impair **kidney function through disruptions in gut microbiota.**

About PFAS

- Often dubbed **forever chemicals because** these chemicals persist in environment and **human bodies, breaks down extremely slowly.**
- **Man-made chemicals used in everyday products** such as Non-stick cookware, some cosmetics, etc.
- Exposure has been linked to several health issues, including **cardiovascular disease, cancer, etc.**
- Currently, three sub-groups of PFAS are **listed** under **Stockholm Convention** as industrial POPs.

3.5. TERMS IN THE NEWS

3.5.1. SOIL ACIDIFICATION

As per a study, Acidification may strip Indian soils of 3.3 billion tonnes of essential carbon.

About Soil Acidification

- It is a process by which **soil pH decreases** over-time.
- **Factors Accelerating Soil Acidification: Leaching of nitrogen** released from ammonium-based fertilizers, **Organic residues** on decomposition release organic acids, **Roots, during active growth stages**, release CO2 into soil resulting in formation of carbonic acid.
- **Impacts of Soil Acidification:** loss of soil inorganic carbon (SIC), loss of microbes, increased aluminum toxicity, Rise in Pathogenic fungi, Decreased Nutrients availability etc.
- **Managing Acid Soils**
  - **Liming:** Incorporation of Lime, Gypsum, or dolomite into upper cultivable soil layer.
  - **Using Industrial By-products:** Press mud from sugarcane industry, basic slags from the iron and steel industries, and flue dust from cement plants can be used.
  - **Growing acid-tolerant crops** e.g. Sugarcane and bananas

3.5.2. BIOCOVER

A recent study has proposed a **sustainable approach of microbial methane oxidation system** (called as biocover) to control fugitive methane emissions from old dumpsites.

About Biocovers

- **Porous material layers laid directly on top of a landfill** which is then covered by an **oxidizing layer of mature compost**.

- It provides optimal conditions for **methanotrophic (methane utilizing) bacteria** to thrive and act as biofilters, hence **control methane emissions by converting methane to CO_2.**
- **Potential applications**: Road construction, land reclamation, control fungitive methane emissions from old dumpsites, etc.

3.5.3. GRASSHOPPER EFFECT

The Arctic's Plastic Crisis: Toxic Threats to Health, Human Rights, and Indigenous Lands from the Petrochemical Industry report talked about grasshopper effect.

- **Report Released by**: Alaska Community Action on Toxics (ACAT) and the International Pollutants Elimination Network (IPEN).
  - IPEN is a global network aiming to build a global movement for a toxics-free future.

About grasshopper effect

- Plastic and Toxic chemicals from the world deposit and accumulate in the Arctic, making the Arctic a **"hemispheric sink".**
- These are transported on atmospheric and oceanic currents from lower latitudes through a process known as global distillation or the "**grasshopper effect."**
- Chemicals threaten the environment and health of Arctic People. E.g. Polyaromatic hydrocarbons (cancer, heart disease), Bisphenols (obesity and cancer), etc.

3.5.4. AQUATIC DEOXYGENATION (AD) AND PLANETARY BOUNDARIES

Recently, experts called for **recognition of Aquatic Deoxygenation** (AD)as a new planetary boundary.

About Aquatic Deoxygenation

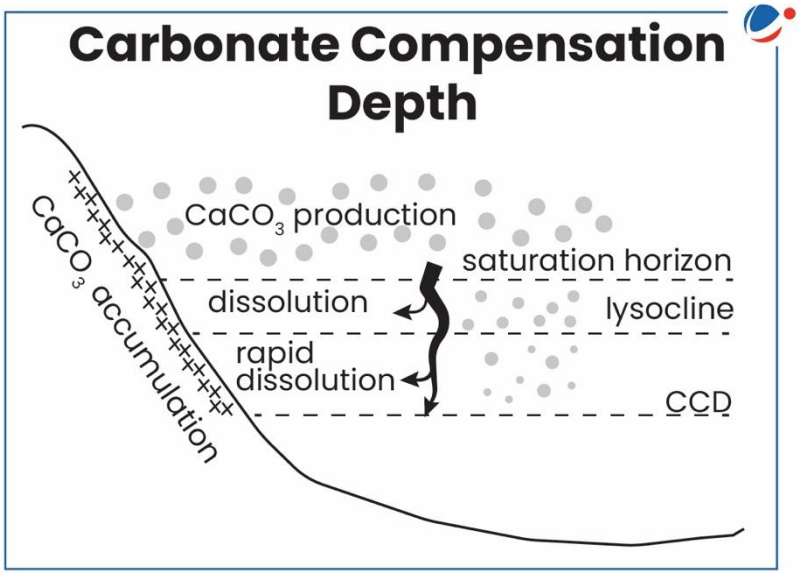
- **AD** is **overall decline in the oxygen content of oceanic and coastal waters** (happens when oxygen consumption is greater than oxygen replenishment).
- **Reasons underscoring AD:**
  - Global Warming caused by Green House Gases (Rise in temperatures decreases solubility of oxygen in water)
  - **Warm surface layers in ocean** prevent oxygen from mixing deeper into ocean (leading to **low oxygen level in deep sea waters**)
  - **Eutrophication** Nutrient over enrichment from anthropogenic sources (e.g. agriculture) leads to **algal blooms** and increased **consumption of oxygen.**
- **Impact on Ecosystems: Occurrences of dead zones** and ocean hypoxia effect, habitat compression, change in marine food web, modulation of Earth's climate.

Planetary boundaries

- Planetary boundaries are a **framework to describe limits** to **impacts of human activities** on the Earth system.
- Beyond these limits, environment **may not be able to self-regulate** anymore.
- **There are nine planetary boundaries:** Climate change, Novel entities, Stratospheric ozone depletion, Atmospheric aerosol loading, Ocean acidification, Modification of biogeochemical flows, Freshwater change, Land system change and Biosphere integrity.
- **Six of the nine boundaries have been transgressed** (except Ocean acidification, Stratospheric ozone depletion, Atmospheric aerosol loading).

3.5.5. CARBONATE COMPENSATION DEPTH (CCD)

Research indicates that the **Carbonate Compensation Depth (CCD)** is expanding.



About CCD

- It is defined as the **water depth at which the rate of supply of calcium carbonate** from the surface is **equal to the rate of dissolution.**
- In the deep ocean, **carbonate particles in bottom sediments are supplied by the die-off of surface** plankton that secrete calcium carbonate tests or shells.
- When **these shells fall below a certain water depth (around 4,000 meters),** they begin to dissolve as ocean **waters become undersaturated** with respect to calcium **carbonate because of increasing pressure, decreasing temperature and increasing amounts of dissolved CO2.**

3.5.6. HYDROGEL

Indian Institute of Science (IISc) has designed novel hydrogel to remove Microplastics from water.

About Hydrogel

- **Hydrogel** has a unique **intertwined polymer network** that can bind the microplastic and degrade them **using Ultraviolet (UV) light irradiation.**
- It consists of three different polymer layers – **chitosan, polyvinyl alcohol and polyaniline.**
- **Applications:** Hygiene Products (toothpaste), medical applications (contact lenses, drug delivery systems, industrial lubricants (air conditioning).

3.5.7. BIOPLASTICS

Some Small holder farmers of Nagaland are replacing **plastics with compostable bioplastic bags made from Cassava starch.**

Bioplastics

- They are **Bio based polymers** produced from **renewable resources** including **carbohydrates, vegetable oils,** etc. in the presence of **microorganisms.**
- **Degradable by microbes** (such as fungi, bacteria, and yeasts), leading to the production of **CO2, water, and biomass.**
- **Alternative to plastic with similar physical properties to synthetic plastics** and have a low carbon footprint.

3.5.8. STEEL SLAG

Guidelines for Utilization and Processing of Steel Slag in Road Construction, released by Central Road Research Institute (CRRI).

About Steel slag

- It is the **solid waste generated** in the **process of steel making.**
- It is composed of **oxides of calcium, iron, silicon, magnesium**, etc.

- **Key Applications: Road base** course material (**Steel Slag Road Technology (SSRT))**, Blending material for Portland cement, Fertilizer and soil improvement etc.
- **Benefits of SSRT**
  - **Technical**: Improved durability of road; Improved skid resistance; Economical than bituminous etc.
  - **Environmental**: Utilization of 19 million tons of steel slag waste, generated annually; Reduction of carbon footprint in road construction.

3.5.9. AEROBIOLOGY ADVANCEMENTS

New technologies have enabled real-time bioaerosol monitoring.

About Aerobiology

- Aerobiology is the study of the **movement and impact of airborne biological particles**, or bioaerosols, on human, animal, and plant health.
- Bioaerosols include **Bacteria, fungal spores, pollen grains, viruses, etc.**
  - Bioaerosols reflect changes in biodiversity, plant flowering patterns, and distribution, all sensitive to climate shifts.

3.5.10. GAS FLARING

Global Gas Flaring Tracker Report has been released by the **World Bank**.

- Global gas flaring in 2023 has increased by **7% from 2022 leading to a rise of 23 million tonnes of CO_2 emissions.**
- **Major Contributor**: Russia, Iran, Iraq, USA, etc.

About Gas Flaring

- It refers to burning of the **natural gas associated with oil extraction**.
- **Reasons behind use of Gas Flaring**
  - Safety Concern (to manage pressure change)
  - Economical (logistical issues in transporting gases from oil fields are located in remote and inaccessible places).
- **Key Measures taken to avoid Gas Flaring**: Zero Routine Flaring by 2030 (ZRF) initiative (World Bank)

3.5.11. LIGHT POLLUTION

Night time light pollution is linked to **increased Alzheimer's risk**.

About Light pollution

- It is **excessive or inappropriate use of outdoor artificial light.**
  - It adversely affects our **ability to observe stars and other celestial objects,** human health and wildlife behavior.
- The study noted that **night time light pollution disrupts natural circadian rhythms** and hampers sleep, making individuals more susceptible to Alzheimer's disease (AD).
- **Impact of light pollution on biodiversity:** Changes in migratory patterns leading to collisions, increased predation etc.; Attracts and kills insects impacting pollination and food chains.

3.5.12. BIO-BITUMEN

Union Transport Minister inaugurated India's first National Highway made with **Bio-Bitumen in Nagpur-Mansar Bypass on National Highway 44.**

About Bio-Bitumen

- It is a **petroleum-free alternative to bitumen manufactured** from organic elements. E.g. Bio-char, Stubble, lignin, bio-oil, etc.

- Bitumen is a **black substance derived from distillation of crude oil**, known for adhesive properties. It is mainly used in road paving and waterproofing applications.

- **Benefits:** Reduced imports, address issue of stubble burning, boosting Bio-economy etc.
- Other sustainable methods for road construction -**Copper Slag, Geotextiles, Cold asphalt mix etc.**

3.6. MISCELLANEOUS

3.6.1. WHITE CATEGORY INDUSTRIES

Why in the news?

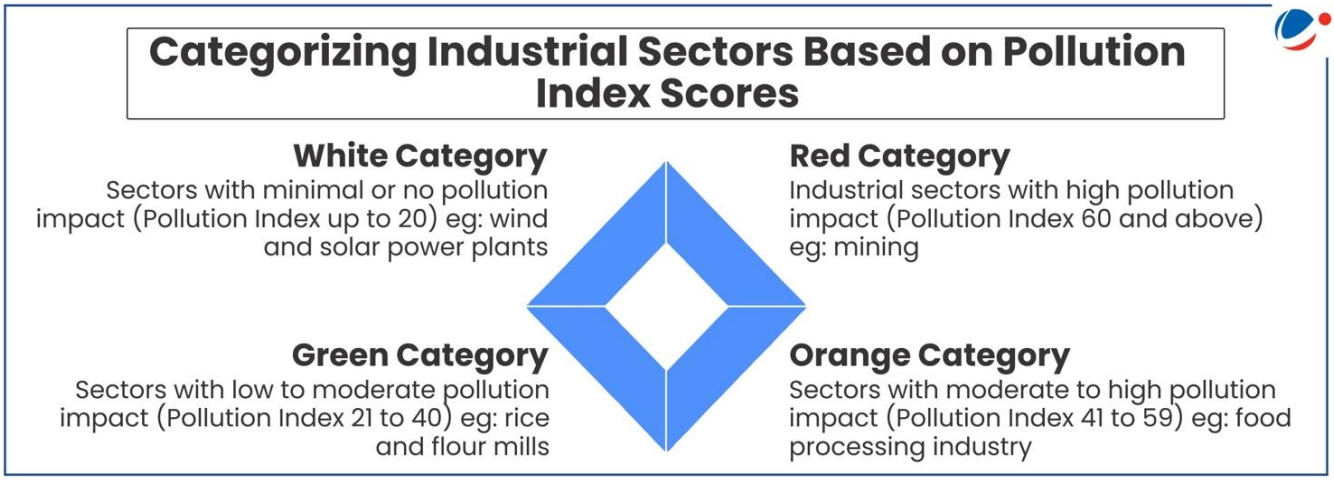
White category sectors will now not require prior permission of the State Pollution Control Boards (SPCBs) to establish and operate under the **Air Act, 1981 and Water Act, 1974.**

More on the news

- The permissions officially known as **'consent to establish' (CTE) and 'consent to operate' (CTO)** are granted to regulate industries that discharge effluents or emit pollutants into the environment.
- White category industries will have to inform **SPCBs through self-declaration.**

White category sectors

- Those industries which are practically non-polluting are categorized under the **'white category'** by the **Central Pollution Control Board.**
- **Eg. Wind and solar power projects, assembly of air coolers, bicycle assembly etc.**



3.6.2. EMISSIONS FROM ROCKET AND SATELLITE LAUNCH

Why in the news?

In 15 years, the rockets **launched per year has nearly tripled,** and the satellites orbiting the planet **has increased 10 times.**

Atmospheric impact of rocket launches

- **Alumina (Al2O3) and black carbon (soot):** Al2O3 and soot **absorb and trap the long-wave radiation** from Earth, thus resulting in **warming and** consequent **ozone depletion**.
- **Carbon dioxide**: Each rocket launch produces significantly higher levels of CO_2 than airplane flights.
- **Metallic ash**: May **disrupt Earth's magnetic field**, allowing more **harmful cosmic radiation** to reach the planet's surface.
- Even **"green rockets," propelled by liquid hydrogen**, produce water vapor, which is a **greenhouse gas at high altitudes.**

Measures for controlling Pollution

- **Horizontal Launch of Small satellite:** It uses about 1/20th of the fuel of typical ground-launched, heavy-lift rockets.
- **Trajectory control for re-entry:** New efforts suggest burning satellites at lower altitudes (12–18 miles) to allow metal oxides to settle back to Earth faster.
- **Alternative fuels and design improvements:** Such as Bio propane and develop reusable launch systems to reduce waste.

3.6.3. ANNUAL LAND USE AND LAND COVER (LULC) ATLAS OF INDIA

Why in The News?

Recently, Annual Land Use and Land Cover (LULC) Atlas of India was released by the **National Remote Sensing Centre** (NRSC).

More on The News

- It aims to **systematically examine land utilization patterns** to offers invaluable insights into the evolving dynamics of our environment.

Key highlights of the Atlas

- **Agriculture:** Over the past 17 years, **Kharif and Rabi cropland has expanded** and **fallow land diminished**.
- **Double/ triple/ annual cropping areas have also increased** by 82.22%. (Double/ triple crop land are areas where crops are sown and harvested twice/ thrice in one crop year.)
- Since 2005, **shifting cultivation increased until 2016-17**, after which it witnessed a decline.
- **Built-up land: Shows an increase** with an overall growth of 30.77% since 2005.
    - **Built-up area** refers to an area with buildings, paved surfaces, commercial and industrial sites, and urban green areas.

3.6.4. CENTRAL POLLUTION CONTROL BOARD (CPCB)

Why in the news?

A CPCB Report to NGT showed that 80% environmental funds remained unutilized.

More on the news

- **It receives compensation under:**
    - **Environment Protection Charge (EPC):** The dealer/manufacturer is required to pay **one per cent EPC** for specified new diesel vehicles, registered only in Delhi and NCR.
    - It is received as per **order of Supreme Court.**
    - **Environmental compensation:** A **policy instrument** for protection of environment which **works on the Polluter Pay Principle.**
        - It is received as per **orders of NGT.**

About CPCB

- CPCB is **Statutory Body** formed under **Water (Prevention and Control of Pollution) Act, 1974.**
- It is entrusted with powers and functions under **Air (Prevention and Control of Pollution) Act, 1981.**
- Functions under **Ministry of Environment, Forest and Climate Change**
- CPCB along with **State Pollution Control Boards (SPCBs)** are responsible for **implementation of legislations relating to prevention and control of environmental pollution.**
- CPCB promotes **cleanliness of streams and wells, and aim to improve the quality of air** in the country.

3.7. ORGANIZATIONS IN NEWS

3.7.1. NATIONAL GREEN TRIBUNAL

New Delhi

- **National Green Tribunal (NGT)** stated that Ganga River is facing floodplain encroachment.

Principal Place of Sitting: New Delhi
- **Other 4:** Bhopal, Pune, Kolkata and Chennai

Genesis: Established as a **statutory body** under the **NGT Act, 2010.**

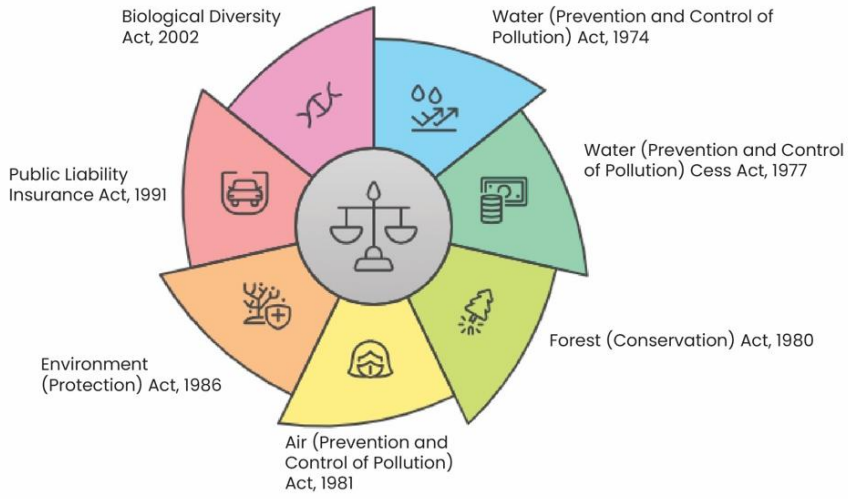
Composition: Headed by a **chairperson** with **10-20 judicial** as well as **expert** members.

Guided by: Principles of **natural justice** and not bound by the **Code of Civil Procedure, 1908.**

Powers:
- Power of the **civil court**
- Power to take **suo motu cognizance.**
- Power to **grant relief** in the form of compensation and damages to affected persons.

Mandate: A **specialized judicial body** equipped with expertise **solely to adjudicate environmental cases in the country** (refer to the infographics)

NGT's Legislative Framework



Disposal of applications or appeals **within 6 months of filing** of the same.

Appeal: Its orders are binding but not final (it can review its judgements or an appeal could be made in SC within ninety days.)

Benches: NGT has a **presence in five zones- North** (Principal Bench, headquartered in Delhi), Central, East, South and West.

3.7.2. CENTRAL GROUND WATER BOARD (CGWB)

HQ: Faridabad, Haryana, India.

- **Central Ground Water Board (CGWB)** aims to develop and disseminate technologies, and monitor and implement national policies for management of India's Ground Water Resources.

Genesis: Established in **1970** by renaming the **Exploratory Tube wells Organization** under the **Ministry of Agriculture.**

Ministry: Subordinate office under **Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti.**

Functions:

- **Groundwater Assessment:** Maps aquifers and evaluates availability and quality.
- **Monitoring:** Operates 25,000+ observation wells to track groundwater levels and quality.
- **Regulation**: Develops guidelines and policies for sustainable groundwater use.
- **Scientific Studies:** Conducts hydrogeological, geophysical, and chemical analyses.

Key Initiatives:

- **National Aquifer Mapping and Management Program (NAQUIM):** Maps aquifers and suggests region-specific groundwater management plans.
- **Artificial Recharge Projects:** Promotes rainwater harvesting and recharge techniques to replenish groundwater.
- **Groundwater Regulation:** Recommends state-specific regulatory mechanisms for controlling groundwater overuse.

Reports/Indices

- **Dynamic Ground Water Resources Of India:** Annual report assessing groundwater availability and trends.
- **Groundwater Yearbook:** Summarizes the status of groundwater levels and quality.
- **Aquifer Mapping Report:** Documents detailed aquifer characteristics and management strategies.

3.7.3. COMMITTEE FOR AIR QUALITY MANAGEMENT

Commission for Air Quality Management in National Capital Region and Adjoining Areas

- A **statutory body** established under **Commission for Air Quality Management in National Capital Region (NCR) and Adjoining Areas, Act 2021.**
  - Replaced **Environment Pollution (Prevention and Control Authority).**

Mandate: Air Quality Management in **National Capital Region and Adjoining Areas** including Punjab, Haryana, Uttar Pradesh, and Rajasthan.

- It aims to achieve **better co-ordination, research, identification and resolution of problems** surrounding the air quality index.

Key Functions:

- Releases **Statutory Directions for environmental pollution to the state government.**
- **Imposes penalties for non-compliance:** Offence punishable with imprisonment **up to 5 years or fine up to 1 crore rupees or both.**

4. SUSTAINABLE DEVELOPMENT

4.1. SDG INDIA INDEX 2023-24

Why in the news?

The index was released by NITI Ayog.

About SDG (Sustainable Development Goal) India Index

- It is the **4th edition of the report**
- It **measures and tracks national progress of all States and Union Territories (UTs)** on 113 indicators aligned to Ministry of Statistics and Programme Implementation's National Indicator Framework.
- Scores range **between 0–100.**
- Score of **100 means State/UT achieved targets** set for 2030.
- States are divided into **four categories**: Achiever (100), Front runners (65-99), Performers (50-64), and Aspirants (0-49).
- **Key findings**
  - **Composite score for India improved** (66 in 2020-21 to 71 in 2023-24).
  - **All States have shown an improvement** in overall score.
  - **Top States:** Uttarakhand and Kerala
  - **Top UT:** Chandigarh

Other reports related to SDG

SDGs – National Indicator Framework (NIF) Progress Report, 2024

- **Released by: Ministry of Statistics and Programme Implementation (MoSPI)** in consultation with concerned Ministries, **UN Agencies,** and other stakeholders.
- This annual report facilitates **monitoring of the SDGs' progress at national level.**
- **Key findings:** Positive progress shown in some indicators of No Poverty (SDG 1); Zero hunger (SDG 2); Gender Equality (SDG 5); Clean water and sanitation (SDG 6); Reduced inequalities (SDG 10); Sustainable cities and communities (SDG 11).

Sustainable Development Report 2024

- **Released by:** UN Sustainable Development Solutions Network (SDSN)
- **Key Highlights**
  - **On average, only 16% of the SDG targets are on track** to be met globally by 2030.
  - **Finland is ranked first**, followed by Sweden and Denmark.
  - **India is ranked 109th** out of 166 countries, with **on track performance** in **Poverty reduction and Quality Education** targets while **decreasing progress in Sustainable Cities and Climate Action** targets.
- **New Index of Support to UN-based Multilateralism (UN-Mi):** It ranks countries based on their engagement with the UN System.
  - **Barbados ranks highest, India at 139th place** while USA ranks last.

Sustainable Development Goals (SDGs) Report 2024.

Released by: UN Department of Economic and Social Affairs (UN DESA)

Key findings

- **Only 17% of the SDGs targets** are expected to be achieved by 2030.
- **India's status in achieving SDGs: Positive progress in**
  - **SDG-3 (**decline in Maternal Mortality Ratio)
  - **SDG-4:** Increase in Gross Enrolment Ratio in higher secondary education
  - **SDG-7:** Installed renewable energy generating capacity has shown a steady increase in value from 2014-15 to **2023-24**
  - **SDG-9:** Number of patents issued **from 2015-16 to 2023-24**

4.2. CHIPKO MOVEMENT

Why in the news?

2023 marked the 50th anniversary of the Chipko movement.

About Chipko movement

- A nonviolent resistance **against forest cutting** that began in the **Reni village** in **Uttarakhand's Chamoli** district.
- **Origin:** Dates back to the 18th century and was started by **Rajasthan's Bishnoi community.**
- It was led **by Amrita Devi against the orders of then King of Jodhpur**.
- Resulted in a royal decree that **banned cutting of trees in all Bishnoi villages.**
- **Led by:** Primarily village women, with leaders like **Sunderlal Bahuguna, Chandi Prasad Bhatt, Gaura Devi,etc**.
- It is **renowned for its collective mobilization of women** manifesting the philosophy of **Eco-feminism**.
- It is a **philosophical and political movement** that examines **connections between ecological concerns and women.**

Other Major environmental movements

- **Silent Valley Movement (1973):** Against hydro-electric dam, on the Kundapuzha River, in Palakkad, Kerala.
- **Appiko movement (1983):** Led by Panduranga Hegde in Karnataka' Western Ghats.
- **Narmada Bachao Andolan (1985):** Led by environmental activist Medha Patkar against construction of large dam on Narmada.
- **Other important environmental movements:** Chilika Bachao Andolan, Against Bauxite Mining in Kashipur, Gandhamardan Environment Protection, etc.

4.3. SYSTEM OF ENVIRONMENTAL-ECONOMIC ACCOUNTING (SEEA)

Why in the news?

Union Ministry of Statistics and Programme Implementation (MoSPI) released the 7th issue of the "**EnviStats India 2024: Environment Accounts**".

More on the news

- EnviStats (Environment Statistics) have been compiled in accordance with the **SEEA (System of Environmental- Economic Accounting) Framework.**
- It provides **information about environment**, its most important **changes** and **main factors** that influence them.
- **Publication includes Four areas-** Energy Accounts, Ocean Accounts, Soil Nutrient Index and Biodiversity.
- **Key Highlights of EnviStats India 2024**
  - India emerged as **world leader in energy transition**.
  - Around **72% increase in number and around 16% increase in area** for **Total Protected Area** during 2000 to 2023.
  - Coverage of **Mangroves has increased around 8%** during 2013 to 2021.

About System of Environmental-Economic Accounting (SEEA)

- Agreed international framework for the **compilation of the Environment Economic accounts**.
- Describes the **interaction between the economy and the environment**, as well as the stocks and changes in stocks of environmental assets.
- **There are two sides of SEEA**- SEEA-Central Framework (SEEA-CF) and SEEA-Ecosystem Accounting (SEEA-EA).
  - **SEEA-CF** measures environmental assets and individual resources and the economy used them. E.g., Timber, water, Fish, Soil, etc.

- **SEEA-EA** measures ecosystems and the services they provide to economic and human activity. E.g., Forests, Rivers, Coral Reefs, etc.

Other Environment Accounts in India

- **National Statistical Office** under MoSPI is mandated with the "Development of Environment Statistics and methodology of National Resource Accounts for India".
- MoSPI released the '**Strategy for Environmental Economic Accounts in India: 2022-26'**.
- **India also participated** in 'Natural Capital Accounting and Valuation of Ecosystem services (**NCAVES**)'.
  - NCAVES was launched by United Nations Statistics Division **(UNSD), UNEP and Secretariat of CBD in 2017.**
- **First EnviStats** were released in 2018 on **recommendations of Sir Partha Dasgupta Committee**.

Related news

Gross Environment Product Index

- Uttarakhand has **become the first Indian state to launch** a Gross Environment Product Index (GEPI).
- **About GEPI**
- GEPI is a **novel method to evaluate ecological development** caused by human interventions.
  - **Four pillars of GEPI:** Air, soil, tree and water.
  - **Formula:**
    - **GEP index =** (Air- GEP index + Water- GEP index + Soil-GEP index + Forest-GEP index)
  - **Significance:** Help assess the **impact of anthropological pressure** and **Quantifies contributions** of natural ecosystems to the economy and overall welfare.

4.4. ALTERNATIVE FUELS/ENERGY AND ENERGY EFFICIENCY

4.4.1. RENEWABLE ENERGY IN INDIA

Renewable Energy in India

Status of Renewable Energy (RE) in India

- **Share of RE sources (Incl. Hydro) in Total Installed Generation Capacity**= 45.0% (Nov. 2023)
- **Source wise share (decreasing order):**
  - **Solar** (20.6%), **Wind** (10.5%), **Hydro** (10.3%), **Biomass Power/Cogen**.(2.3%), **Small Hydro Power** (1.1%), **Waste to Energy** (0.1%)
- Renewable energy capacity **grew by 165% in 10 years from 2014 to 2024.**
- **Leading states in RE capacity: Rajasthan tops the list** followed by Gujarat, Tamil Nadu and Karnataka.

Global standing

- India ranks **4th globally in RE Installed Capacity.**
- **4th in Wind Power capacity**.
- India overtook Japan to become **3rd largest solar power generator in 2023. (Global Electricity Review 2024 Report)**

Initiatives in India

- **National Green Hydrogen Mission:** to make India the Global Hub for production, usage and export of Green Hydrogen.
- **PLI Scheme for National Programme on High Efficiency Solar PV Modules:** For achieving manufacturing capacity of Giga Watt (GW) scale in High Efficiency Solar PV modules.
- **PM KUSUM:** Income generation for farmers by installing solar power plants in infertile land.
- **PM Surya Ghar- Muft Bijli Yojana:** To install rooftop solar plants in one crore households
- **Solar Parks Scheme:** To provide solar power developers with a plug and play model.
- **Green Energy Corridor (GEC) projects**: To facilitate renewable power evacuation and reshaping of the grid for future requirements.

RE targets in India

- Non-fossil fuel energy **capacity of 500 GW by 2030**.
- At least **half of its energy requirements via RE** by 2030.

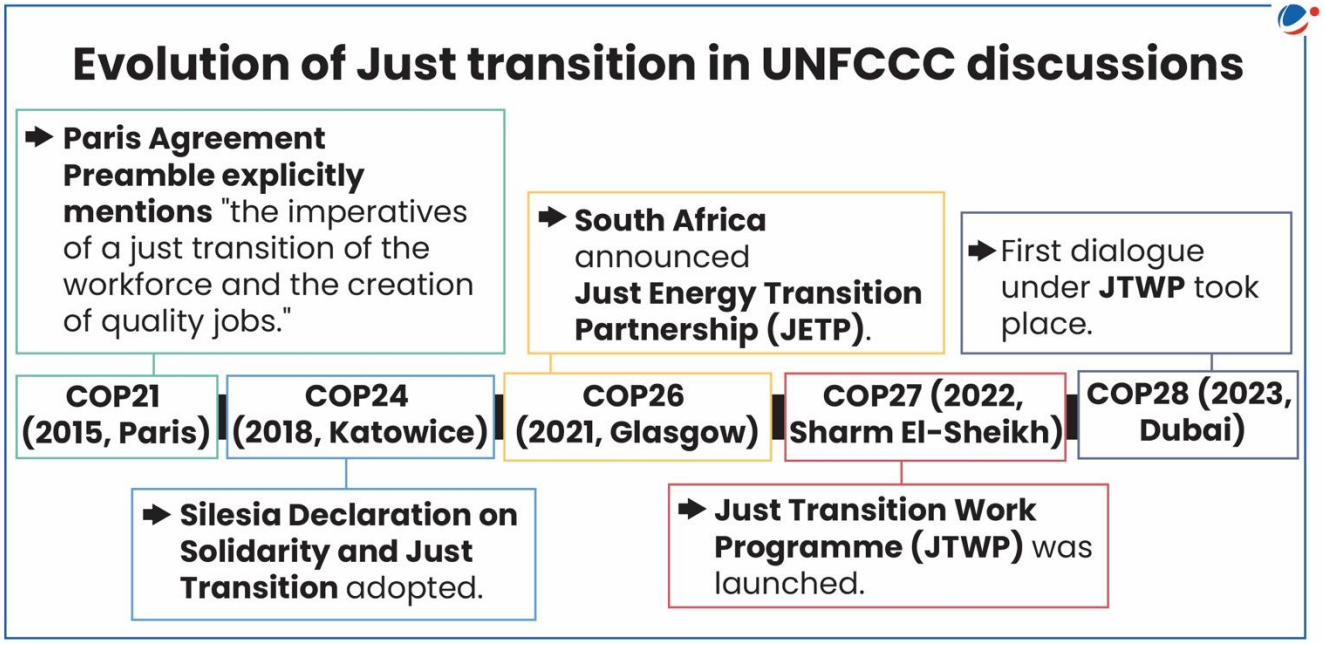
4.4.2. JUST ENERGY TRANSITION

Why in the News?

India underscored the need for global climate justice and equitable action during the **Second Annual High-Level Ministerial Round Table on Just Transition at CoP29.**

About Just Transition

- **Greening the economy in a way that is as fair and inclusive** as possible to everyone concerned, creating **decent work opportunities, and leaving no one behind. (International Labour Organization (ILO)).**
- It was recognised by the **Just Transition Declaration agreed** at the **UN Climate Change Conference in Scotland (COP26).**
- **Key elements:**
  - **Equity:** Protecting the **rights and livelihoods of workers and communities**, particularly those **dependent on fossil fuels** and other high-carbon industries.
  - **Inclusion:** Ensuring that **all stakeholders**—workers, governments, industries, and civil society—are **involved in decision-making.**
  - **Sustainability:** Aligning **economic and social systems with the goals of reducing GHG** emissions and conserving natural ecosystems.



Steps taken for Just Transition

- **Just Energy Transition Partnership (JETP):** Launched at **COP 26 of UNFCCC**.
- **ILO Guidelines for a Just Transition towards Environmentally Sustainable Economies and Societies for All** adopted in 2015.
- **'Just Transition for All' initiative:** By World Bank
- **Renewable Energy Technology Action (RETAP):** First joint working group meeting was held between the representatives of India and USA
  - It was announced by India and US jointly in 2023 under Strategic Clean Energy Partnership (SCEP), launched in 2021.

Related news

Energy Transition Index (ETI)

- World Economic Forum released **"Fostering Effective Energy Transition 2024"** report based on the Energy Transition Index (ETI) that evaluates **120 countries**.
  - ETI 2024 framework offers a comprehensive assessment of countries' energy systems.
  - **Energy Transition** refers to shifting energy production away from sources that release a lot of GHG, such as fossil fuels.

Key Findings

- **India's rank:** 63rd (up from 67 in 2023)
- **Top 5 performers:** Sweden, Denmark, Finland, Switzerland and France.
- **Six G20 countries** among the top 20 performers: **France, Germany, Brazil, China, UK, USA**

4.4.3. OFFSHORE WIND ENERGY

Why in the news?

Cabinet recently approved **Viability Gap Funding (VGF) scheme for implementation of Offshore Wind Energy Projects**.

Features of the scheme

- **Nodal Ministry**: Ministry of New and Renewable Energy
- **Aim**: Installation and commissioning of **1 GW of offshore wind energy projects** (500 MW each off the coast of **Gujarat and Tamil Nadu**)

About Viability Gap Funding

- Cabinet Committee on Economic Affairs (CCEA) in **2005** approved the **Viability Gap Funding (VGF) Scheme (Scheme for Financial Support to PPPs in Infrastructure)** as a **Central Sector Scheme**.
- **Administered by:** Department of Economic Affairs, Ministry of Finance
- Aims at supporting infrastructure projects that are **economically justified but fall marginally short of financial viability**.
- Support under this scheme is available **only for infrastructure projects** where **private** sector **sponsors** are selected through a process of **competitive bidding**.

Key facts about Offshore Wind Energy

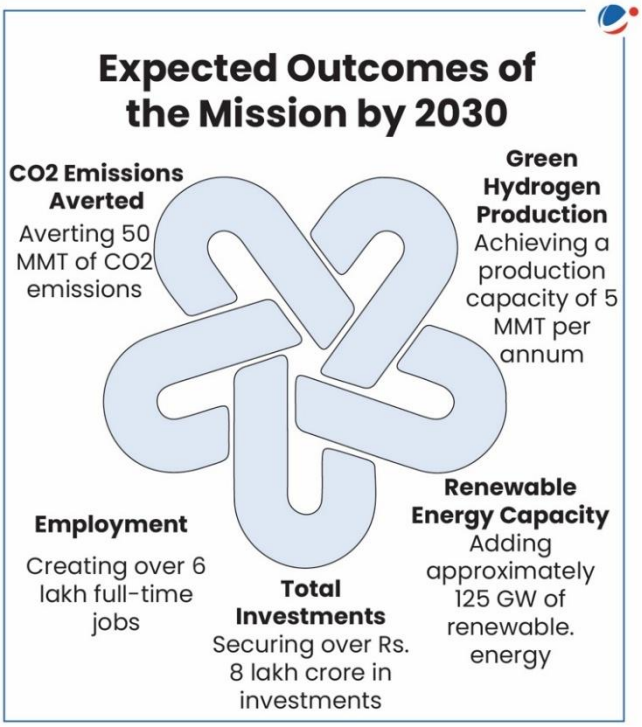
- MNRE has set a target of **30 GW offshore wind installations by 2030** under **National Offshore Wind Energy Policy (2015).**
- **Comparison of Offshore and Onshore wind energy projects**

Offshore Wind Energy Projects	Onshore Wind Energy Projects
Pros: • **Generates more energy**: 1MW more energy than onshore turbines **due to larger turbines**. • **Efficiency**: winds at sea are **stronger** and blow in the **same direction more often**. • **Less intrusive**: **Fewer environmental impacts; no issue of land acquisition.**	**Pros**: • **Cost-effective** compared to offshore • **Quicker** installation • **Lower transmission losses** with **less voltage drop** • Proven **technology** and **reduced wear and tear**
Cons: • **Transmission and distribution process** is tedious, and needs more infrastructure. • **High maintenance costs**	**Cons**: • Noise pollution. • Unpredictable **wind speeds and direction**. • **Limits on Land availability and landscape**

4.4.4. NATIONAL GREEN HYDROGEN MISSION

Why in the news?

The Ministry of New and Renewable Energy (MNRE) has released **Scheme Guidelines** for development of Standards and Regulatory framework under the **National Green Hydrogen Mission.**



Key-features of the Guidelines

- **Budgetary Outlay:** Rs. 200 Crore till FY 2025-26.
- **Objective:** To identify the gaps in the existing testing facilities for components, technologies and processes in the value chain of Green Hydrogen & its derivatives.
- **Scheme Implementation agency (SIA):** National Institute of Solar Energy (NISE)
- **Implementation Methodology:**
  - SIA will identify the **test facilities.**
  - SIA will issue **call for proposals** (**CfP**) in consultation with MNRE for **establishment** of testing facilities.
  - The proposals will be evaluated by a **Project Appraisal Committee (PAC).**
  - **Selected agencies** will be recommended by PAC to MNRE to issuing sanctions.
  - **Letter of Award** shall be issued to Executing Agency (EA) by SIA.

- **Funding and Disbursement:** MNRE will fund up to:
  - 100% of the capital cost (for Government entities).
  - **70% of the capital cost** (For Non-Government entities).

About National Green Hydrogen Mission (NGHM)

- Launched in **2023,** with an outlay of **₹ 19,744 crore.**
- **Duration:** Phase I (2022-23 to 2025-26) and Phase II (2026-27 to 2029-30).
- **Objective:** To make India a Global Hub for production, usage and export.
- **Key components:**
  - **Facilitating demand creation**
  - **Strategic Interventions for Green Hydrogen Transition (SIGHT)** programme,
- **Pilot Projects** for steel, mobility, shipping, decentralized energy applications, etc.
- Development of **Green Hydrogen Hubs** (for e.g., 3 ports namely Deendayal (Kandla, Gujarat), Paradip (Odisha) and V.O. Chidambaranar (Tuticorin, Tamil Nadu).
- **Initial steps taken under NGHM**
  - **GAIL Limited** started India's **maiden project of blending Hydrogen** in City Gas Distribution grid in Indore (Madhya Pradesh)
  - **NTPC Limited** has initiated blending of Green Hydrogen up to **8%** in PNG Network at **NTPC Surat (Gujarat).**
  - **Hydrogen based Fuel-Cell Electric Vehicle (FCEV)** Buses in **Greater Noida (Uttar Pradesh) and Leh** by NTPC.
  - **Oil India Limited** has developed a **60-kW** capacity hydrogen fuel cell bus.

About Green Hydrogen (GH_2)

- Refers to hydrogen produced through **electrolysis**, which splits water molecules (H_2O) into hydrogen (H_2) and oxygen (O_2) using electricity generated from renewable sources.
- Another method of producing **GH_2** is from biomass, involving the gasification of biomass to produce hydrogen.
- **Applications of GH_2:** Fuel Cell Electric Vehicles (FCEVs) Aviation and Maritime, Industry (Fertilizer Refinery, Steel, Transport (Road, Rail), Shipping, Power Generation.

Types of Hydrogen

Colour						
Type	Black/Brown Hydrogen	Grey Hydrogen	Blue Hydrogen	Turquise Hydrogen	Pink Hydrogen	Green Hydrogen
Process	Coal Gasification	Methane Reformation	Coal Gasification &Methane Reformation with CCUS	Pyrolysis	Electrolysis	Electrolysis/ Biomass Gasification
Source	Coal	Natural Gas	Fossil Fuel	Methane	Nuclear Energy	Renewable Energy

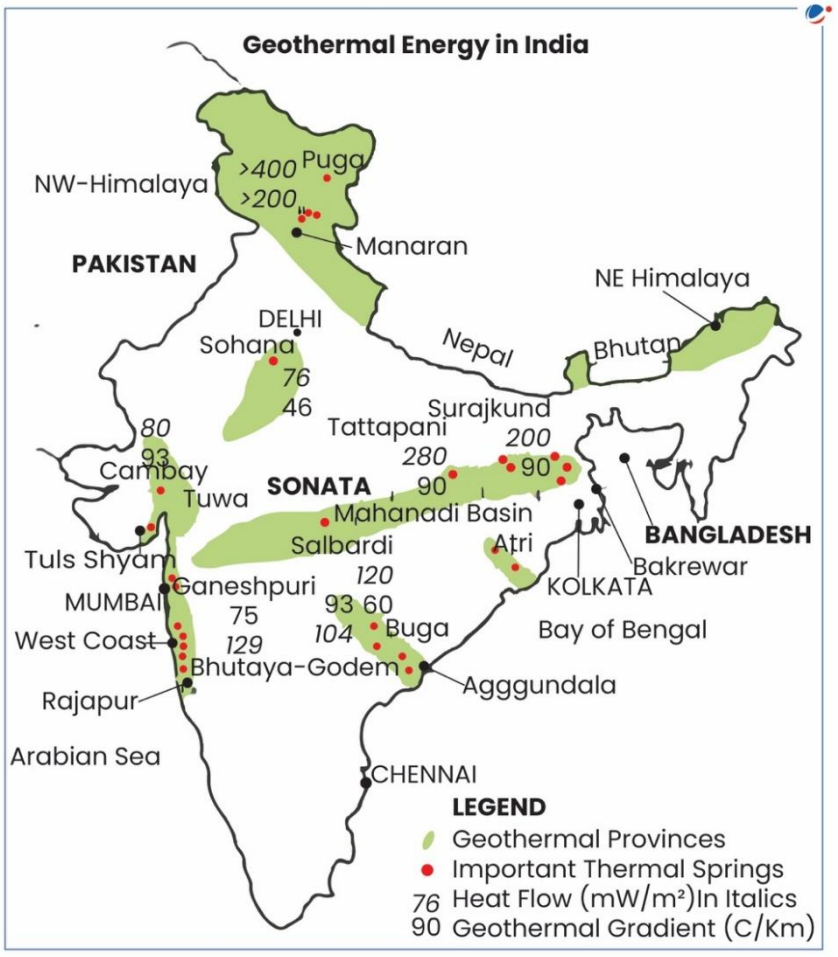
Related News

- **SIGHT (Strategic Interventions for Green Hydrogen Transition) Programme**
- Recently, Allocation for Bidding for Green Ammonia under SIGHT Programme was enhanced.
- **Capacity available for bidding under Mode 2A** of SIGHT programme is increased from 5,50,000 MT per annum to **7,50,000 tonnes per annum.**
  - Mode 2A of SIGHT programme (Incentive for Procurement of Green Ammonia Production) **provides selected bidder financial incentive for 3 years** for Green Ammonia produced and supplied.

4.4.5. GEOTHERMAL ENERGY

Why in the news?

Recently, Geothermal Power Potential of 10,600 MW identified in India



About Geothermal Energy

- Its **renewable heat energy generated** and stored in earth.
- This internal heat/thermal energy is generated from **radioactive decay and continual heat loss** from earth's formation.
- **Disadvantages/issues of Geothermal Energy:**
- **Possible land subsidence, high transportation charges** of energy (Due to remote plant location).
- **Possible release of toxic chemicals** e.g. mercury, arsenic, boron, and antimony.
- **Other Issues:** Higher capital costs, techno-economic viability issue due to remote location

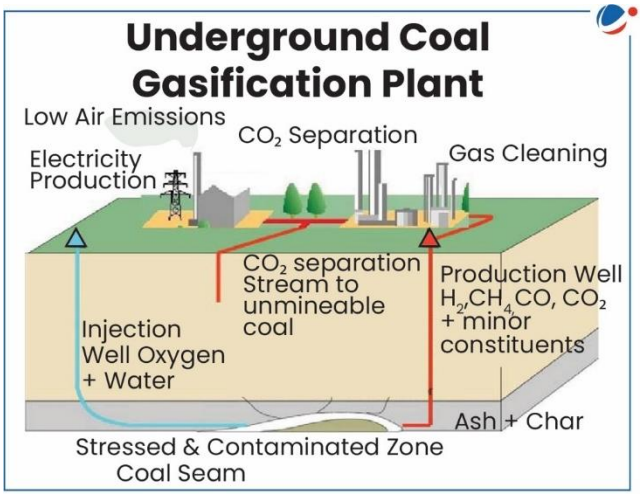
Steps Taken in India

- **Renewable Energy Research & Technology Development Programme (RE-RTD)**
- **100% financial support by MNRE to governmen**t/non-profit research organizations and up to 70% to industry, startups etc.
- **Renewable Energy Technology Action Platform** under US - India Strategic Clean Energy Partnership.
- **Mission on Advanced and High-Impact Research (MAHIR**)

4.4.6. UNDERGROUND COAL GASIFICATION (UCG)

Why in the News?

Ministry of Coal has launched a pioneering Underground Coal Gasification pilot project in Jharkhand'.



About Underground coal gasification (UCG)

- An energy manufacturing process whereby **coal is gasified or chemically converted into a synthesis gas (syngas)** in its original coal seam.
- UCG gas is **similar to surface coal gasification gas**, typically a mixture of methane (CH_4), carbon dioxide (CO_2), hydrogen (H_2) and carbon monoxide (CO).
- UCG is the **in-situ combustion** of the coal seam to produce usable gas.
    - The process is initiated by **injecting steam and air/oxygen** into the seam and igniting it, requiring temperatures over **1000°C**.

- **Products of UCG:** Electricity; Chemical Feedstock; Production of Hydrogen etc.
- **Benefits of UCG**
  - **Access to unmineable coal**
  - **Reduced capital expenditure** related to coal mining and surface gasification complex.
  - **Energy Density:** Needs less than 3% of land area needed for coal bed methane extraction to produce the same amount of gas energy.
- **Concerns:** Induced Subsidence; Contamination of Groundwater; Unsteady-state process etc.

Government Initiatives for Coal Gasification

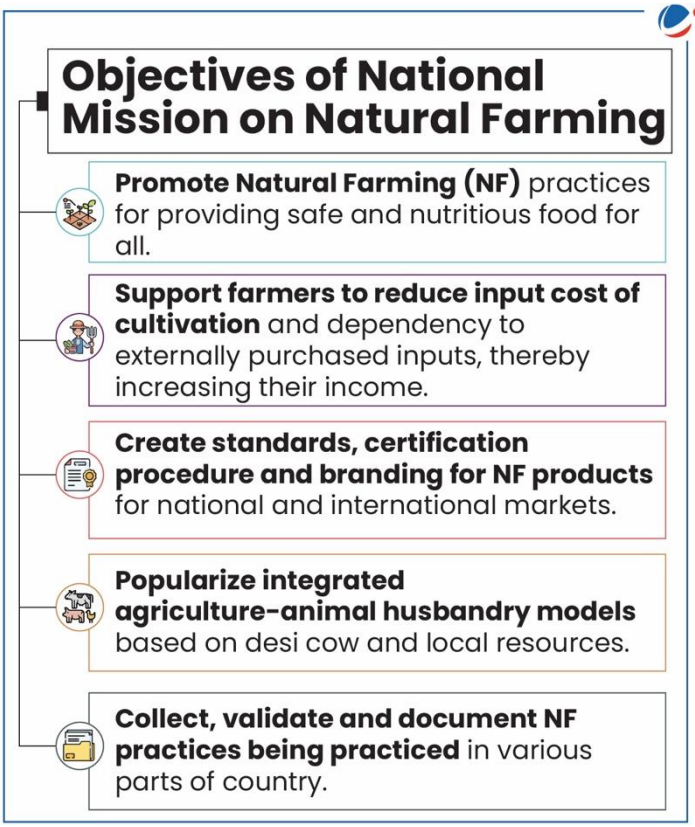
- **National Coal Gasification Mission:** Aims to achieve coal gasification and liquefaction of 100 MT of coal by 2030.
- **Dedicated policy framework for development of UCG in coal and lignite bearing areas** in India was approved by Ministry of Coal in 2015.
- **Scheme for promotion of Coal/Lignite Gasification:** A financial assistance scheme to promote Coal/Lignite Gasification Projects by Government PSUs and the Private Sector.
- **Joint venture agreement (JVA):** Government promoting project using coal gasification through JVA such as CIL and BHEL for setting up an ammonium nitrate plant through coal gasification (SCG).

4.5. SUSTAINABLE AGRICULTURE

4.5.1. NATURAL FARMING

Why in the News?

Recently, Union Cabinet approved the launch of the **National Mission on Natural Farming (NMNF)** as a standalone **Centrally Sponsored Scheme** under **Ministry of Agriculture & Farmers' Welfare**.



About National Mission on Natural Farming (NMNF)

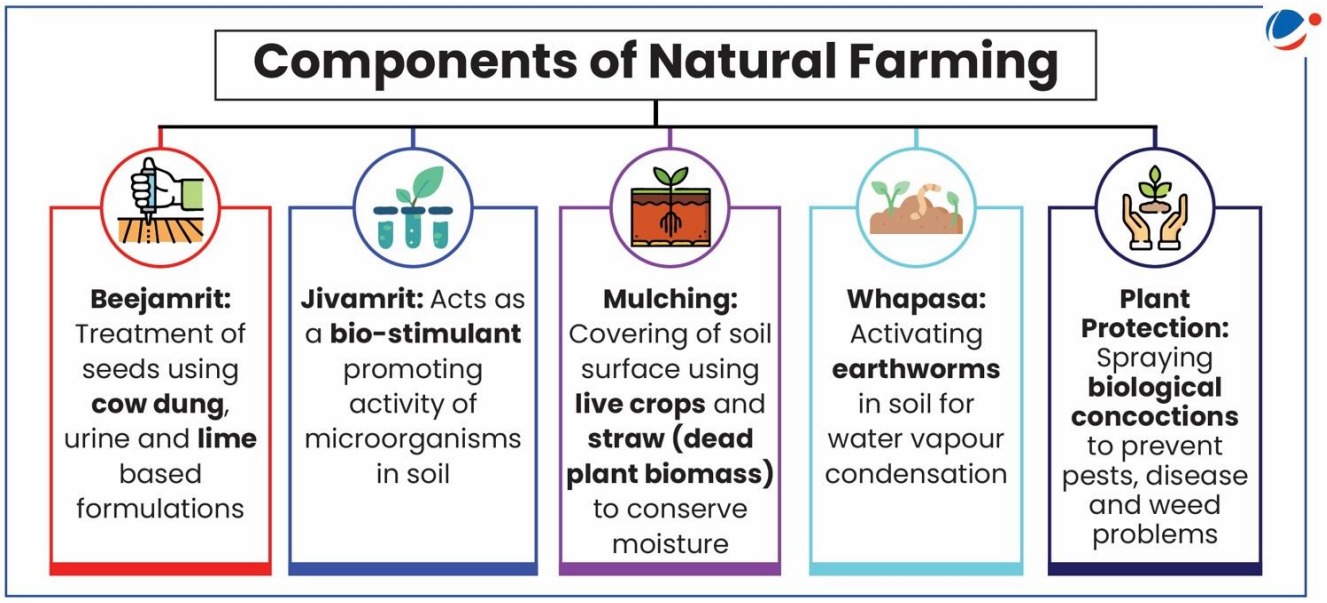
- Bhartiya Prakritik Krishi Padhati (BPKP) was **renamed as NMNF from 2023-24** for implementation across the country.
- BPKP is a **Centrally Sponsored Scheme**, initiated for a period of six years (2019-25).
- It was made a sub-scheme under umbrella scheme of Paramparagat Krishi Vikas Yojna (PKVY) in 2019.
- **Aim**: To cover 12 Lakh ha in 600 major blocks of the country and provides financial assistance of Rs.12,200/ha for 3 years for Cluster formation and Capacity building.

Key features

- **Implementation**: In 15,000 clusters in willing Gram Panchayats, NF would be initiated in 7.5 lakh hectare area over the next 2 years.
- **Other components of the mission**:
  - **Bio-input Resource Centres (BRCs)** will be established for easy availability of ready-to-use inputs.
  - **Model Demonstration Farms** will be set up to train farmers.
  - **Krishi Sakhi** for awareness generation, mobilisation and handholding of willing farmers.

About Natural Farming

- It is a **chemical free, low-input, climate-resilient farming system** based on livestock and locally available resources while eliminating synthetic agro-chemicals.
- **States practicing NF** are Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, etc.
- **Benefits of Natural Farming:** Improved Yield; revitalizes soil microbiota, improving soil health; better soil biology, improved agro-biodiversity; more judicious usage of water; smaller carbon and nitrogen footprints; use of bio-inoculums nutrient content and increase bioavailability for humans.



Organic vs. Natural Farming Systems

Similarities: Both are **non-chemical systems** of farming largely relying on biomass management, rejuvenation of natural nutrient recycling, crop rotation and multiple cropping.

Differences:

Parameter	Organic Farming	Natural Farming
Input	Involves **off-farm purchased organic and biological inputs.**	No external inputs and **use on-farm inputs based on Desi Cow.**
Soil Correction	**Need based soil correction** through natural mined minerals.	**Use of compost/ vermi compost and minerals** are **not allowed.**
Agro Practices	Requires practices like **plowing, tilting, mixing of manures, weeding, etc.** to be performed.	**Decomposition of organic matter** by microbes and earthworms is encouraged on the soil surface.
Cost	**More expensive** due to need for organic manures.	**Low cost** due to reliance on local biodiversity.

Other Initiatives to promote Natural Farming

- **National Centre for Management of Agriculture Extension (MANAGE)**: MANAGE is a knowledge partner for documentation of best practices, digitalization of success stories on Natural Farming.
- **National Centre for Organic and Natural Farming (NCONF):** For promotion of chemical-free agricultural systems and development of certification programme for Natural Farming.
- **National Mission on Sustainable Agriculture (NMSA):** One of the eight Missions outlined under National Action Plan on Climate Change (NAPCC).
- **PKVY:** Launched in 2015 to produce agricultural products free from chemicals and pesticides residues by adopting eco- friendly, low- cost technologies.

4.5.2. NATIONAL PEST SURVEILLANCE SYSTEM (NPSS)

Why in the news?

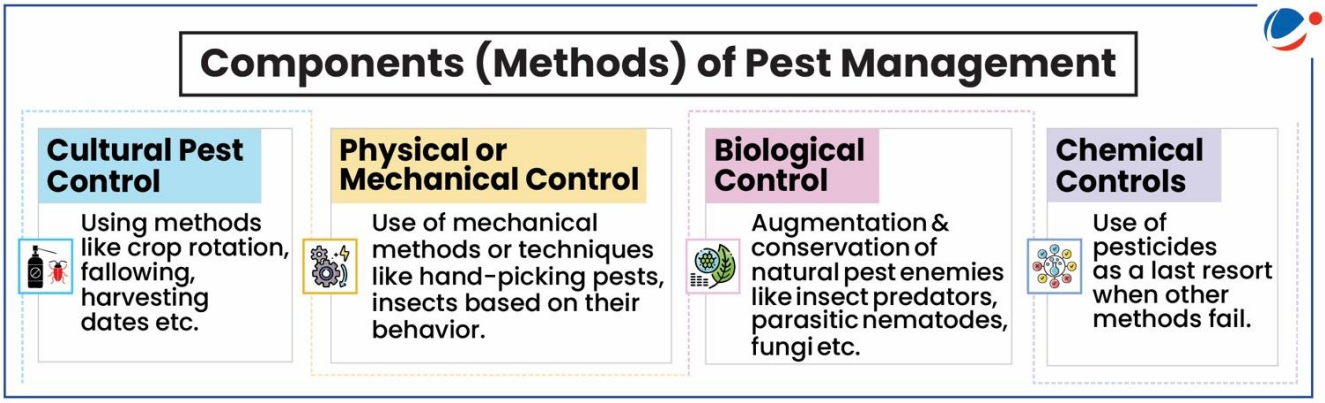
Union Ministry of Agriculture has launched **AI-based platform, National Pest Surveillance System** (NPSS) that will promote Integrated Pest Management in India.

About National Pest Surveillance system (NPSS)

- **Aim:** To **reduce dependence of farmers on pesticide retailers** and inculcate a **scientific approach** among them towards **pest management.**
- **Agencies involved:** Collaboration of **Directorate of Plant Protection, Quarantine & Storage and ICAR-National Research Centre for Integrated Pest Management (ICAR- NCIPM).**
- **Key Features:** Use of cutting-edge technologies like **Artificial Intelligence (AI) and Machine Learning (ML),** mobile app and web portal and expert advice.

About Integrated Pest Management (IPM)

- **Integrated Pest Management (IPM)** is an eco-friendly pest control method which emphasizes on use of bio-pesticides and **pesticides** of plant-origin.



4.5.3. FOOD WASTE INDEX

Why in the News?

United Nations Environment Programme (UNEP) launched '**Food Waste Index (FWI) Report 2024'** with **WRAP (Waste and Resources Action Programme).**

About Food Waste Index (FWI)

- Tracks global and national generation of food and inedible parts **wasted at retail and consumer (household and food service) levels.**
- It supports the goals of **two indicators of SDG 12.3 which i**s to be achieved by 2030**: SDF12.3.1(a) and SDG12.3.1(b)**

SDG 12.3.1 (a)	SDG 12.3.1 (b)
• **Food Loss Index (FLI):** reduce food losses along production and supply chains, including post-harvest losses. • **Custodian:** FAO	• **Food Waste Index (FWI) :** halve per-capita global food waste at retail and consumer levels. • **Custodian:** UNEP

- **Key findings**
  - Households across all continents **wasted over 1 billion meals a day in 2022.**
  - Food Waste generates an estimated **8–10% of global greenhouse gas emissions.**

About WRAP

- It is a **climate action NGO (established in UK in 2000)** working to tackle causes of climate crisis and give the planet a sustainable future.
- **Suggestions for reducing food waste through collaborative approach**
- Systemic action through **Public-Private Partnerships (PPPs) model**. Example, Courtauld Commitment 2030 (UK), Australian Food Pact etc.
- Establish a roadmap or delivery plan, targeting priority areas or **"hotspots"** of waste.

4.5.4. OTHER SUSTAINABLE PRACTICES IN NEWS

4.5.4.1. PAIRA CROPPING SYSTEM

This conservation agricultural practice in Odisha is reportedly dwindling in recent years.

About Paira cropping system

- It is a **relay method** of sowing with **short-duration pulses/oilseeds,** which are broadcast in standing crop of rice ~2 weeks before its harvest.
- **Does not allow interventi**ons such as tillage, weeding, irrigation, and fertilizer application.
- **Benefits:** maximize land use efficiency, boost farmers income, etc.
- **Areas of Practise**: Bihar, Eastern Uttar Pradesh, West Bengal, Chattisgarh and Odisha.

4.5.4.2. GREEN MANURING

Distribution of green manure, Dhaincha has recently been commenced in Tamil Nadu.

About Green Manuring

- **Growing of plants** belonging to leguminous family and incorporating them into soil after sufficient growth.
- Generally grown as a **green manuring crop** in India, Dhaincha is used for **feeding livestock and soil improvement**.
- **Significance:**
  - Improves soil structure, increases **water holding capacity** and decreases soil loss by erosion.
  - Reduces **weed proliferation** and helps reclamation of alkaline soils.
  - It adds **organic matter to the soil** and stimulates **activity of soil microorganisms.**

4.5.4.3. INTEGRATED NUTRIENT MANAGEMENT (INM)

Recently, experiments conducted by Indian Council of Agriculture Research **reveal that Integrated Nutrient Management maintained Soil Fertility.**

Integrated Nutrient Management

- It refers to **maintenance of soil fertility and plant nutrient supply** at an optimum level for **sustaining desired productivity** through **optimization of benefits from all possible sources of organic, inorganic, and biological components** in an integrated manner.
- **Significance:** Enhanced soil fertility and health, sustainable crop production, food security etc.
- **Government initiatives to promote INM:** Paramparagat Krishi Vikas Yojana (PKVY),Mission Organic Value Chain Development in North East Region (MOVCDNER),Market Development **Assistance (MDA)** to promote organic fertilizers, **PM-PRANAM** to promote sustainable and balanced use of fertilizers, et

4.6. MISCELLANEOUS

4.6.1. ILLEGAL SAND MINING

Why in the news?

Recently, Supreme Court sought report by Directorate of Enforcement (ED) on illegal sand mining in Tamil Nadu.

About Sand Resource

- Sand is the **second most exploited natural resource** in the world after **water** (as per the **United Nations Environment Programme**).
- **Main sources**: Rivers (riverbed and flood plain), lakes and reservoirs, coastal /marine sand, etc.
- **Regulation in India**: Sand is a **minor minerals** under the Mines and Minerals (Development & Regulation) Act, 1957 (MMDR Act).
    - The regulation of minor mineral (including control of illegal mining) comes under the legislative and administrative domain of the **State Governments**.

Impacts of Sand Mining:

- **Biodiversity**: Habitat loss of aquatic (also marine) and terrestrial flora and fauna.
- **Hydrological function**: Change in water flows, **lowering** of the **water table, etc.**
- **Infrastructures**: Damage to bridges, river embankments and coastal infrastructure.
- **Extreme events**: Decline of protection against extreme events like **floods**, **storm surge** etc.

Key Measures taken to Ensure Best Practices in Sand Mining

- **Sustainable Sand Management Guidelines (2016)** supplemented by the **Enforcement & Monitoring Guidelines for Sand Mining-2020 for** restoration and maintenance of river ecology.
- **Sand Mining Framework (2018)** by **Ministry of Mines:** Envisages alternative sources of sand in form of **Manufactured Sand (M-Sand)** from crushed rock fines, and sand from Overburden (OB) of coal mines.
- **Overburden** (also called waste or spoil) refers to the material that lies above an area that lends itself to economical exploitation, such as the rock, soil, and ecosystem that lies above a coal seam or ore body.

4.7. OTHER IMPORTANT NEWS

4.7.1. ECOMARK

Recently, Union Ministry of Environment, Forest and Climate Change notified **Ecomark Rules, 2024**.

Rules notified

- **Granting Criteria:** To a product that has a licence or a certificate of conformity with **Indian Standards** granted under the **Bureau of Indian Standards Act and/or a mandate of the Quality Control Orders** and that fulfills the criteria as prescribed in the rules.
    - According to rules, the Ecomark may be granted to products that meet **specified environmental criteria as per resource consumption and environmental impacts.**
- **Application Process:** Manufacturers must apply for Ecomark through the Central Pollution Control Board (CPCB).
- **Duration**: 3 years
- **Oversight and Implementation**: By Steering Committee, headed by the Environment Secretary.

Other Environmental Certification in India

- **Indian Forest & Wood Certification Scheme**
- It offers **voluntary third-party certification to promote sustainable forest management and agroforestry**
- It includes **forest management certification, tree outside forest management certification, and chain of custody certification.**
- It **provides market incentives** to various entities.

4.7.2. ETHANOL 100

Ministry of Petroleum and Natural Gas launched Ethanol 100 fuel.

About Ethanol 100

- Ethanol 100 is a **cleaner and greener alternative to gasoline and is a blend of 92-94% ethanol, 4-5% motor spirit to provide color to flame,** and 1.5% Co-solvent higher saturated alcohol.
- Ethanol 100 has a **high octane number in the range of 100-105**, which makes it ideal for high-performance engines, ensuring improved efficiency and power output all while minimizing environmental impact.

4.7.3. RETAP

First virtual Joint working group meeting of RETAP was held between representatives of India and USA.

About RETAP

- RETAP was announced by **India and US jointly** in 2023 under **Strategic Clean Energy Partnership (SCEP).**
- SCEP, launched in 2021, is collaborative effort between India-US to accelerate **clean energy innovation and deployment.**
- RETAP's initial focus is to be on **green/clean hydrogen, wind energy, ocean/tidal energy etc.**
- **Work is guided by five themes:** Research & Development, Piloting & Testing of Innovative Technologies etc.

4.7.4. BIO-CNG

Recently, **Indore** Municipal Corporation reported to be producing 17,000 kilograms of **Bio-CNG** (Bio-Compressed Natural Gas) every day from **Asia's largest municipal solid waste-based facility**.

About Bio CNG

- It is the purified and compressed form of biogas with around 92 - 98% of methane content.
- The plant was launched in 2022 under Galvanizing Organic Bio-Agro Resources Dhan **(GOBARdhan**) initiative to turn waste into wealth.
- **About GOBARdhan initiative**
  - **Coordinating Dept.:** The Department of Drinking Water and Sanitation of Ministry of Jal Shakti
  - **Aim:** Converting biodegradable/ organic waste into valuable resources such as biogas, compressed biogas (CBG), and organic manure and to promote circular economy

4.7.5. SUPERHYDROPHIC CATALYST

A team of scientists developed a Superhydrophobic (**water-repellent) catalyst** that can reduce the cost of producing biodiesel.

About Superhydrophobic Catalysts

- Derived from **biomass (cellulose),** and are **eco-friendly, abundant, reusable,** and **affordable.**
- Can withstand the **water by-product** obtained during biodiesel production, preventing the poisoning of active sites by water.
- Can provide a **sustainable method for biomass waste disposal** and expand the utility of **biochar** as an alternative to graphene.

4.7.6. BUSINESS RESPONSIBILITY AND SUSTAINABILITY REPORTING (BRSR)

Recent report analyses how companies are adopting to BRSR.

About BRSR

- It is a **mandatory disclosure mechanism (from FY 2022–23) for the top 1000 listed companies or businesses** to report their **performance on environmental, social and governance (ESG) aspects**.

- SEBI's guidance document provides details on three kinds of disclosures—**general, management and process, and "principle wise" (principle-based).**

- BRSR is aimed at **improving compliance, consistency and communication around non-financial disclosures.**
- **SEBI also introduced BRSR Core in 2023** to enhance the reliability of ESG disclosures.
  - BRSR Core represents a subset of the comprehensive BRSR and **includes a specific set of key performance indicators (KPIs) / metrics across ESG attributes.**

Related News
2024 Corporate Climate Responsibility Monitor (CCRM) report

- **Released by:** New Climate Institute in collaboration with Carbon Market Watch
  - **Carbon Market Watch** is an independent, not-for-profit watchdog and research organisation with unique expertise in carbon pricing.
- Report assesses the transparency and integrity of climate strategies of 51 major global companies.

4.7.7. CRITICAL ENERGY TRANSITION MINERALS (CETMS)

Recently, **UN Secretary-General's Panel on Critical Energy Transition Minerals (CETMs)**, established, to develop **guiding principles for energy transition,** has released a report on CETMs.

About CTEMs

- They are minerals necessary to construct, produce, distribute and store renewable energy.
- Include Rare Earth Elements, copper, cobalt, nickel, lithium, graphite, cadmium, selenium etc.
- **Demand** for CETMs **expected to triple by 2030** as the world **transitions from fossil fuels to renewable energy**.

4.7.8. BIOMASS BRIQUETTES

Biomass briquettes emerge as a **fuel alternative for the power and electricity generation sector**.

- Presently, biomass pellets are commonly used as a coal alternative

About Biomass briquettes

- **Composition**: Compact blocks of organic materials like agricultural residues, forestry wastes, or waste biomass.
- **Briquetting Process**: Densification of biomass to improve its characteristics as a renewable energy resource.
- They are **Carbon-Neutral** unlike fossil fuels, as they release no additional CO_2 when burned.

4.7.9. PARIVESH PORTAL

Centre's PARIVESH portal crosses 50,000 clearances milestone

About Parivesh Portal

- Stands for Pro Active and Responsive Facilitation by Interactive and Virtuous Environmental Single-window Hub.
- Developed by Ministry of Environment, Forest and Climate Change **through NIC.**
- **Objective:** Acts as a **single window portal** for Environment, Forest, Wildlife and Coastal Regulation Zone (CRZ) clearances and **monitor their subsequent compliance.**

4.8. ORGANIZATIONS IN NEWS

4.8.1. INTERNATIONAL SOLAR ALLIANCE (ISA)

HQ: Gurugram, Haryana, India

Recently, **Armenia** became the 104th country to join the **International Solar Alliance (ISA).**

Genesis: Jointly announced by **India and France in 2015** at the UN Paris Climate Change Conference (COP-21 of the UNFCCC).

Objective: Promotes the efficient use of solar energy, facilitates solar energy projects, and fosters cooperation to reduce dependence on fossil fuels, addressing energy security and climate change.

Guided by 'Towards 1000' strategy:
- Mobilise **USD 1,000 billion of investments** in solar energy solutions by 2030
- Deliver **energy access to 1,000 million people** using clean energy solutions
- Installation of **1,000 GW of solar energy capacity.**
- Mitigate global solar emissions to the tune of **1,000 million tonnes of CO2 every year.**

Membership: 104 countries (signed and ratified)
- Eligibility: All UN Member States (2020 Amendment to Framework Agreement)

Key Initiatives:
- **One Sun One World One Grid (OSOWOG): Connects different regional grids** with common grid.
- **Solar Technology Application Resource Centre (STAR C):** Capacity-building, institutional strengthening.
- **Global Solar Facility: To catalyze solar investments** in underserved segments across Africa.
- **MIGA Solar Facility: Multi-donor trust fund** was established by **Multilateral Investment Guarantee Agency** (part of World Bank Group) and ISA to support solar investments in Sub-Saharan Africa.
  - This is the **first program under guarantee component of ISA's Global Solar Facility (GSF).**
- **Others: Development of Large-Scale Solar Power Projects** under **Solar Park** Concept; **ISA Solar Fellowship for Mid-Career Professionals; International Solar Festival etc.**

Reports/Indices

Ease of Doing Solar 2020: Assesses solar energy-friendly policies in member nations.
Scaling Solar Applications for Agriculture: Focuses on solar-based agricultural solutions.
Solar Investment Roadmap: Guides investments in solar energy.

4.8.2. INTERNATIONAL ENERGY AGENCY (IEA)

HQ: Paris, France

Autonomous inter-governmental organisation within the OECD framework.

International Energy Agency

Genesis: Established in 1974 to ensure the **security of oil supplies after the oil crisis (1973)**

Members: 32 members and 13 associate members **(India Associate member since 2017)**. 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/Indices

World Energy Outlook 2024
Key Findings
- Around 20% of today's global oil and LNG supplies flow through the **Strait of Hormuz**, a **maritime chokepoint** in the Middle East.
- **More than half of the world's electricity** will be generated by low-emission sources before 2030.

Tracking SDG 7: The Energy Progress Report 2024
- Released in collaboration with other **SDG 7 custodian agencies-** International Renewable Energy Agency (IRENA), United Nations Statistics Division (UNSD), World Bank and World Health Organization (WHO).
- **SDG 7** is to ensure access to affordable, reliable, sustainable and modern energy for all.

Other reports: Global EV Outlook; World Energy Employment 2024; etc.

4.8.3. INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA)

HQ: Abu Dhabi (UAE)

A leading **global intergovernmental agency** for energy transformation.

IRENA
International Renewable Energy Agency

Genesis: Proposal for an international agency dedicated to renewable energy was made in **1981 at the UN Conference on New and Renewable Sources of Energy, held in Nairobi, Kenya.** IRENA was **founded in Bonn (Germany) in 2009** with 75 states signing the IRENA Statute at the time.

Members: 168 countries and the EU **(India is also a member).**

Functions: Serves as the **principal platform for international cooperation,** supports countries in their energy transitions, and provides state of the art data and analyses on technology, etc.

Reports/Indices

A World Energy Transitions Outlook Brief: Tracking CoP 28 outcomes

- Tracks global progress towards the **energy transition commitment to triple renewables by 2030 as outlined in COP 28 of UNFCCC (held in November 2023).**
- **Key findings**
  - 2023 added **473 GW** (73% contributed by Solar energy) additional **Renewable** to global energy mix.
  - However, annual addition must **reach almost 1100 GW** to meet tripling target.
  - With a growth of 20.1% **Asia was leader** in renewable deployment and its growth was driven by China.

Other reports: Renewable Energy Outlook for ASEAN; Renewable Energy for Agriculture; Renewable Energy and Jobs etc.

4.8.4. UN DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS (UN DESA)

HQ: New York, USA

- **UNDESA (United Nations Department of Economic and Social Affairs)** aims to promote international cooperation on economic, social, and environmental issues.

UNITED NATIONS DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

Genesis: Established in **1948** to promote international cooperation on **economic, social, and environmental issues.**

Objective: Supports **sustainable development** by providing **policy analysis, capacity-building,** and **coordination** among UN member states.

Key Initiatives:
- **High-Level Political Forum (HLPF):** Monitors progress on SDGs.
- **DESA Global Policy Dialogues:** Engages stakeholders to address pressing economic and social challenges.

Membership: Comprises all **193 UN member** (including **India**)

Reports/Indices

World Economic Situation and Prospects (WESP): Analysis of global economic trends and challenges.
World Social Report: Insights into social trends affecting inequality and development.
Global Sustainable Development Report (GSDR): Tracks progress toward SDGs.
Financing for Sustainable Development Report: Examines strategies to fund the 2030 Agenda.

4.8.5. UN SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK (SDSN)

Sustainable Development Solutions Network (SDSN)

- Body under the UN aims to support the 2030 Agenda for Sustainable Development and the SDGs.

SDSN

Genesis: Established in **2012**.

Objective: Mobilizes global expertise for **sustainable development solutions** at local, national, and global levels.

Membership: Over 2,000 member institutions, **primarily universities,** coordinated by 57 National and Regional Networks.

Functions: Provides **policy advice,** promotes **research,** and fosters **collaboration** across sectors for achieving SDGs.

Key Initiatives:
- **Youth Solutions Program:** Engages young innovators.
- **SDSN Networks:** Adapts SDG solutions to regional and local contexts.
- **Thematic Networks:** Focus on **climate, energy**, and **biodiversity.**

Reports/Indices

Sustainable Development Report: Tracks SDG progress.
SDG Cities Guide: Localizing SDGs in urban areas.
Global Happiness Policy Report: Links happiness with sustainable development.
SDG Transformation Roadmaps: Strategies for SDG acceleration.

4.8.6. INTERNATIONAL ENERGY EFFICIENCY HUB (IEEH)

International Energy Efficiency Hub

- Union Cabinet has approved the signing of a letter of intent enabling India to join the IEEH.
- A global platform dedicated to **fostering collaboration and promoting energy efficiency worldwide.**

Genesis: Established in **2020** as the successor to the **International Partnership for Energy Efficiency (IPEEC)** in which **India** was a member.

Members: 16 members, including countries like the United States, China, the United Kingdom, and Germany, and the European Commission.

Mandate: It is a **global platform** dedicated to fostering collaboration and **promoting energy efficiency worldwide.**

Bureau of Energy Efficiency (BEE) has been designated as the **implementing agency** for the Hub on behalf of India.

4.8.7. WORLD ENERGY COUNCIL

HQ: London, United Kingdom

- The 26th World Energy Congress, co-hosted by the World Energy Council (WEC), concluded in Rotterdam (Netherlands).

Genesis: Formed in 1923, the WEC is an **UN-accredited not-for-profit global energy body.**

Mission: Enabling access to **clean, affordable and reliable energy** for better lives and a healthier planet.

Role: Develop **practical solutions and convene network of global energy transition** leaders and practitioners.

Members: More than 3000 member organizations (public, private and academic sectors) located in around 90 countries.

Reports/Indices

Humanising Energy: A look at the G20 Agenda	**World Energy Scenario Foundations 2024**
World Energy Trilemma Report 2024	**World Energy Issues Monitor 2024**

4.8.8. INTERNATIONAL RICE RESEARCH INSTITUTE (IRRI) - SOUTH ASIA REGIONAL CENTRE (ISARC)

Varanasi, Uttar Pradesh

- **International Rice Research Institute (IRRI)- South Asia Regional Centre (ISARC),** marks a significant expansion of IRRI beyond its headquarters in the Philippines.

Established in **2018** through MoU between **India's Department of Agriculture & Farmers Welfare and IRRI.**

- **IRRI (HQ: Philippines)** is dedicated to reducing poverty and hunger through rice science; etc.
- To achieve this, ISARC is promoting adoption of best **agronomic and management practices like Dry Seeded Rice and Alternate Wet and Drying.**

Dedicated to **strengthening rice-based agri-food system** in South Asia region by developing climate-resilient, bio-fortified rice varieties for farmers and consumers.

5. DISASTER MANAGEMENT

5.1. INFRASTRUCTURE FOR RESILIENT ISLAND STATES (IRIS)

Why in the news?

Recently, **CDRI** announced **$8 Million funding** through its **Infrastructure for Resilient Island States (IRIS) Programme** to support disaster resilient infrastructure in **Small Island Developing States (SIDS)**.

More on the news

- Announced at the **United Nations 4th International Conference on SIDS, in Antigua and Barbuda**
- CDRI also recently announced a **$2.5 million fund** under Urban Infrastructure Resilience Programme **(UIRP)** to enhance **climate resilience** of cities **in 30 low and middle-income countries** including India.

About IRIS Programme

- **Members: CDRI** with members **Australia, the European Union, India, the United Kingdom** and SIDS representatives
- Launched at **COP26** during the **World Leaders Summit.**
- **IRIS programme** has won the **2024 UN SIDS Partnership Award** for its contributions to the sustainable development of SIDS through innovative and impactful partnerships.
- **Infrastructure Resilience Accelerator Fund (IRAF)** (**2022**) supports the IRIS Programme.
  - A **US$50 Million Trust Fund** to support global action on Disaster Resilience of Infrastructure Systems.
  - Established with the support of **UNDP and UNDRR**, with special focus on **developing** countries and **SIDS**.

About Small Island Developing States (SIDS)

- SIDS are a group of small island countries and territories that **share similar sustainable development challenges** and face similar social, economic and environmental **vulnerabilities**.
  - **Not all SIDS are islands**. Belize, Guyana and Suriname are also included because of their common characteristics.
  - **Ex of SIDS**: Maldives, Seychelles, Marshall Islands, Solomon Islands, Suriname, Mauritius, Papua New Guinea, Vanuatu, Guyana, Singapore etc.
- The three geographical regions in which SIDS are located are: the **Caribbean, the Pacific, and the Atlantic, Indian Ocean and South China Sea (AIS).**
- SIDS were recognized as a **special case both for their environment and development** at the 1992 United Nations Conference on Environment and Development.

Global measures for SIDS

- **The Alliance of Small Island States (AOSIS)**: It is an intergovernmental organization which plays an **integral role in carrying out advocacy for small island states** and influencing international environmental policy.
- **Global Conference on the Sustainable Development of Small Island Developing States (1994) (Barbados Programme of Action)**
- **UNDP initiatives**
  - **Climate Promise Initiative**: helping SIDS to prepare enhanced Nationally Determined Contributions (NDCs).
  - **Progressive Platforms Initiative** empowers SIDS by building diplomatic, legal and technical capacity for improved climate negotiations.
- **Small Island Developing States Accelerated Modalities of Action (SAMOA) Pathway**: It aims to address the unique challenges faced by SIDS and to support their development
- **2023 UN Resolution on climate justice:** Aims to secure a legal opinion from the international court of justice (ICJ) on the **"Obligations of States in respect of Climate Change".**
- **International Tribunal for the Law of the Sea (ITLOS) advisory opinion** concerning the specific **obligations** of the Parties to the UNCLOS on **climate change mitigation**.

5.1.1. UNITED NATIONS OFFICE FOR DISASTER RISK REDUCTION (UNDRR)

Why in the news?

Recently, UNDRR lauded India's role in Global Crisis Response System aligning with its ethos of **Vasudhaiva Kutumbakam.**

More on the news

- **India's Response Efforts highlighted: Operation Dost** (Turkey Earthquake), **Operation Karuna** (Cyclone Mocha, Myanmar), **Vaccine Maitri** (COVID-19 pandemic), etc.

About UNDRR

- **HQ:** Geneva, Switzerland
- **Genesis:** Established in 1999.
- **Mandate:** To **facilitate the implementation of the International Strategy for Disaster Reduction (ISDR).**
- **Mission:** To provide leadership and support to accelerate global efforts in **disaster risk reduction** to achieve inclusive sustainable development and the goal of the **Sendai Framework**.

About Sendai Framework

- A **15-year non-binding agreement** having **7 targets**, and is an **improved version** of the previous **Hyogo Framework for Action** (2005-15).
- **Adoption**: At **3rd UN World Conference on DRR** (2015, Sendai, Japan).
- **DRR Definition**: Systematic efforts to **reduce disaster risks** by analyzing and mitigating causal factors.
- **Aim**: Substantial reduction in **disaster risk, losses in lives, livelihoods, health, and economic, social, cultural, and environmental assets**.
- **Priorities**: **Understanding disaster risk, strengthening disaster risk governance, investing in disaster risk reduction** for resilience and **enhancing disaster preparedness** and **"Build Back Better"** in recovery and reconstruction.

Seven targets to be achieved by 2030	
SUBSTANTIALLY REDUCE	**SUBSTANTIALLY INCREASE**
• Global disaster mortality • Number of affected people • Economic loss in relation to GDP • Damage to critical infrastructure and services disruption	• Number of countries with national and local DRR strategies by 2020 • International cooperation to developing countries • Availability and access to early warning systems and DRR information

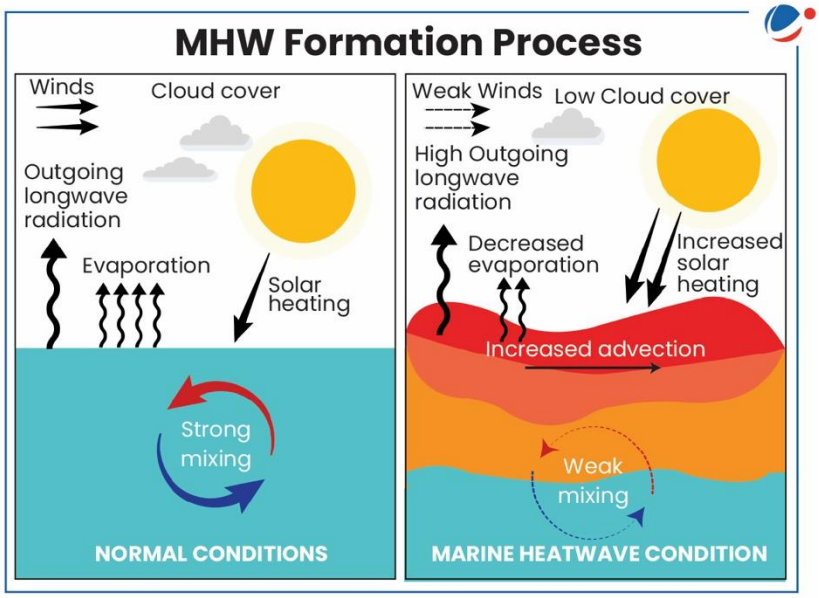
5.2. MARINE HEATWAVES (MHWS)

Why in The News

Recently, ICAR-Central Marine Fisheries Research Institute (CMFRI) found that **Lakshadweep has been affected by MHWs since October 2023** due to **changes in ocean currents and excessive heat transfer into atmosphere** causing coral bleaching.

About MHWs

- Occurs when **seawater temperatures exceed a seasonally varying threshold** (usually the 90th percentile) for at least 5 consecutive days.
  - MHWs can last for **weeks, months** or **even years**.
- **Recent Trends:** MHWs have increased by up **to four-fold in the tropical Indian Ocean**, aided by rapid **warming in the Indian Ocean** and **strong El Niños.**



About ICAR -CMFRI

- **Genesis**: Established under **Ministry of Agriculture and Farmers Welfare** in 1947 and later it **joined ICAR in 1967**.
- **Headquarter: Kochi, Kerala**
- **About**: Emerged as a **leading tropical marine fisheries research institute** in the world.
- **Mandate**
  - Monitor and **assess marine fisheries resources of Exclusive Economic Zone** including impact of climate and anthropogenic activity.
  - **Act as a repository of geo-spatial information** on marine fishery resources and habitats

5.3. CYCLONE

Why in the news?

Recently, **land-originating cyclone** named Asna was formed over the Kutch coast in Gujarat in Arabian Sea.

More on the news

- Cyclone was named under the process established by **World Meteorological Organisation (WMO).**
- A list of cyclone names is prepared by **the Tropical Cyclone Regional Body (TCRB)** responsible for an ocean basin.
- **WMO/ESCAP Panel on Tropical Cyclones**, one of five TCRBs assigns names to tropical cyclones in North Indian Ocean (Bay of Bengal and Arabian Sea).
  - Its members include Bangladesh, **India,** Maldives, Myanmar, Pakistan, Sri Lanka, Oman, Thailand, Iran, Qatar, Saudi Arabia, United Arab Emirates and Yemen.
- All member countries provided a list of **13 names each which are used sequentially**.

About Tropical Cyclones

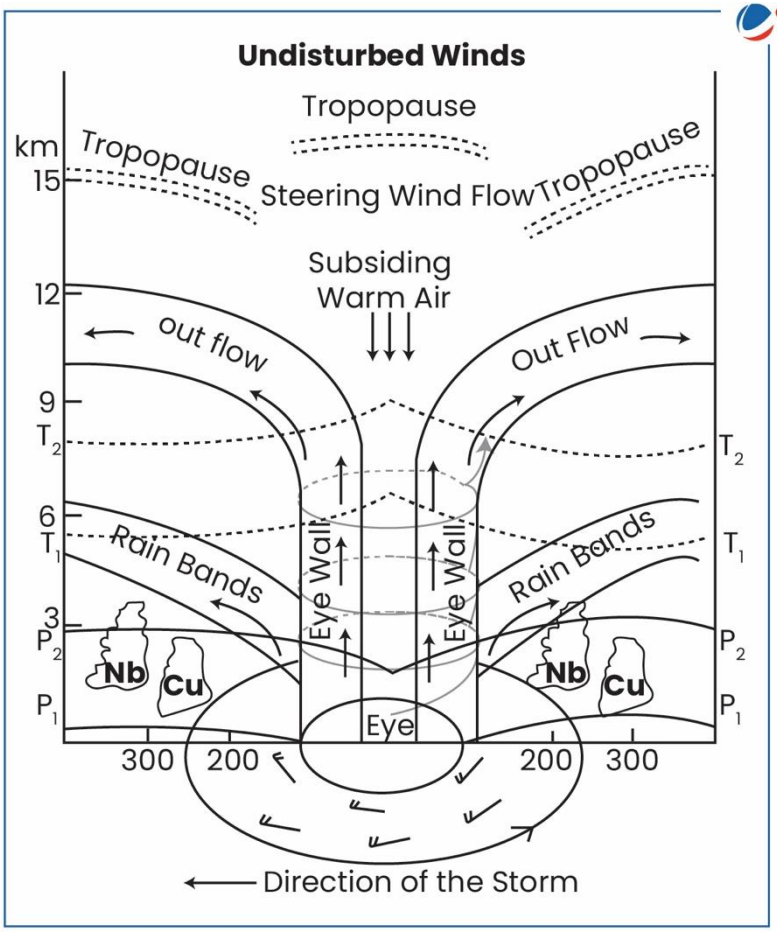
- **Rapidly rotating storms** that are non-frontal **low-pressure system** originating over tropical oceans.
- Known as **Cyclones** (Indian Ocean), **Hurricanes** (Atlantic), **Typhoons** (Western Pacific and South China Sea) and **Willy-willies** (Western Australia).
- **Other cyclones in news**: Cyclone **Remal** on West Bengal and Bangladesh coast; Typhoon **Yagi** in Vietnam; Hurricane **Helene and Milton** (USA); Typhoon **Yinxing** in Philippines; Hurricane **Beryl** in Caribbean.
- Cyclones are different from **tornadoes also known as twisters**.
  - A tornado is a violently rotating column of air that **extends from a thunderstorm to the ground.**

Comparison with Tropical Cyclones

Parameters	Tropical Cyclones	Tornadoes
Size and Scale	Can span **hundreds of miles** and affect vast areas.	Size is only a **few hundred yards** in **diameter**.
Wind Shear	Require very **low values of tropospheric vertical shear**.	Require **substantial vertical shear** of horizontal winds.
Temperature Gradient	Generated in regions of **near-zero horizontal temperature gradient.**	Produced in regions of **large temperature gradient.**
Area of Formation	Purely an **oceanic phenomenon.**	Primarily **developed over land.**
Time-Scale	**Lifetime** that is measured in **days.**	Typically lasts on the **scale of minutes.**
Impact	Heavy rainfall, storm surges, and **widespread flooding**.	Cause **Localized destruction.**

Key features of Tropical cyclones

- They get energy from **condensation in towering cumulonimbus clouds** around the storm centre (eye).
  - **Eye is a region of calm** with subsiding air.
  - When they reach land (landfall), moisture supply stops and the storm dissipates.
- The cyclones, which cross **20-degree N latitude generally, recurve and they are more destructive.**
- **Favourable Conditions for Tropical Cyclones**
  - Sea surface **temperature higher than 27° C**.
  - Presence of **Coriolis force**.
  - Tropical cyclones are **not formed near equator** due to absence of Coriolis force.
  - Small **variations in vertical wind speed**.
  - A pre-existing **weak low-pressure area**.
- **Impact of Global Warming on cyclone formation**
  - **Tropical cyclones are becoming stronger**.
  - Cyclones in Southeast Asia now form **closer to coasts, intensify more rapidly, and lingering longer over land** likely due to **warmer sea surface temperatures (SSTs).**



Cyclones in India

- **More cyclones occur in the Bay of Bengal than Arabian Sea** and the ratio is approximately 4:1.
- However, cyclones are becoming more **frequent on the western coast**
- **Possible reasons**: Unusual monsoon wind system, moisture from the Arabian Sea and soil moisture from the lands, warming of Indian Ocean, etc.

IMD's colour coded weather warnings for cyclone prone areas

- **Green: Pre Cyclone Watch**, issued 72 hours in advance.
- **Yellow**: **Cyclone Alert**, is issued at least 48 hours in advance.
- **Orange: Cyclone Warning**, issued at least 24 hours in advance.
- **Red: Post Landfall Outlook**, is issued at least 12 hours in advance.

Related News
Saffir-Simpson Hurricane Wind Scale

- Recently, **Southern China (Hainan Island) and Southeast Asia** was hit by Category 5 super **typhoon** on the **Saffir-Simpson Hurricane Wind Scale.**
- **Saffir-Simpson Hurricane Wind Scale** divides the tropical into five categories — **Category 1 (**wind speed 119-153 km/hr) to Category 5 (wind speed 252 km/hr or higher, strongest and most destructive).

5.4. GLACIAL LAKES OUTBURST FLOODS (GLOFS)

Why in the news?

According to a recent report by **Central Water Commission (CWC),** glacial lakes and other water bodies in the Himalayas have expanded their surface area.

Key Findings of the report

- **Increase in area of glacial lakes in India:** Increase of **33.7%.** (2011-2024)
- **Lakes in High-risk category for GLOFs:** 67 lakes identified in India experienced over a **40% increase** in surface area**.**
  - The regions with the most notable expansions include **Ladakh, Himachal Pradesh, Uttarakhand, Sikkim,** and **Arunachal Pradesh.**

About Central Water Commission

- **Ministry:** Ministry of Jal Shakti
- **Hq: New Delhi, India**
- **Aim:** Promote integrated and sustainable development and management of India's water resources.
- **CWC** deals with **only surface water** while **Central Groundwater Board (CGWB)** deals with ground water.

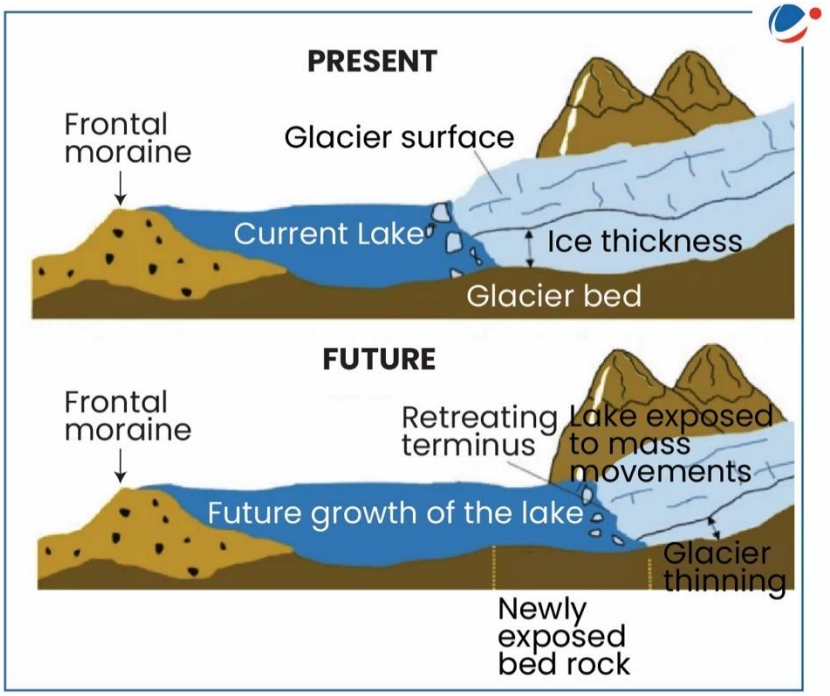
About Glacial Lakes

- **About:** It is a body of water that originates from melting of glacier. They are freshwater sources for rivers in Himalayan region. However, they also pose significant risks like GLOFs
  - **13 out of 486 glacial lakes in Uttarakhand to be vulnerable to GLOFs** (Geological Survey of India, 2021)
- **Categories:** Four broad Categories, namely **Moraine-dammed** (water dammed by moraine), **Ice-dammed** (water dammed by ice), **Erosion** (water dammed in depressions formed by erosion), and **other glacial lakes**.
  - Material, usually **soil and rock**, **left behind by moving glacier** is called **Moraine**.

About GLOFs

- **Sudden release of water** retained in a glacial lake that can be located in **front, at the side, underneath, within, or on top** of a glacier.
- Recognized as a **potential climatological disaster** in India's **National Disaster Management Plan (NDMP) 2019.**

- **3 Main Features:** Involve **sudden** (and sometimes cyclic) releases of water; tend to be **rapid events**, lasting hours to days; Result in **large downstream river discharges**.
- **Vulnerability in India:** Includes Himalayan states and UTs such as **Jammu & Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, and Sikkim.**
- **Examples of GLOFs**
  - **2023:** GLOF at South Lhonak, destroyed the Teesta III Dam at Chungthang in Sikkim.
  - **2013:** GLOF in Chorabari glacial lake and floods in Mandakini river in Uttarakhand.



Reasons for GLOFs

- **Geological** (Earthquake, breach of moraine dams, etc.)
- **Morphological** (Mass movement into glacial lakes, water seepage through glacial structures, etc.)
- **Physical** (Excessive precipitation, Cryoseism (non-tectonic seismic event of the glacial cryosphere)
- **Glacial Surging (**Sudden movement of ice over a short period of time resulting in severe rapid glacier advance. E.g., Gilkey Glacier, Alaska).
- **Moraine dam instability (**Loose, unconsolidated moraines, which are inherently unstable, can collapse due to structural weakness. E,g., South Lhonak GLOFs, Sikkim)
- **Ice dam failure:** Due to thermal stress, water pressure and internal melting weakening their structure.

Initiatives taken in India for GLOFs management

- **National Disaster Management Authority Guidelines** for GLOFs
- **Review of the design flood of all the existing and under construction dams** vulnerable to GLOFs by CWC.
  - **GLOF Studies made mandatory** for all new dams planned having Glacial Lakes in their catchments.
- **GLOF risk mitigation project** approved by **High-Level Committee** Chaired by the Union Home Minister for the States of Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh.
- **National Mission on Himalayan Studies (NMHS):** The status of glacial lakes in the Sikkim Himalayas, prepared by the National Institute of Hydrology, Roorkee, is part of the National Mission on Himalayan Studies (NMHS)
- Centre recently initiated an **Early Warning Systems for 188 critical lakes in the Indian Himalayan Region** prone to GLOFs through a delegation composed of **NDMA, ISRO and the State Disaster Management Authority** for ground level assessment.
  - Beginning with **Tenchungkha lake, Sikkim,** it covers identified lakes in Uttarakhand, Arunachal Pradesh, Sikkim, etc.

Global initiatives for GLOFs management

- **HKH cryosphere initiative** by **International Centre for Integrated Mountain Development (ICIMOD)**
- **Global Climate Observing System:** Encourages governments to invest in **early warning systems** and **remote sensing technologies.**
- **UNESCO Climate Change and Mountain Ecosystem Programme:** Promotes sustainable tourism and conservation
- **Sendai Framework for Disaster risk reduction:** Encourages international cooperation to manage cross-border GLOF risks.

5.5. OIL SPILLS

Why in The News

National Green Tribunal (NGT) imposes no fault liability (caused by an external force and **not by any negligence or error)** ₹5 crore penalty on **Chennai Petroleum Corporation Limited (CPCL) for Tamil Nadu's Nagapattinam oil spill (2023)**

Oil Spill

- **Definition:** An oil spill, a form of pollution, is the r**elease of a liquid petroleum hydrocarbon into the environment,** especially marine areas, **due to human activity.**
- **Causes:** Often caused by **accidents** involving **tankers, barges, pipelines, refineries, etc.**
- **Impact:** Loss of Biodiversity; Damage to food chain; coastal erosion, etc.

Tackling Oil Spills			
Bioremediation • Use of living organisms in the removal of contaminants. E.g., **Oilzapper** (contains bacteria feeding on oil), **Oilivorous-S (**similar to Oilzapper but more effective against oil with high sulphur content), etc. • **Genetic engineering** can be used to create microorganisms specifically designed for bioremediation.	**Floating Booms Temporary floating barriers** for marine spills.	**Use of Sorbents** Like Straw, volcanic ash, etc.	**Booms and Skimmers** • Booms are **physical barriers** that slow the spread of oil and keep it contained. • Skimmers are **boats deployed** to remove the oil.

Laws and Conventions to tackle oil spills

- **International**
  - International Convention for the Prevention of Pollution from Ships (MARPOL)
  - International Convention on Civil Liability for Oil Pollution Damage 1992
  - OPRC (Oil Pollution Preparedness, Response, and Cooperation) 1990
  - International Convention on Civil Liability for Bunker Oil Pollution Damage (2001): Ratified by **India** in 2015
- **National**
  - National Oil Spill Disaster Contingency Plan, 1996
  - The Merchant Shipping Act, 1958
  - The Environment (Protection) Act, 1986

5.5.1. LANDSLIDE

Why in the News?

Union Minister inaugurated National Landslide Forecasting Centre (NLFC) in Kolkata

More on the News

- NLFC is aimed at landslide hazard mitigation in India and will in due course issue **early warning bulletins for all landslide-prone states**, operationalizing the **regional Landslide Early Warning System (LEWS) nationwide by 2030**.
- **Other Initiatives:**
  - **Bhusanket Web Portal:** Will facilitate dissemination of relevant information on landslide hazards, initiating short-range and medium-range landslide forecasting.
  - **Bhooskhalan Mobile App:** Quick dissemination of daily landslide forecasts.

About Landslides

- Landslides, **a type of mass wasting,** is defined as the rapid movement of a **mass of rock, debris, or earth down a slope.**

- **Recent landslides:** Wayanad district of Kerala
- **India's Vulnerability:** Approximately 0.42 million sq. km (**12.6% of land area**), excluding snow covered area, is **prone to landslide hazard**.
  - **Himalayas and Western Ghats** are particularly susceptible to landslides due to hilly topography and heavy rainfall.
- **Causes of landslides**
  - **Natural:** Heavy rainfall, undercutting of slopes due to flooding or excavation, earthquakes, snowmelt etc.
  - **Anthropogenic:** Overgrazing by cattle, soil erosion due to loss of vegetation, terrain cutting and filling, excessive development etc.

Initiatives taken for Landslides reduction

- **National Landslide Risk Management Strategy (2019):** comprises hazard mapping, monitoring and early warning system etc.
- **National Landslide Susceptibility Mapping (NLSM) Programme:** for landslide prone areas in the country.
- **Landslide Risk Mitigation Scheme (LRMS):** to provide financial support for site specific Landslide Mitigation Projects.
- **Landslide Atlas of India:** Developed by ISRO.

5.6. WEATHER FORECASTING

5.6.1. LOCALISED WEATHER FORECASTS

Why in The News?

Recently, a first of its kind, Gram Panchayat Level Weather Forecasting Initiative was launched, supported by **India Meteorological Department's (IMD)** expanded sensor coverage for localized weather forecasting.

About Gram Panchayat-Level Weather Forecasting Initiative

- **Ministry:** Joint program of the **Panchayati Raj Ministry, IMD,** and **the Ministry of Earth Sciences.**
- **Features:**
  - **2.5 lakh Gram Panchayats:** They can see data on the current temperature, wind speed, cloud cover, rainfall, and relative humidity strengthening grassroot governance and agricultural livelihoods.
  - **Digital platforms:** e-GramSwaraj, Gram Manchitra, and Meri Panchayat will deliver 5-day and hourly weather forecasts.
  - **SMS alerts:** Will be sent to panchayat representatives. **E.g.,** cyclones and heavy rainfall.
  - **Other initiatives: Weather information network and data system (WINDS)** Agro Advisory Services (AAS) and Gramin Krishi Mausam Sewa (GKMS)

India's localised weather forecasting capabilities

- **Present:** IMD has **ability to forecast weather events over a 12 km x 12 km area. (40% improvement in accuracy over the past decade).**
- **Target: IMD is trying out experimental forecasts for 3 km x 3 km grids,** with the eventual objective of making **hyper-local forecasts for 1 km x 1 km areas.**

Related News

CoS-it-FloWS (Community-Sourced Impact-based Flood Forecast and Early Warning System)

- Recently, the CoS-it-FloWS, a new system that collects hyper-local data for flood forecast was launched in the flood-prone Periyar and Chalakudi river basins in Kerala.
  - **Hyperlocal weather forecasting** is a specialized form of meteorology that **pinpoints weather conditions to extremely localized areas.**
- **About CoS-it-FloWS**
  - It is a project run by **Equinoct**, a Kochi-based **community-sourced modelling solution provider.**

- **Recognized by UNICEF's Climate Tech Cohort,** it **uses 100 rain gauges** installed across Ernakulam, Idukki, and Thrissur to **plug gaps in government data** and to scale up community participation by **collecting hyper-local data for fighting natural disasters.**
- **Data** on rainfall, river, tidal and groundwater levels that are **collected primarily by students, women, and youth** at the household level and analysed through **Insight Gather, a web portal** to host the **impact-based forecasts** in the pilot basins.

5.6.2. DROUGHT EARLY WARNING SYSTEM (DEWS)

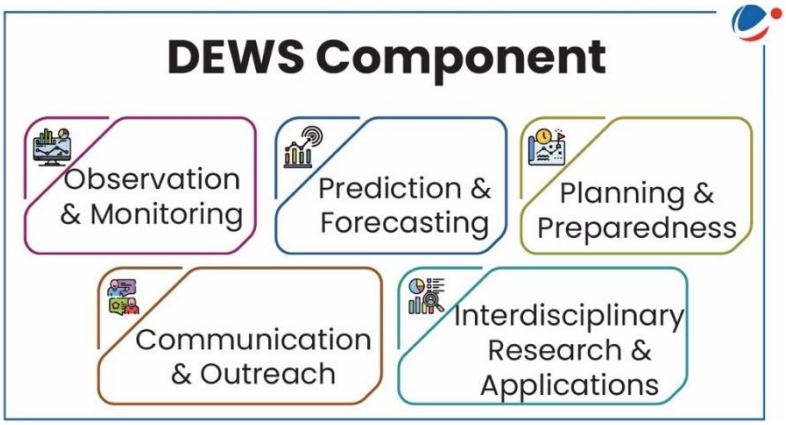
Why in the News?

30% of India's land area experienced different degrees of drought in September 2023, as per DEWS data.

Key Findings by DEWS

- **August 2023** was the **driest August since 1901** when record-keeping began.
- According to the **Standardised Soil Moisture Index (SSI),** numerous districts across states like **Chhattisgarh, Bihar, Maharashtra, and Karnataka are experiencing extreme water scarcity.**
- **Standardised Precipitation Index (SPI)** also indicates a notable **increase in rainfall deficit** in the various regions of the country over the last month.

About Drought Early Warning System (DEWS)



- **About:** DEWS is **India's first real-time drought-monitoring platform** run by the Water and Climate Lab of **IIT Gandhinagar.**
- It is a **network of regional and national partners** that share information and coordinate actions **to provide accurate, timely, and integrated information** on drought conditions at the relevant spatial scale.
- It **identifies climate and water supply trends** and detects the emergence or probability of occurrence and the likely severity of drought and its impacts.
- **Methodology:** It identifies **drought** based on the **Standardised Soil Moisture Index (SSI) and Standardised Precipitation Index (SPI).**
  - **Soil moisture drought** is indicated by **SSI,** which shows the **amount of water available to plants.**
  - The **SPI**, which is based on **rainfall data**, is a tool used to indicate **meteorological drought.**

5.6.3. POLAR COUPLED ANALYSIS AND PREDICTION FOR SERVICES (PCAPS)

Why in the News?

World Meteorological Organization has launched the **PCAPS project** to improve **weather forecasting in Arctic and Antarctic.**

About PCAPS

- **Objective:** To increase and improve weather, water, ice, and **climate information** about the **Arctic** and **Antarctic.**
- It will help **develop observation systems** and **Earth system models** and advocate for improved forecasting services.
- PCAPS is part of WMO's **World Weather Research Programme** (WWRP).
- WWRP helps **advance research of the earth system** through the science-for-services value cycle approach
- **Improve the warning process** to account for the evolving nature of extreme weather impacts.

5.7. OTHER DISASTER RELATED NEWS

5.7.1. PARAMETRIC INSURANCE

Nagaland became the **first Indian state** to adopt the **Disaster Risk Transfer Parametric Insurance Solution (DRTPS)** after signing a MoU with SBI General Insurance.

About Parametric Insurance

- **About: Type of insurance** that covers **probability/likelihood of a loss-causing event** happening (**E.g. earthquake)** instead of compensating for actual loss incurred from event.
- It is an agreement that **offers a pre-specified payment** upon occurrence of a covered event meeting or exceeding a pre-defined intensity threshold, as **measured by an objective value/parameter** (hence name 'parametric insurance').
- **Covered events**: Could be earthquakes, tropical cyclones, or floods where parameter or index is magnitude, wind speed or water depth respectively.

5.7.2. RECOVERY AND RECONSTRUCTION (R&R) FUNDING WINDOW

Recently, MHA issued guidelines on Recovery and Reconstruction (R&R) Funding Window within NDRF and SDRF

About R&R Funding Window

- **Background:** Originally, the guidelines for constitution and administration of **National Disaster Response Fund (NDRF) and State Disaster Response Fund (SDRF)** were issued by **the Ministry of Home Affairs (MHA)** in **2022.**
- It has been created on **recommendations of 15th Finance Commission** (FC).
- **Aim:** To **address gaps in funding for states affected by natural disasters**, reallocating resources within existing disaster relief frameworks to **support recovery efforts** better.
- **Under NDRF & SDRF:** Funds for **response and relief**; **recovery & reconstruction**; **preparedness & capacity building** will be distributed.
    - NDRF R&R window is to assist State with additional funds where expenditure required is beyond state's coping capacity.
- **Nodal Agency for Implementation:** State Disaster Management Authority (SDMA)
- **Calamities covered (notified disasters):** cyclone, drought, earthquake, fire, flood, tsunami, hailstorm, landslide, avalanche, cloud burst, pest attack, and frost & cold wave.
- **Activities Under R & R:** Housing, education, infrastructure, etc.

5.7.3. FLOODWATCH INDIA

Ministry of Jal Shakti launched the **version 2.0** of the 'FloodWatch India' mobile application covering 592 flood monitoring stations (earlier 200) along with 150 major reservoirs.

About FloodWatch India Application

- Developed by the **Central Water Commission (CWC).**
- **Aim:** Using mobile phones to disseminate information related to flood situation in the country and flood forecasts up to **7 days** on a real-time basis to the public.
- Utilizes advanced technologies such as **satellite data analysis, mathematical modelling** and real-time monitoring.

5.7.4. EW4ALL

Recently, IMD chief said that India is helping **Nepal, Maldives, Sri Lanka, Bangladesh and Mauritius** develop EWS as a **part of 'Early Warnings for All (EW4All)' initiative** announced by **UN in 2022.**

About EW4All

- Aims to protect **everyone from hazardous weather, water or climate events** through EWS by **end of 2027**.
- Spearheaded by **World Meteorological Organization** and **United Nations Office for Disaster Risk Reduction**.
- Calls for **investments of USD 3.1 billion between 2023- 2027** to strengthen **four pillars of EWS:**
  - Disaster risk knowledge; Detection, observation, monitoring, analysis, and forecasting; Warning dissemination and communication; Preparedness and response capabilities.

5.7.5. EXERCISE AIKYA

National Disaster Management Authority and Southern Command of the **Indian Army** are set to host the Exercise AIKYA in Chennai (Tamil Nadu).

About Exercise AIKYA

- **Objective: Improve disaster preparedness and foster strong collaboration** among key stakeholders by incorporating **simulations, technology discussions, and expert insights** into various disaster management roles.

5.8. ORGANIZATIONS IN NEWS

5.8.1. COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI)

HQ: New Delhi, India

Recently, **Coalition for Disaster Resilient Infrastructure** marked its 5th anniversary

CDRI
Coalition for Disaster Resilient Infrastructure

Genesis: UN Climate Summit (2019) by **India.**

Members: 40 countries and **7** organisations

About: Global partnership of **nations, UN agencies, multilateral development banks and the private sector.**

Objective: Promote the **resilience of infrastructure systems** to climate and disaster risks ensuring sustainable development.

Significance: Global mechanism for funding and coordination; Technical support and capacity building.

Initiatives Taken by CDRI
- **Infrastructure for Resilient Island States (IRIS)** for Small Island Developing States (SIDS).
- **DRI Connect platform,** a Knowledge exchange, learning and collaborative platform
- **International Conference on Disaster Resilient Infrastructure (ICDRI)** annual conference to identify good practices.
- **Infrastructure Resilience Accelerator Fund (IRAF)** established with support of UNDP and UNDRR.

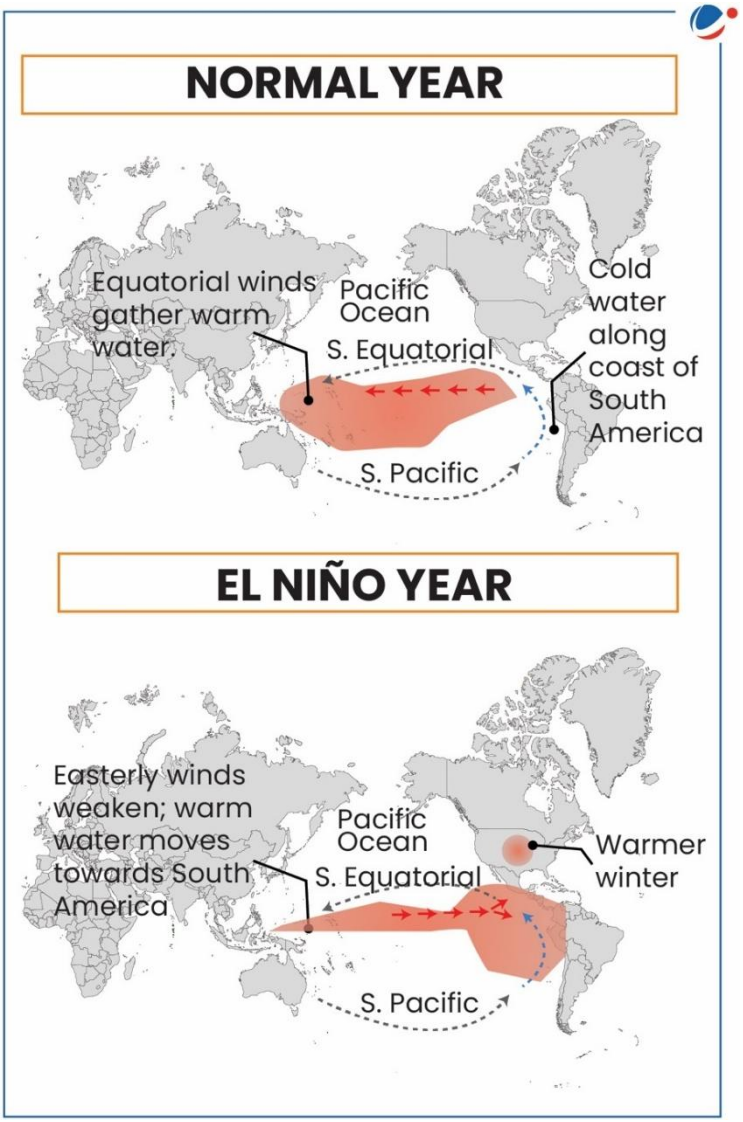
Reports/Indices
- **Global Infrastructure Resilience Report**

6. GEOGRAPHY

6.1. EL NINO AND LA NINA

Why in the news?

National Ocean and Atmospheric Administration (NOAA), a US body**,** announced that the El Nino conditions prevailing since mid-2023 had ended and were replaced by **El Nino Southern Oscillation (ENSO)** neutral phase.



More on the news

- **ENSO** is a recurring climate pattern involving changes in the temperature of waters in the **central** and **eastern** tropical Pacific Ocean.
  - Occurs in **irregular cycles of 2–7 years.**
- **El Nino** (warm phase) and **La Nina** (cold phase) are extreme phases of the **ENSO cycle**; between these two phases is a third phase called ENSO-neutral.
  - In the neutral phase, tropical Pacific Sea surface temperatures (SST) are generally close to average.

About El Nino

- **El Nino** (the Christ Child) is a **climate pattern associated** with the warming of the ocean surface temperatures in the **central** and **eastern** tropical Pacific Ocean.
- **Key Impacts**: It **suppresses rainfall** over India during monsoon; **brings rainfall to South America** and **droughts to Indonesia and Australia.**

About La Nina

- **La Nina** refers (Little Girl) to the periodic **cooling** of ocean surface temperatures in the **central** and **east-central equatorial Pacific.**
- **Key Impacts**: Opposite effect of El Nino, causes **strong monsoon** and above average rains and colder winters in the subcontinent.

6.2. NOR'WESTERS

Why in the news?

India is working to develop its **first research testbed to study Nor 'westers**.

More about the testbed

- **Aim:** To study **thunderstorms** from the formation stage, growth, and propagation over eastern parts of the country covering a large area adjoining **West Bengal, Odisha, and Jharkhand.**

- **Control centre: Chandbali** in Odisha's Bhadrak district (near Bhubaneshwar).
- **Agencies involved:** India Meteorological Department **(IMD)**, Indian Institute of Tropical Meteorology **(IITM), Pune**, and the National Centre for Medium-Range Weather Forecasting **(NCMRWF), Delhi**, will jointly develop and use this facility.

What are Nor 'westers?

- Local winds which cause **thunderstorms,** that affect the **east and northeast** regions of India **every summer.**
- **Local names:**
  - **Bengal**: Kalbaishaki
  - **Assam**: Bardoli Chheerha
- **Influence of Nor 'westers on the region:**
  - **Destructive tornadoes**, cause uprooting trees, loss of property.
  - **Extremely helpful for pre-kharif crops like jute, paddy, vegetables and fruits,** sudden drop in temperature offers relief from **unbearable mid-day heat.**

Other Local winds and their socio-economic influence		
Name	**Description**	**Influence**
Loo	• **Hot, dry winds** blowing throughout daytime in **north and western India** during **May and June**. • Developed due to formation of the **Monsoon Low Pressure Trough** in northern India.	• Facilitates **separating the chaff from the grain.** • **Decline** in number **of insect-borne disease** like malaria due to decrease in mosquito population.
Aandhi or Kali Aandhi	• Strong **dust storms** observed over **north-western and Central India before monsoon.**	Cause **pollution** of cities like **Delhi**, along with destruction of life and property.
Mango showers	• **Pre-monsoon local rain-carrying winds** causing early showers along coastal **Karnataka and Kerala**.	Aid in **early ripening of Mangoes**, thus locally called Mango showers.
Blossom showers	• **Pre-monsoon showers** in late-summer in **Kerala** and adjacent areas.	**Blossoming of coffee flowers**
Elephanta	• Strong **southerly and south westerly winds** along the **Malabar coast**, formed **post-monsoon** during **September and October.**	They mark the **end of southwest monsoon**.

6.3. UNDERSEA FEATURES IN INDIAN OCEAN

Why in the news?

Recently, names of **Ashok Seamount, Chandragupt Ridge and Kalpataru Ridge** in the Indian Ocean have been approved by **International Hydrographic Organization (IHO) and UNESCO's Intergovernmental Oceanographic Commission (IOC).**

More on the news

- These structures are l**ocated along Southwest Indian Ridge.**
- They were discovered by **National Centre for Polar and Ocean Research.**

Naming of Undersea Feature

- **Outside Territorial Sea:**
  - **Individuals and agencies can propose** names for unnamed features, following **IHO's 2013 guidelines ''Standardization of Undersea Feature Name".**

- Before naming of a feature, its **character, extent, and position** must be identified.
- Proposals are **reviewed by IHO Sub-Committee on Undersea Feature Names (SCUFN).**

- **Within Territorial Sea: National authorities** naming features in their territorial sea should adhere to the same **2013 IHO guidelines.**

About IHO and IOC

International Hydrographic Organization (IHO)

- Established in **1921,** enjoys **observer status at the UN.**
- An **intergovernmental body with 100 members** (India a member).
- Competent **international authority regarding hydrography and nautical charting.**
- **IHO Secretariat** has been **hosted by Principality of Monaco** since its creation in 1921.
- **Indian Naval Hydrographic Department** under Indian Navy is nodal agency for Hydrographic surveys and nautical charting in India.

Intergovernmental Oceanographic Commission (IOC)

- Established in **1961** for promoting **international cooperation in marine sciences**.
- **GEBCO:** General Bathymetric Chart of the Oceans (GEBCO) is an IHO & IOC UNESCO joint project to collect **bathymetric data and map the oceans**
  - It maintains and makes available a digital gazetteer of names, generic feature types, etc.

6.4. GEOPARKS

Why in the News

UNESCO endorsed the addition of 18 new Geoparks to the **Global Geoparks Network (GGN).**

More on the News

- Latest addition raises the number of total Geoparks to 213 which are **spread across 48 countries (no geopark in India).**
- **Some major geoparks added to GGN are:**
  - **Land of Extinct Volcanoes (Poland): F**eatures distinctive remnants of Paleozoic and Cenozoic volcanoes
  - **Impact Crater Lake (**Finland): Europe's largest impact crater lake formed through a collision with a meteorite 78 million years ago.
  - **Uberaba (Brazil):** Its tag line 'Land of the Giants' refers to its rich palaeontological heritage

About Global Geoparks Network (GGN)

- It is a non-profit **International Association** officially established in 2014.
  - GGN was founded as an **international partnership** developed under the umbrella of UNESCO.
- **Networking and collaboration among Global Geoparks** is an important component of the GGN.

About UNESCO's Global Geopark (UGGPs)

- **Genesis:** Geopark concept arose in the mid-1990's and **UGGP was** created in 2015
- **About:** UGGPs are **single, unified geographical areas** where **landscapes of international geological significance** are managed with a holistic concept of **protection, education and sustainable development.**
- **Management:** Managed by a body having a **legal existence recognized under national legislation.**
- **Designation is not permanent:** Designation is for four years after which it is reassessed.
- **Mandatory Networking:** Membership of the Global Geoparks Network (GGN) is obligatory for UGGPs.
- **Significance**
  - **UGGPs give local people a sense of pride i**n their region and s**trengthen their identification with the area.**
  - New sources of revenue **are generated through geotourism.**

6.5. TERMS/CONCEPTS IN THE NEWS

6.5.1. BASEFLOW

A recent study has highlighted that Baseflow has contributed significantly to the flooding of rivers in peninsular India.

About Baseflow

- It refers to the **portion of stream flow that originates from groundwater discharge** seeping into the stream or river over an extended period.
- Groundwater **discharges into the water bodies when the water table intersects the surface of the ground** along rivers or wetlands, contributing to their flow.
- **Catchments with higher baseflow lead to an increased likelihood of rapid runoff** with incoming rainfall events in shorter time lags
- **Factors influencing Baseflow:** Topography of the land, Nature of the Soil, Land use pattern and Climate Change.
- **Significance**: Silt reduction, Sustains river flow and ecosystems, Water quality improvement etc.

6.5.2. EQUATORIAL PLASMA BUBBLES (EPBS)

A recent study by **Indian Institute of Geomagnetism** found that **Volcanic** eruptions cause **Equatorial Plasma Bubbles (EPBs).**

About EPBs

- EPBs, normally observed in the equatorial ionosphere, are **depletions in ionospheric plasma density** formed during post-sunset hours.
- **Volcanic** eruptions produce **strong atmospheric gravity waves** that can trigger their formation.
- Generated EPBs can **impact satellite communication and satellite-based technologies**.

6.5.3. ATMOSPHERIC RIVERS (AR)

Scientists warn that **intensification and increased frequency of atmospheric rivers** due to global warming is worsening extreme rainfall events and weather patterns.

About AR

- Also called as **'flying rivers',** are relatively **long, narrow regions** in the atmosphere that **transport most of the water vapor** outside of tropics.
- An average AR is about **2,000 km long, 500 km wide** and nearly **3 km deep.**
- ARs are a part of larger system of **extratropical cyclones** that transport heat and moisture **from tropics toward the poles**.
- ARs are typically located within **low-level jet**, an area of strong winds in lower atmosphere.
- They are largest transport mechanisms of freshwater (approximately 90%) on Earth.

6.5.4. NEGATIVE LEAP SECOND

Researchers have shown that **increased ice melting** may have delayed need for adding negative leap second.

About Negative leap second

- It is a **second that is subtracted from clocks** to keep them aligned with Earth's rotation.
  - It is done when **Earth is spinning more quickly** and length of day is decreasing.
- It is **opposite of positive leap second** (one-second addition to clocks).
  - It is done when length of day is rising (**Earth is spinning** more **slowly**).
- So far, there have been **27 positive leap seconds**, but **no negative leap seconds.**

6.5.5. ZERO SHADOW DAY

Recently, Bengaluru experienced **a rare celestial phenomenon known as 'Zero Shadow Day'.**

About Zero Shadow Day

- It occurs **when the sun aligns perfectly overhead,** causing vertical objects to cast no shadows.
- This phenomenon **occurs twice a year (once during Summer Solstice and once during Winter Solstice) in regions** situated between the Tropic of Cancer and the Tropic of Capricorn.
- The zero shadow days are **different for different places.**

6.5.6. BLUE HOLE

Researchers found evidence that Taam Ja' Blue Hole is the deepest in the world.

- It is located in **Mexico's Chetumal Bay**, on the eastern side of the **Yucatán Peninsula**.

About Blue hole

- Water-filled **caverns** formed **below the seafloor**.
- Often found in coastal areas where the bedrock is prone to erosion**.**
- They develop as ocean water seeps through **cracks**, **dissolving minerals**, leading to sinkholes. Over time, they can grow quite large.
- **Other Prominent Blue Holes**: Dragon Hole in the South China Sea, Great Blue Hole near Belize and the Dahab Blue Hole (Egypt).

6.5.7. HEAT DOME

Cities across southern and western states in the USA are facing heat waves due to a weather phenomenon known as Heat Dome.

About Heat Dome

- It is a weather phenomenon where a **ridge of high pressure gets stuck in the atmosphere.**
- **It traps hot air that expands vertically** into the atmosphere and high pressure pushes it toward the ground.
- Winds usually move from high pressure but with the dome stretching far into the atmosphere, these **weather systems become almost stationary.**

6.5.8. INDIAN OCEAN OBSERVING SYSTEM (INDOOS)

Recently, **India and the US have decided to reactivate the IndOOS**, in despair since the COVID.

About IndOOS

- **Network of 36 moored buoys** on the high seas to collect high-resolution ocean and atmospheric data for weather forecasts.
- A **moored buoy is an oceanographic instrument** to stay in one place with multiple sensors to collect data.
- **Established in 2006, its objective** include:
  - P**rovide sustained, high-quality oceanographic and marine meteorological data**
  - To **foster agreements and partnerships among Indian Ocean countries**
  - Set up initially to understand and **forecast the monsoon.**

6.5.9. RINGWOODITE OCEAN

Researchers have uncovered a vast reservoir of water, dubbed the "**Ringwoodite Ocean**," concealed within the Earth's mantle, over 700 kms beneath the surface.

About Ringwoodite Ocean

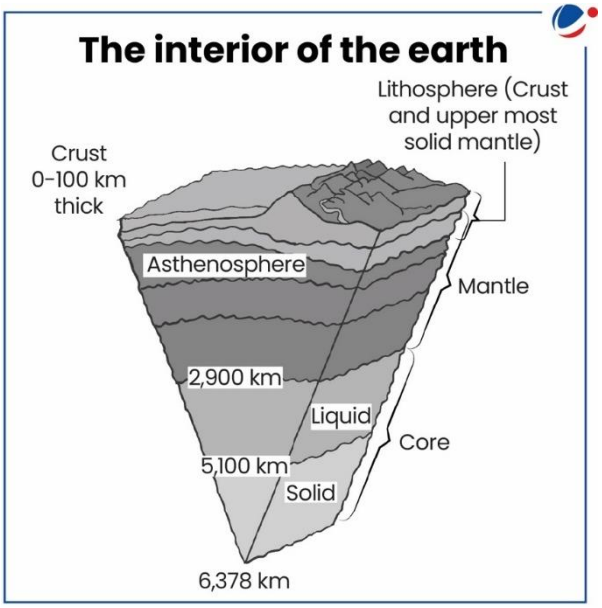
- "Ringwoodite Ocean" is a vast reservoir of water trapped within the **mineral ringwoodite in the Earth's mantle.**

- Ringwoodite is a vivid **blue mineral formed under high temperatures** and pressures in Earth's mantle.
- It is one of the most typical high-pressure mineral in Ringwoodite

6.5.10. EARTH'S MANTLE

Recently, Scientists on the US vessel **JOIDES Resolution** have drilled around **1.2 Kms meters below the Atlantis Massif**, surpassing the previous drilling depth of 201 meters.

- **Programme**: Drilling was done **under International Ocean Discovery Program** (India is a funding partner).



About Earth's Mantle

- It consists of silicate rock makes up over 80% of Earth's volume is the mid layer of the earth (Refer infographic).
- They are **usually inaccessible, except in areas of seafloor spreading,** where Earth's tectonic plates slowly move apart. For example, the **Atlantis Massif.**

6.5.11. ISOSTASY

Recent study explains the formation of new topological features like plateaus and escarpments (high steep slopes) through Isostasy.

About Isostasy

- It is the **equilibrium or balance** between **blocks of crust** and the **underlying mantle.**
- It involves a **line of equality** at which the **mass of land above sea level is supported below sea level.**
- It is **not a process or a force** but simply a **natural adjustment** by blocks of crust of different thicknesses that also **maintains gravity.** Isostasy **uses energy to balance mass**.
- **Processes that may disturb isostasy**: Waning of ice sheets erosion, sedimentation, volcanism, etc.

6.5.12. EARTH'S MAGNETIC FIELD

Recent research on ancient rocks from South Africa and Brazil **suggests weakening of Earth's magnetic field** during **the Ediacaran period** (about 635 million to 541 million years ago).

About Earth's magnetic field

- Earth is surrounded by an immense magnetic field forming a region called **Magnetosphere**.
- It is generated in the Earth's outer core by the **geodynamo process**.
  - Here, the **convective energy** (which moves heat) from the **slow-moving molten iron** is converted to electrical and magnetic energy.
- The magnetic field forms **two poles** (a dipole) – **North and South magnetic poles** – having opposite polarities, like a bar magnet.
- Most dramatic changes impacting Earth's magnetosphere are **pole reversals**.

About Magnetic Pole reversal

- The forces that generate Earth's magnetic field are **constantly changing**, causing changes in strength of magnetic field.
- This causes the **location of Earth's magnetic north and south poles to gradually shift**, and to **even completely flip locations** around every 300,000 years.
- During a pole reversal, the magnetic field **weakens but doesn't completely disappear**.

6.5.13. COLD LAVA

Recently Cold Lava rushed through streets as Mount Kanlaon erupted in the Philippines.

Cold Lava (A.k.a. Lehar in Indonesian)

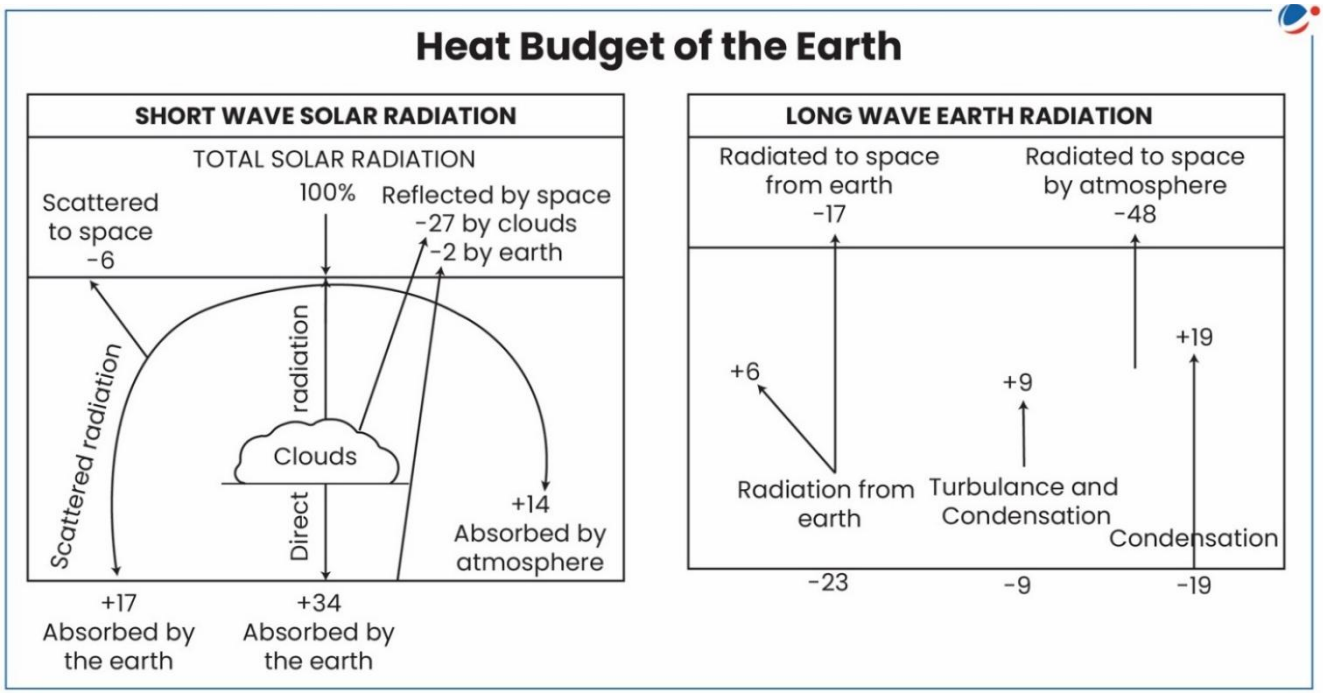
- It is a dense mixture of volcanic material, debris, and water that behaves like a **fast-moving landslide.**
- It occurs when water interacts with volcanic ash and debris on the slopes of a volcano.
- It remains **hot** internally due to chemical reactions within volcanic material.

6.5.14. HEAT BUDGET OF THE EARTH

NASA has launched one of the two climate satellites under **PREFIRE (Polar Radiant Energy in the Far-InfraRed Experiment) mission to measure** how much heat the Arctic and Antarctica radiate into space.

About Heat Budget

- It is the **balance between the amount of heat incoming to Earth from the Sun and the amount of heat outgoing from Earth into space.**
- **Factors responsible for the disturbance of heat budget** are Green House Gases emissions, reduction in thickness of the ozone layer, melting of glaciers etc.



6.5.15. KALLAKKADAL

Weather agencies has sent an alert in **coastal areas of Kerala and Tamil Nadu** about possibility of 'Kallakkadal' phenomenon.

About Kallakadal

- It is essentially **coastal flooding usually in pre-monsoon (April-May) or post - monson** season by swell waves on **southwest coast of India.**
- **Swell waves** are a **series of mechanical or surface gravity waves** generated by distant weather storms **E.g. Hurricane** that propagate thousands of miles across oceans and seas.
- Swell waves can **propagate** in directions that **differ from direction of the wind.**

7. PLACES IN NEWS

7.1. INDIA

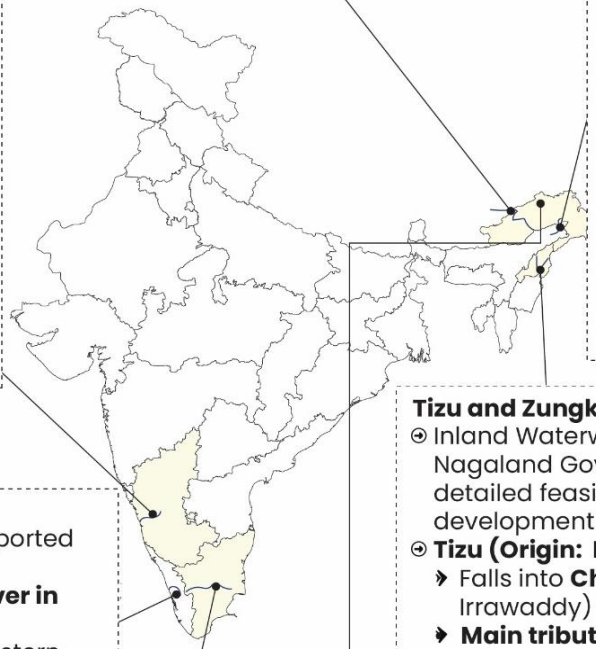
7.1.1. RIVERS

India: Rivers in News

Sharavathi River
- NGT tells Karnataka to curb illegal sand mining here.
  - **Origin:** Ambutirthha (Western Ghats) in Karnataka.
  - **Tributaries:** Haridravathi, Yennehole, Nagodi, etc.
  - **Water Falls:** Jog falls (one of the highest plunge waterfall)
  - **PA:** Sharavathi Valley Wildlife Sanctuary is located in the Sharavathi River Valley.
  - **Dam:** Mahatma Gandhi HEP

Subansiri
- Agreement for comprehensive Fisheries Management Plan at Subansiri Lower Hydro Electric Project (SLHEP).
  - **Origin:** Kangig glacier range in Tibet.
  - Enters India in **Arunachal Pradesh.**
  - Right bank tributary of **Brahmaputra River,** joins it, in Assam.
  - **Major tributaries:** Laro, Nye, Yume, Tsari, Kamla, etc.

Jiadhal River
- Its flow is being **disrupted due to climate change.**
- **North-bank tributary** of **Brahmaputra.**
- **Origin:** Lower Himalayan ranges (Arunachal Pradesh).
- Flows through Assam. Tributary of Brahmaputra, meets near **Majuli Island.**



Tizu and Zungki River
- Inland Waterways Authority of India and Nagaland Government to conduct detailed feasibility study for development of National Waterways 101.
- **Tizu (Origin: Nagaland)**
  - Falls into **Chinwin River** (Tributary of Irrawaddy)
  - **Main tributaries:** Zungki, Lanye and Likimro.
- **Zungki (Biggest Tributary of Tizu in Nagaland)**

Periyar River
- Mass fish deaths were reported here.
- **Perennial** and **longest river in Kerala.**
- **Origin:** Sivagiri Hills of Western Ghats
- Flows through **Periyar Tiger Reserve** and reaches **Periyar Lake.**
  - Flows into **Vembanad Lake** and, finally, into **Arabian Sea.**
- **Tributaries:** Muthirapuzhayar, Mullayar, Cheruthoni, Perinjankutti, and Edamala.
- **Major Dams:** Idukki, Mullaperiyar, Edamalayar etc.

Upper Siang Hydropower Project
- Locals in Upper Siang district are protesting against the Upper Siang Hydropower Project in Arunachal Pradesh.
  - **Origin:** Angsi Glacier in Kailash Ranges near Mansarovar Lake (Tibet).
  - **Major tributaries:** Lohit and Dibang.

  Meets Dihang and Lohit rivers in Assam and **becomes the Brahmaputra.**

Noyyal River
- Facing issues of **pollution, choking by plastics and sewage.**
  - **Origin: Velliangiri hills** (called as South-Kailash), a division of the Nilgiri Biosphere Reserve.
  - Tributary of Cauvery River

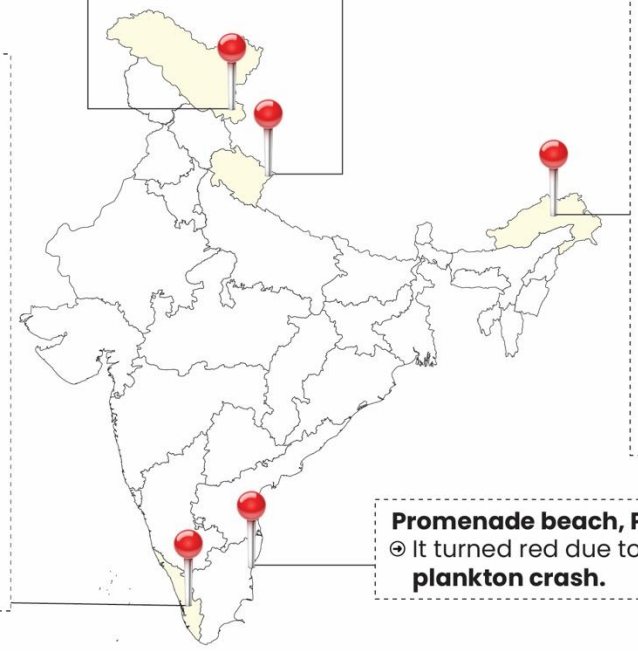
7.1.2. OTHER PLACES

India: Other Places in the News

Unming La Pass
- NewSpace Research and Technologies successfully tested a **100-kg Max Take Off Weight (MTOW)** Unmanned Aerial Vehicle **(UAV)**.
  - **World's Highest motorable road** constructed by **Border Road Organization (BRO)** under **Project Himank.**
  - Umling La is **world's highest motorable pass.**

Lipulekh Pass
- First batch of pilgrims viewed **Mount Kailash** (abode of Lord Shiva) from **Old Lipulekh pass.**
  - Located on **International Mountain pass** in **Vyas Valley, Uttarakhand.**
  - Forms tri-junction between **India, Nepal,** and **China (Tibet).**
  - Inhabited by **Bhutiya**

Mullaperiyar Dam
- Tamil Nadu moved to Supreme Court, alleging that Kerala is obstructing in strengthening work of Mullaperiyar Dam.
  - Constructed during **1887-1895,**
  - Located within the **Periyar Tiger Reserve in Kerala.**
  - **Purpose:** To divert the waters of River Periyar eastward to Tamil Nadu (Vaigai basin).
  - **Operated and maintained by Tamil Nadu.**



Siang Valley
- Indian researchers have discovered a new blue-coloured ant species named **Paraparatrechina neela.**
  - Lies primarily in **Arunachal Pradesh.**
  - Part of the **Eastern Himalaya Biodiversity Hotspot.**
  - **Tribal Groups:** Nyishi, Adi tribes etc.

Promenade beach, Puducherry
- It turned red due to **plankton crash.**

7.2. INTERNATIONAL

7.2.1. WATER BODIES

International: Water Bodies in News

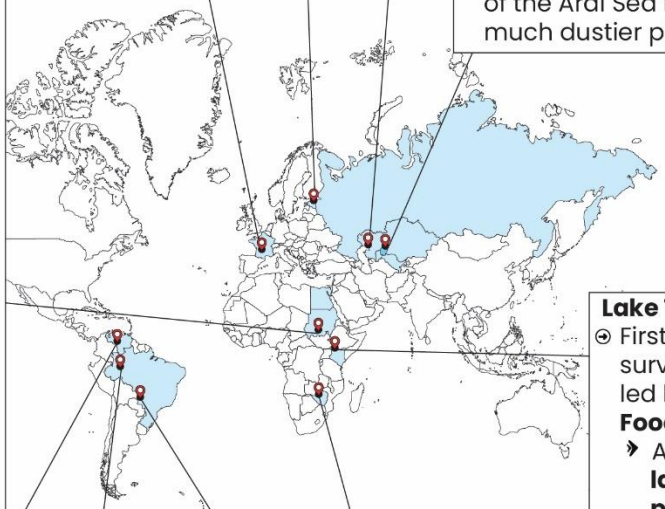
Seine River
- Paris mayor took pre-Olympics to prove its cleanliness
  - France's 2nd-longest river (after the Loire). Empties into **English Channel.**

Narva River
- A new dispute emerged between Russia and Estonia, around the removal of navigation markers on the River.

Ural River
- **Rise in water level** due to snow melting.
  - Originates in **Ural Mountains** empties into **Caspian Sea.**
  - **Europe's 3rd longest river** after **Volga** and

Nile
- **Agreement on the equitable use of water resources from the Nile River basin** has come into force.
- **Negotiated by 9 countries:** Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, and Uganda.
- **World's longest river.** Originates from rivers that feed Lake Victoria.
- Drains into **Mediterranean** Sea.
- **2 main tributaries: White Nile** (Originate from Burundi and Rwanda) and **Blue Nile** (originating in Ethiopia).

Aral Sea
- Desert emerged due to the drying up of the Aral Sea made Central Asia a much dustier place.



Lake Turkana
- First comprehensive survey held in 50 years, led by **UNESCO and World Food Programme (WFP)**
  - Africa's **4th largest lake, World's Largest permanent desert and alkaline lake**

Humboldt (or La Corona) Glacier
- Venezuela's last standing glacier in the Andes, shrunk to a size that **no longer qualifies it as a glacier.**

Lake Coari
- Faced below-normal water levels causing extreme water temperature.

Lake Kariba
- Water levels dropped to **13% of its capacity** due El Nino induced drought.
  - Formed by damming **Zambezi River** in 1955.

Pantanal Wetland
- Grappling with devastating wildfires.
  - **World's largest tropical wetland**
  - Spread across **Bolivia, Brazil, and Paraguay.**
  - Comprises **UNESCO World Natural Heritage Site, Biosphere Reserve and two Ramsar sites.**

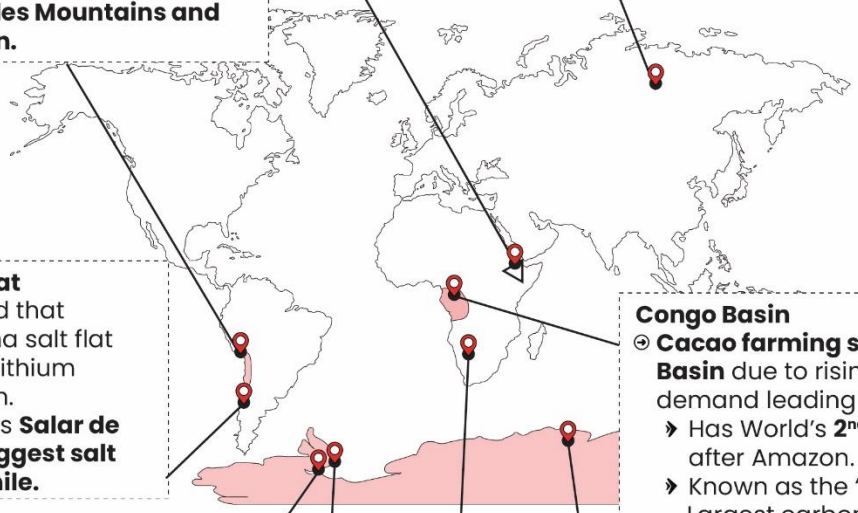
7.2.2. OTHER GEOGRAPHICAL FEATURES

International: Geographical features in News

Afar Triangle
- Geologists predict emergence of a new ocean here.
- Represents the **northernmost portion of the Great Rift Valley.**
- One of the most geologically active regions on earth, where **Nubian, Somali** and **Arabian** Plates converge.

Batagay Crater
- Newly captured aerial footage revealed its yearly growth as the frozen ground melts.
  - Known as "Gateway to Underworld" or "Doorway to Hell"
  - World's **biggest permafrost crater.**

Atacama Desert
- Researchers found a **biosphere of extreme microbes, 13 feet below it.**
  - Between **Andes Mountains and Pacific Ocean.**



Atacama Salt Flat
- Research found that Chile's Atacama salt flat sinking due to lithium brine extraction.
  - Also known as **Salar de Atacama, biggest salt deposit in Chile.**

Congo Basin
- **Cacao farming surged in Congo Basin** due to rising chocolate demand leading to deforestation.
  - Has World's **2nd tropical forest** after Amazon.
  - Known as the "lungs of Africa" Largest carbon sink in the world.
  - Home to the **world's largest tropical peatlands.**

Mount Erebus
- It is is expelling pockets of gas containing crystallised gold. **(only one to emit it in a metallic form)**

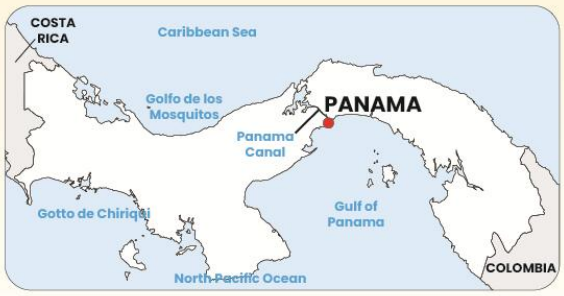
Antarctica
- Plant cover is increasing due to climate crisis **(Greening of Antarctica).**

Ross Ice Shelf
- **Antarctica's Ross Ice Shelf** makes sudden jumps (occurring when 2 sections of ice press against each other) twice a day.
  - Jumps might cause **"icequakes"** - seismic disturbances within the ice.

Mercury Island
- Documentary film on conservation of Mercury Island premiered in 18th Mumbai International Film Festival.
  - Recognised as **Important Bird Areas (IBAs)** by Bird Life International.
- Note: **New Zealand** also has a group of islands named **Mercury Islands**

7.2.3. COUNTRIES IN THE NEWS

Countries in News



Panama (Capital: Panama City)
First nation to evacuate island community from island of Gardi Sugdub Island over climate change impact.

China (Capital: Beijing)
Unveiled the world's first dual-tower solar thermal power plant (TPP), which boosts energy efficiency by 24%

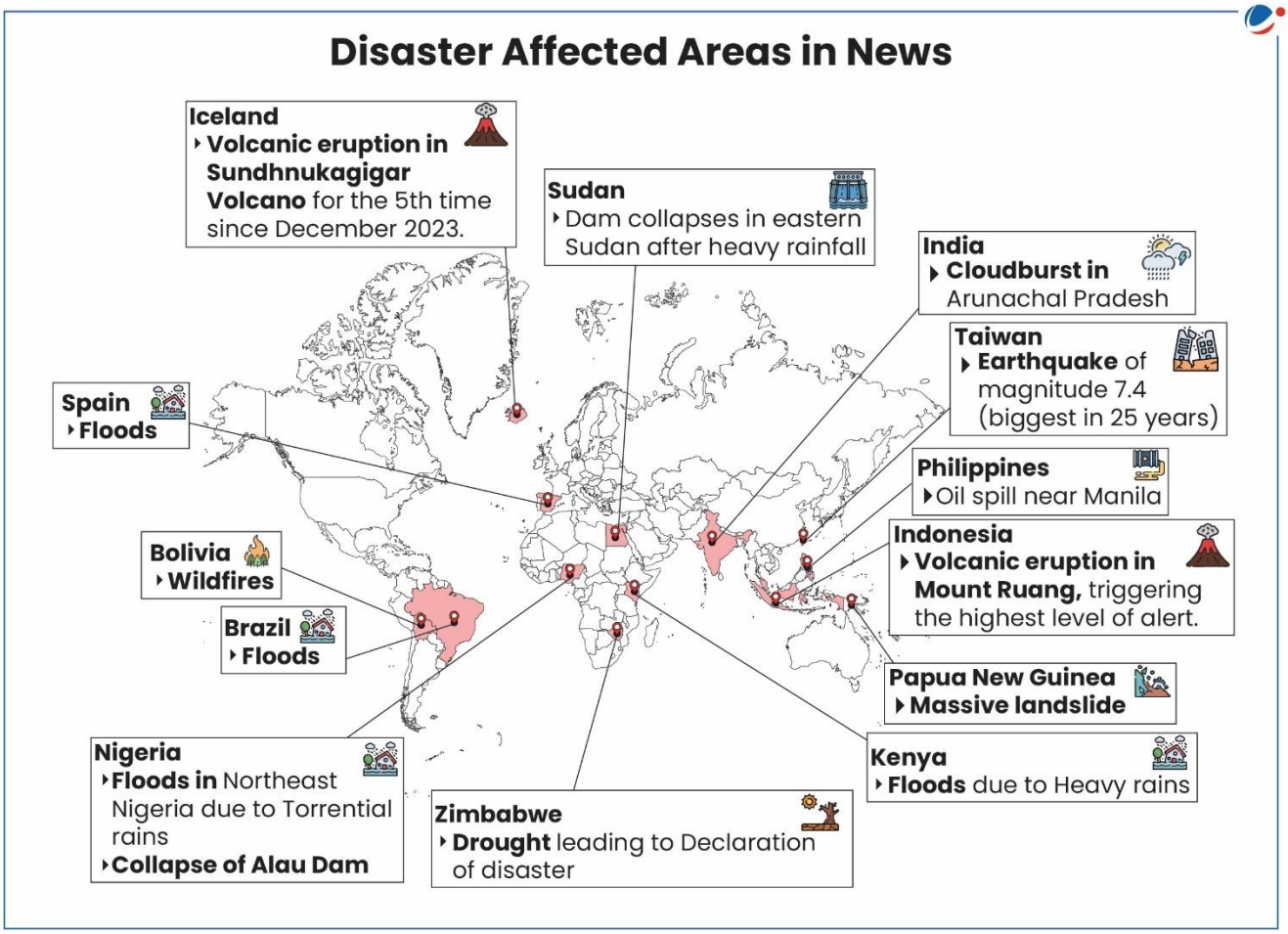
UK(Capital: London)
Became the first country to stop electricity production from coal post the closure of its last coal based power plant.

Colombia (Capital: Bogota)
Bogota **started water rationing** due to low **levels of water in its reservoirs.**

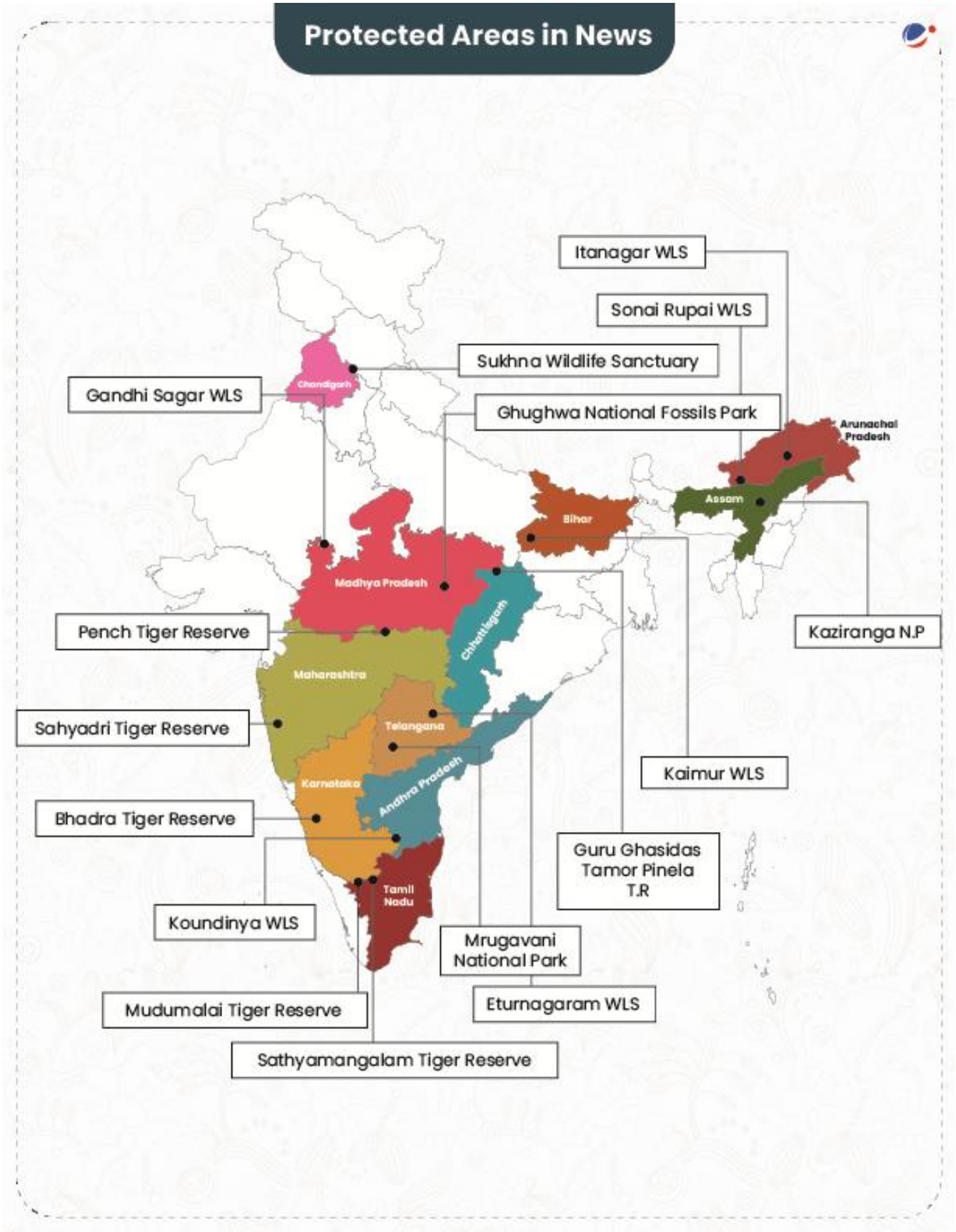
Malaysia (Capital: Kuala Lumpur)
A community of seafaring people in Malaysia, the indigenous Bajau are being evicted to make way for rapid urbanisation in Sabah, Malaysian Borneo.

Denmark (Capital: Copenhagen)
Will introduce a tax on livestock carbon dioxide emissions from 2030, making it the first country to do so.

7.2.4. DISASTER AFFECTED AREAS



8. PROTECTED AREAS IN THE NEWS



Andhra Pradesh

Koundinya Wildlife Sanctuary

Sri Lankan golden backed frog has been rediscovered after 200 years in India at Koundinya Wildlife Sanctuary.

About Koundinya Wildlife Sanctuary

- **Location:** Lies in **Kuppam and Palmaner Ranges, Andhra Pradesh.**
- **Only sanctuary in Andhra Pradesh** known for **harboring Asian elephants.**
- **Forest type:** Dry Deciduous forests with thorny scrub
- **Flora and Fauna:** Indian Elephant, Panther, Sloth bear, Wild boar, Nilgai, Hyena, Jackal etc.

Arunachal Pradesh

Itanagar Wildlife Sanctuary

New plant species 'Phlogacanthus sudhansusekharii' has been discovered in **Itanagar Wildlife Sanctuary.**

About Itanagar Wildlife Sanctuary

- **Location: southern-west part of Arunachal Pradesh and state capital Itanagar** is located inside the sanctuary.
- Recognized as an **Important Bird Area by Birdlife International.**
- **Rivers:** Poma, Pam, Pachin, Neorochi and Chingke.
- **Forest type:** Mixed evergreen to semi-evergreen forests.
- **Flora and Fauna:** Asian Elephant, Four species of Hornbills, Tiger, Asiatic Black Bear etc.

Assam

Sonai Rupai Wildlife Sanctuary

National Green Tribunal has taken notice of polling stations, schools and other construction activities **in Sonai Rupai Wildlife Sanctuary.**

About Sonai Rupai Wildlife Sanctuary

- **Location:** Foothills of the Himalayas, Assam
  - Together with Nameri National Park, it forms part of **Sonitpur Kameng Elephant Reserve.**
- **Important Bird Area** recognized by Birdlife International.
- **Rivers:** Dolsiri, Gabharu, Gelgeli, Belsiri, and Sonairupai
- **Forest Type:** Evergreen, Semi-evergreen and Moist Deciduous forests
- **Flora and Fauna:** Asian Elephant, Indian Bison, Leopard, Sambar, Hog Deer, Sloth Bear.

Kaziranga National Park (KNP)

KNP collected the highest revenue in its 50-year history.

About KNP

- **UNESCO recognition:** Declared as a **UNESCO World Heritage Site** in 1985.
- **Location: Golaghat and Nagaon districts** (Assam).
- **River:** Situated between the **river Brahmaputra** and **the Karbi Mikir hills.**
- **Forest Type: Wet alluvial grassland, deciduous to semi-evergreen** woodlands.
- **Flora and Fauna:** Indian gooseberry, One-horned rhinoceroses (the world's largest population), swamp deer, Ganges Dolphin, etc.

Bihar

Kaimur Wildlife Sanctuary (KWS)

National Tiger Conservation Authority's (NTCA) has given approval to develop KWS as **Bihar's second tiger reserve after Valmiki Tiger Reserve.**

About KWS

- **Location-** Located on **Kaimur Hills** plateau.
  - Spread over **Central highlands** (include Satpura-Maikal hills and Vindhya-Bagelkhand hills) and **Chota Nagpur Plateau.**
  - Linked to **Bandhavgarh-Sanjay-Guru Ghasidas-Palamau** tiger landscape.
- **Rivers:** Situated between the **Son River** (south) and **Karmanasa River (west).**
- **Forest Type:** Northern Tropical Mixed Dry Deciduous Forests
- **Flora and Fauna-**Leopards, wild boars, sloth bears, etc.

Chandigarh

Sukhna Wildlife Sanctuary

Centre has recently issued a draft notification **demarcating an ESZ around Sukhna Wildlife Sanctuary.**

About Sukhna Wildlife Sanctuary

- **Location:**Located **in Chandigarh at the foothills of** Shivalik
  - Situated adjacent to **Sukhna Lake.**
- **Forest Type:** Tropical Dry Deciduous forests & shrubs
- **Flora and Fauna:** the Indian Grey Hornbill, Indian Peafowl, White-Throated Kingfisher, elusive Porcupine, resilient Wild Boar.

Chhattisgarh

Guru Ghasidas Tamor Pingla Tiger Reserve

Guru Ghasidas Tamor Pingla Tiger Reserve is notified by **Chhattisgarh** as the **4th Tiger Reserve of the State.**

- **Third largest** tiger reserve in the country after **Nagarjuna sagar-Srisailam Tiger Reserve** and **Manas Tiger Reserve.**
- **TR are notified by the State Governments** as per provisions of Section 38V of the **Wildlife (Protection) Act, 1972** on the advice of **National Tiger Conservation Authority (NTCA).**
- Formed by integrating **Guru Ghasidas National Park and Tamor Pingla Sanctuary.**

Tamor Pingla Sanctuary

- Named after **Tamor** and **Pingala** Reserve Forests after Tamor Pahar and Pingla River.
- **Flora and Fauna:** Asian elephants, Bengal tigers, Indian leopards, bears, Sambar deer, wild boars, etc.

Guru Ghasidas National Park

- **Location:** located at **Chhota Nagpur plateau and some part in Baghelkhand plateau**
- **Rivers:** Falls under **Son** drainage basin.
- **Forest Type:** Moist deciduous with moderately dense forest
- **Flora and Fauna:** Teak, Sal, Gurjan, Palas, Tigers, Leopards, Jackals, barking deer, Spotted Deer etc.

Karnataka

Bhadra Tiger Reserve (BTR)

Mikania micrantha weed is rapidly spreading BTR and threatening its biodiversity.

About Mikania micrantha

- Perennial climber, originally from **tropical America.**
- It is a **major invasive species** in several parts of **south-east Asia and Pacific islands**

About Bhadra Tiger Reserve

- **Location:** Western Ghats of Karnataka.
  - → **Corridor:** Bhadra Tiger Reserve, Kudremukh National Park and Shettihalli Wild life Sanctuary are part of same landscape.
- **River:** Bhadra (**Tungabhadra River tributary**).
- **Forest types:** Tropical Moist Mixed Deciduous; Tropical Dry Deciduous; Semi-Evergreen Forest.
- **Flora and Fauna:** Tiger, Leopard, ungulates like Gaur, Sambar and Barking Deer, etc.

Madhya Pradesh

Ghughwa National Fossils Park

Prehistoric artefacts made from **fossil wood** found in **Ghughwa National Fossils Park,** indicating use of **fossilised tree trunks as raw materials for tools** by early men.

- → Notable discoveries include **preserved fossils of woody plants** climbers, leaves, flowers, fruits, etc. and **dinosaur egg** fossil.

Ghughwa National Fossil Park

- **Location:** Dindori district, Madhya Pradesh.
- Recognized as a National Park in **1983.**
- **Forest Type:** Tropical dry deciduous.

Gandhi Sagar Wildlife Sanctuary (GSWS)

It was recently approved as the second site for the translocation of Cheetahs, after **Kuno Palpur National Park, Madhya Pradesh (MP),**

About GSWS

- **Location:** Along the border between MP and Rajasthan.
- **River:** Chambal and Gandhinagar dam lies within the sanctuary.
- **Forest Type:** open grasslands, dry deciduous forest.
- **Flora and Fauna:** Panther, Nilgai, Chinkara, wolf etc.

Pench Tiger Reserve

Advanced Artificial Intelligence (AI) system for early detection of forest fires has been launched at Pench Tiger Reserve.

About Pench Tiger Reserve

- **Location:** Spread across states of Maharashtra and Madhya Pradesh in lower southern reaches of Satpura hills.
- Finds mention in **Ain-i-Akbari** and it is the original setting of **Rudyard Kipling's most famous work, The Jungle Book.**
- **River:** Pench
- **Forest Types:** South Indian **Tropical Moist Deciduous,** Southern **Tropical Dry Deciduous Teak,** and **Southern Dry Mixed Deciduous.**
- **Flora and Fauna:** Mahua, White Kulu, Dhaora, Amaltas, Tiger, leopard, sloth bear, Indian gaur, wild dog, wolf, etc.

Maharashtra

Sahyadri Tiger Reserve

Maharashtra plans to relocate tigers to the Sahyadri Tiger Reserve from Tadoba-Andhari Tiger Reserve in Chandrapur district.

About Sahyadri Tiger Reserve

- **Location:** situated in the Sahyadri Ranges of Western Ghats.
- Reserve was notified in 2010 **amalgamating Koyana Sanctuary and Chandoli National Park.**
- **Forest type:** Subtropical Hill Forests, Semi-evergreen Forests, Tropical Dry Deciduous and Tropical Moist Deciduous forests.
- **Flora and Fauna:** Tiger, Atlas Moth, Moon Moth, Blue finned Mahasheer fish, Hornbills.

Tamil Nadu

Sathyamangalam Tiger Reserves (STR)

Study highlights lack of awareness on vulture conservation across species' key habitats in STR.

About STR

- Declared as **tiger reserve in 2013.**
- **Location: Erode district, Tamil Nadu.** It is contiguous with **Mudumalai Tiger Reserve (TN); Biligiri Rangaswamy Temple Tiger Reserve and Bandipur Tiger reserves (Karnataka).**
- Links Eastern and Western Ghats.
- **Forest types:** Tropical dry thorn, tropical dry mixed deciduous; Tropical semi evergreen; Sub tropical hill forest.
- **Flora and Fauna:** Elephant, Tiger, Panther, Sloth bear, Gaur, Black Buck, Spotted deer, Nilgiri langur, etc.

Mudumalai Tiger Reserve

Two critically endangered species of amphibians, Micrixalus spelunca, commonly known as cave dancing frog, and Nyctibatrachus indraneili, Indraneil's Night Frog were found in Mudumalai Tiger Reserve.

About Mudumalai Tiger Reserve (MTR)

- **Location:** Located in **Nilgiris District of Tamil Nadu,**
- Part of **Nilgiri Biosphere Reserve** along with **Wayanad Wildlife Sanctuary (Kerala), Bandipur National Park (Karnataka),** Mukurthi National Park and Silent Valley.
- **River: Moyar River.**
- **Forest Type:** Tropical evergreen forest, moist deciduous forest, moist teak forest, etc.
- **Important flora & fauna:** Elephant Grass, Tiger, Elephant, Indian Gaur etc.

Telangana

Eturnagaram Wildlife Sanctuary

Eturnagaram Wildlife Sanctuary is witnessing forest fires.

About Eturnagaram Wildlife Sanctuary

- **Location:** It is **one of oldest sanctuaries situated in Warangal, Telangana** (established in **1953**).
  - Lies on **border of Maharashtra, Chhattisgarh and Telangana**
  - Bounded by **Laknavaram Lake.**
- Hosts **one of Asia's largest tribal jathras – Sammakkka Sarakka Jathra .**
- **River:** Dayyam Vagu.
- **Forest type:** Tropical Dry Deciduous Forest
- **Flora and Fauna:** Teak, Bamboo, Maddi, Indian Gaur, Giant Squirrels, Sloth Bears, Black Bucks, Chinkaras, nilgai and Tigers.

Mrugavani National Park (MNP)

Telangana Forest Department Informed the National Green Tribunal (NGT) that area of MNP in Chilkur has **been reduced by 80 hectares on paper.**

About MNP

- **Location: Hyderabad, Telangana**
- **Forest type:** Tropical dry deciduous forest
- **Flora and Fauna:** Spotted deers, Indian hare, forest cat, civet, Indian rat snake, Russell's viper.

9. SPECIES IN THE NEWS

SPECIES IN NEWS

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

Terrestrial Animals

Grey Wolf

Indian Wolf	Himalayan wolf or Tibetan wolf
IUCN STATUS: LC	IUCN STATUS: VU
CITES: Appendix I	CITES: Appendix I
WPA, 1972: Schedule I	WPA, 1972: Schedule I

Context

- **'Operation Bhediya'** has been launched by the UP govt to capture man-eating wolf in U.P.

Characteristics

- Extremely **social living in a pack of 6-8 individuals**,
- Run at **very high speeds,**
- **Monogamous** and follow **male dominance hierarchy,**
- Communicate with **different vocalizations and scent-marking.**

Habitat

- **Indian Wolf :** In peninsular India including Rajasthan, Gujarat, etc.
- **Himalayan wolf or Tibetan wolf:** In Upper trans-Himalayan ranges.

Red Panda

IUCN STATUS: EN

CITES: Appendix I

WPA, 1972: Schedule I

Among 22 species covered under **Species Recovery Programme**

Context

- Red Panda Program of **Darjeeling's Padmaja Naidu Himalayan Zoo's** has been selected as finalist for 2024 **WAZA (World Association of Zoos and Aquariums) Conservation Award.**

Characteristics

- **Small arboreal mammals, indicator species** for ecological change.
- Skilled climbers; **nocturnal** and usually solitary, but come together in **pairs in breeding season**; most active during twilight hours of early morning and evening (**crepuscular**)
- **Sikkim's** state animal

Habitat

- Mixed deciduous and conifer forests with dense understories of bamboo.
- **Distribution**: India (Sikkim, West Bengal, Meghalaya and Arunachal Pradesh), Nepal, Bhutan, Myanmar, China.

Asiatic Lion

IUCN STATUS: EN

CITES: Appendix I

WPA, 1972: Schedule I

Among 22 species covered under **Species Recovery Programme**

Context

- Six Asiatic lions have migrated from Gir Forest to the **Barda Wildlife Sanctuary (BWS).**

Characteristics

- They are **slightly smaller than African lions.**
- Males have only moderate **mane growth at the top of the head.**
- Lions have **no particular breeding season.**

Habitat

- Only in Gir forest and other protected areas in Gujarat's Saurashtra region.

Conservation Measures

- **'Project Lion'** announced on **August 15, 2020.**

Cheetah

Asiatic Cheetah

IUCN STATUS: CR

CITES: Appendix I

WPA, 1972: Schedule I

African Cheetah

IUCN STATUS: VR

CITES: Appendix I

Context

- Gandhi Sagar Wildlife Sanctury was chosen as the second home for the translocation of Cheetahs.

Characteristics

- Unlike other big cats (lions, tigers, leopards, and jaguars) cheetahs don't roar.
- **World's fastest Mammal** and the **only large carnivore to be extinct in India (**1952).

Habitat

- **African Cheetah**: Sub-Saharan Africa (Namibia holds the largest population)
- **Asiatic Cheetah**: Limited to Iran's arid landscapes

Conservation Measures

- **Project Cheetah (World's first intercontinental large wild carnivore translocation project**, part of **Project Tiger**)
  - **Implementing agency:** National Tiger Conservation Authority (NTCA)

Nilgiri Tahr

IUCN STATUS: EN

WPA, 1972 Schedule I

Among 22 species covered under **Species Recovery Programme**

Context

- Tamil Nadu government is executing a synchronized survey to estimate the population of Nilgiri Tahr.

Characteristics

- **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

Habitat

- **Endemic to western ghats**
- **Ernavikulam National Park in Anamalai Hills, Kerala,** home to the largest population.

Conservation Measures

- **State animal** of Tamil Nadu
- October 7 declared as Nilgiri Tahr day by Tamil Nadu.

Hoolock Gibbon

Western hoolock gibbon

IUCN STATUS: EN

CITES Appendix I

WPA, 1972 Schedule I

Eastern hoolock gibbon

IUCN STATUS: VU

CITES Appendix I

WPA, 1972 Schedule I

Context

- **The National Board for Wildlife** approved oil exploration in **Assam's Hollongapar Gibbon Sanctuary.**

Characteristics

- **Two types**: western hoolock gibbon *(Hoolock hoolock)* and the eastern hoolock gibbon *(Hoolock leuconedys).*
- Arboreal, diurnal, and highly territorial
- Sexual dimorphism in fur color:
  - **Eastern**: Males are black; females light brown or golden
  - **Western**: Males black with white brows; females orange-tan

Habitat

- Endemic to northeastern India
- **Eastern Hoolock Gibbon**: Found in Arunachal Pradesh and parts of Assam
- **Western Hoolock Gibbon**: Found in Assam, Meghalaya, Tripura, and Mizoram

Iberian Lynx

IUCN STATUS VU

CITES Appendix I

Context

- According to IUCN, **conservation status** of Iberian lynx has **improved from Endangered to Vulnerable**, reflecting significant **increase in its population**.

Characteristics

- Solitary hunter; nocturnal or crepuscular; may temporarily become diurnal during winter; live in small, isolated meta-populations.
- **European Rabbit** accounts for **80-99%** of its diet.

Habitat

- Endemic to Iberian Peninsula
- Found in southwestern Spain, some populations in Portugal.

Avian Species

Gyps Indicus (Indian Vulture)

IUCN STATUS CR

WPA, 1972 Schedule I

Among 22 species covered under **Species Recovery Programme**

Context

- **Moyar valley** located in **Mudumalai Tiger Reserve (Tamil Nadu)** is the only region with largest nesting colony of Gyps vultures in wild.

Characteristics

- **Possess whitish feathers on a dark head and neck**, and a pale collar.
- **Colonial nesters** and often **seen in flocks.**
- **Population is declining**.

Habitat

- **Habitat Specialization:** Open Grassland.
- Found in **Jharkhand, Madhya Pradesh, Rajasthan**.

Conservation Measures

- **Banning of Non-steroidal anti-inflammatory drugs** like diclofenac, Ketoprofen for veterinary use.
- **Vulture Action Plan 2020-25.**

Jerdon's Courser

IUCN STATUS CR | WPA, 1972 Schedule I

Among 22 species covered under **Species Recovery Programme**

Context

- Jerdon's Courser has not been visually spotted in over a decade.

Characteristics

- **Nocturnal** ground-dwelling **bird** found only in the Eastern Ghats.
- Small, cryptic plumage for camouflage in its scrub habitat

Habitat

- **Exclusively endemic** to **Andhra Pradesh,** specifically within the **Sri Lankamalleswara Wildlife Sanctuary** in Kadapa, Andhra Pradesh.
- Prefers dry, scrub forests and grasslands

Greater Adjutant Stork

IUCN STATUS NT | WPA, 1972 Schedule I

Context

- Purnima Devi Barman received the **2024 Whitley Gold Award dubbed 'Green Oscar'** for conserving Greater Adjutant Stork (Leptoptilos dubius).

Characteristics

- Also known as 'Hargila', they reside **only in Assam (80%) and Bihar of India and Cambodia.**
- **One of the largest flying birds** in the world.
- Primarily scavengers, feeding on carrion, but also consume fish, reptiles, and amphibians

Habitat

- Inhabits wetlands, nesting in **tall trees with closed canopies and bamboo clumps** around nesting trees, etc.

Amur Falcon

IUCN STATUS LC | WPA, 1972 Schedule I

Context

- Manipur's Tamenglong district imposes a ban on hunting of Amur Falcon.

Characteristics

- It is locally known as **'Kahuaipuina'** in Manipur.
- **Migratory raptor**: Make voyage from breeding grounds in Russia and China to southern Africa.
  - **22,000 km journey** (longest sea crossing of any raptor)
- Passes through **Manipur and Nagaland.**
- **Feeds on dragonflies** that follow a similar migration path over Arabian Sea.

Aquatic Species

Eurasian Otter

IUCN STATUS: NT | CITES: Appendix I | WPA, 1972: Schedule I

Context
- For the first time in India, Eurasian otter was radio-tagged in Satpura tiger Reserve (Madhya Pradesh).

Characteristics
- Brown Fur, adapted for aquatic lifestyle with webbed feet and ability to close small ears and nose under water.
- Other two otter species found in India – **Smooth-coated otter and Asian small-clawed otter.**

Habitat
- Found in Europe, Asia, and Africa.
- In India, found in northern, northeast, and southern regions.

Vaquita

IUCN STATUS: CR | CITES: Appendix I

Context
- A recent survey revealed a devastating decline in population of endangered marine mammal, the Vaquita.

Characteristics
- It is the **smallest and now most endangered species** of the **cetacean order.**
- It is a toothed whale, like dolphins and sperm whales, as opposed to whales with **baleen** (Baleen is a filter-feeding system inside the mouths), such as the blue whale.

Habitat
- It is **endemic to the Gulf of California** where it lives in the shallow waters bordering the Colorado estuary.

Blue Whales

IUCN STATUS: EN | CITES: Appendix I | WPA, 1972: Schedule I

Context
- Blue whales have made a comeback near the Seychelles after 60 years.

Characteristics
- **Largest & loudest animal** on the planet.
- **Lifespan:** Estimated at around 80 to 90 years.
- **Key Behaviour aspect**: Sometimes **swim in small groups** but are more often **found alone or in pairs.**
- **Diet: Feeds** almost exclusively on **krill (marine crustaceans)**

Habitat
- Found in **all oceans except the Arctic Ocean.**

Reptiles, Insects, Amphibians, etc

Neptis Philyra

Context

- Rare butterfly species Neptis philyra was recently discovered for the first time in India.

Characteristics

- It has been discovered in **Tale Valley wildlife sanctuary** in lower Subansiri district of **Arunachal Pradesh.**
- It is commonly known as **long-streak sailor**
- It has **serrated wings with rich brownish-black on the upper side** and yellow brown on the underside
- It is **generally found in east Asia,** including eastern Siberia, Korea, Japan, central and southwest China.

Habitat

- Evergreen forests, riverine vegetation, and rocky streams.

Butterfly Cicada

Context

- A new species of **cicada** discovered in Meghalaya.

Characteristics

- It belongs to **genus Becquartina** and marks **the first ever record of this genus in the country.**
- The species in this genus are often called **"Butterfly cicadas"** because of their colourful wings.
- The present discovery extends the distributional range of the genus Becquartina from Southeast Asia into Northeast India.
- It increases the total number of known **Becquartina species to seven.**

Bumblebees

Context

- Recent research highlights that the Bumblebees are resilient to pesticides.

Characteristics

- Belongs to the **genus Bombus** and are important **pollinator for many wildflowers.**
- They are **fuzzy insects with short, stubby wings.**
- They are **larger than honeybees**, but they don't produce as much honey.
- They are known for **buzz pollination.**
- They **use dance as a means of communicating 'food alert'** signals to other members of their colony.

Sea Anemone

Context

- Scientists have found mass sea anemone bleaching off Agatti island, Lakshadweep.

Characteristics

- They are **ocean-dwelling members of the phylum Cnidaria**.
  - Sea anemones are **predatory animals** and most species are found in **coastal tropical waters**.
- Like corals, sea anemones establish **symbiotic relationships with green algae**.
- **Sea surface temperature rise** disrupts this relationship, resulting in **bleaching**.
- They also have a **symbiotic relation** with **clownfish.**
  - Clownfish are protected by the **stinging tentacles** of **anemone** and anemone gets food from Clownfish's meals.
- They play key **biogeochemical roles in benthic ecosystems**.

Batillipes chandrayaani

Context

- A new species of marine tardigrade discovered from the southeast coast of Tamil Nadu is named **Batillipes chandrayaan**i after **Chandrayaan-3 moon mission.**

Characteristics

- **Third marine tardigrade species** to have been scientifically described from the Indian waters.
- It has a t**rapezoid-shaped head** and **four pairs of legs** with **sharp-tipped sensory spines**.
- They can **survive extreme environmental conditions**
- Recently, a **study of the first tardigrade fossil has** enabled Scientist to classify them and **retrace their evolutionary history.**

Sea cucumbers

WPA, 1972
Schedule I

Context

- As per a new research, repopulating Sea Cucumbers **can help in recovery of coral reefs.**

Characteristics

- Belong to the animal group called **echinoderms**, which also contains starfish and sea urchins.
- Are known as **janitors of tropical seas** as they consume decomposing organic matter and convert it into recyclable nutrients and buffers the ocean's acidification.
- It exhibits **sexual and asexual reproduction.**

Plant Species

Seaweed

Context

- ICAR-Central Marine Fisheries Research Institute have been designated as a **center of excellence for seaweed cultivation.**

Characteristics

- It is a common name for **various species of marine plants and algae** which grow in oceans as well as in rivers, lakes etc.
- Multicellular and macroscopic **autotrophs** broadly classified into **three groups** such as **green** (Chlorophyta), **brown** (Phaeophyta), and **red** (Rhodophyta) seaweeds.

Applications

- **Nutritional**: Also called sea vegetables, it provides:-
  - **Minerals:** calcium, phosphorus, sodium, potassium
  - **Vitamins:** A, B1, B12, C, D, E etc
- **Health**: Anti-inflammatory, antimicrobial & used in cancer treatment.
- **Manufacturing**: Binding agents in toothpaste,fruit jelly, organic cosmetics, skincare items.
- **Agriculture**: Enhances crop productivity

Aquilaria Malaccensis (agarwood)

Context

- CITES eases export of agarwood from India, move to benefit lakhs of farmers.

About Aquilaria Malaccensis

- An evergreen tree **native to Northeast India, Bangladesh, Bhutan, and parts of Southeast Asia,** and is considered a precious aromatic plant in the region.
- **Aromatic plant's oil and chips** both are highly valued in the market.

Syntrichia Caninervis

Context

- Scientists have found a **desert moss** - Syntrichia Caninervis - which is able to withstand Mars-like environment conditions.

About Syntrichia Caninervis

- It is **widespread in some of Earth's harshest locations** including Antarctica and the Mojave Desert.
- It could be the **first possible pioneer species for the colonization of Mars.**

Semal Trees (Silk Cotton Tree)

Context

- Disappearance of **Semal trees** from Southern Rajasthan is creating adverse effects on the forests and people.

About Semal Trees

- Large **deciduous tree**, known for its Crimson red flowers.
- **Ayurvedic medicines** can be prepared from every part of the tree.
  - For instance, roots are used for treating ailments such as diabetes, etc.
- Worshipped by **many tribal communities** in Rajasthan and Madhya Pradesh.
- Its seed produces **edible oil, used in making soaps.**

Tmesipteris oblanceolata

Context

- News research shows that **Tmesipteris oblanceolata,** a species of fork fern, has **largest genome** of any organism on the earth.

About Tmesipteris oblanceolata

- Contains **160 billion base pairs** (the units that make up a strand of DNA) outstripping the human genome by more than 50 times.
- It belongs to a **primordial group of plants** that evolved long before dinosaurs set foot on the earth.
- Found only in **New Caledonia and a few nearby islands in the Pacific Ocean** and thrives on the trunks and branches of trees in rainforests.

Palm Tree

Context

- Odisha will plant palm tree to combat lightning deaths.

About Palm Tree

- Belongs **to Tropical Forest Ecosystem**.
- **Varieties of palm Tress:** Coconut, Oil Palm, Arecanut, Palmyrah etc.
  - Palmyrah is declared as **State Tree of Tamil Nadu.**
- **Characteristics of Palm trees:**
  - Act **as natural conductors during lightning strikes** and prevent loss of lives.
  - Male palm tree produces only flowers, while female tree produces fruits as well.
- **Benefits**:
  - Palm leaves used as construction materials for fences, walls, and roofs.
  - Provide edible and non- edible products.

Neelakurinji

Context

- It has been included on the **IUCN (International Union for Conservation of Nature) official Red List of threatened species** under the **Vulnerable category.**

About Neelakurinji

- Shrub known for massive blooming every 12 years.
  Semelparous, i.e., single reproductive episode before death.
- **Location:** Shola grasslands of Western Ghats - the Nilgiri hills, Palani hills and the Eravikulam hills of Munnar, also Shevaroy hills in the Eastern Ghats.
  - The name **Nilgiris (blue mountains)** was derived from the colors of these flowers.
- **Major Threats:** Tea and softwood plantations, urbanization, invasion of exotic species like eucalyptus, black wattle, etc.

Water Spinach

Context

- **Water spinach** now reached the door of the farmers with the technology developed by the **Indian Institute of Vegetable Research (IIVR).**

About Water spinach

- Native to t**ropics and subtropics,** this **semi-aquatic perennial plant** is believed to have been the **first domesticated in Southeast Asia.**
- **Benefits**
  - Rich in **folic acid (vitamin B9)**; Contains medium levels of **beta carotene, calcium, vitamin E and C.**
  - Helps prevent **neural tube defects in unborn children.**
  - Being **rich in iron,** it's beneficial for people with **anemia.**
  - Has great **potential as a purifier of aquatic habitats.**

Ashwagandha (withania somnifera)

Context

- Ashwagandha is growing in popularity, both in India and abroad.

About Ashwagandha

- It is an **evergreen shrub** found in parts of **India, Africa, and the Middle East.**
- Used as a medicinal plant, especially in traditional **Ayurvedic medicine**.
- Contains several **bioactive compounds**, including withanolides, which have anti-inflammatory and antioxidant effects.
- Its supplements are often **promoted for stress and anxiety, sleep, male infertility, athletic performance**, etc.

Arogyapacha (Trichopus zeylanicus)

Context

- **'Arogyappacha'** (Trichopus zeylanicus) found endemic to Agastyar hills of Kerala is **used by the local 'kani' tribe as a health food for getting instant stamina, ever green health and vitality.**

About Arogyapacha

- The term arogyapacha literally mean **'the green that gives strength'**.
- Arogyapacha is a small medicinal plant with **slender stems and thick leaves**. It grows in **shade near the banks of streams and rivulets**. Only tender fruits of this plant are edible.
- **Medicinal properties:** Anti-oxidant, anti-microbial, anti-inflammatory, anti-tumour, anti-ulcer, anti-hyperlipidemic, hepatoprotective and anti-diabetic, etc.
- Arogyapacha is a subspecies of Trichopus zeylanicus.
  - The subspecies found in India is called **Trichopus zeylanicus travancoricus**.
  - Though the main species, Trichopus zeylanicus, is found in Sri Lanka and Thailand, only the Indian variety is proved to have medicinal qualities.

Baobab Tree

Context

- Global Society for Preservation of Baobabs and Mangroves has initiated a mission to rejuvenate baobab trees.

About Baobab Tree (Genus: Adansonia)

- **Long-lived deciduous**, small to large trees from 20 to 100 ft tall with broad trunks and compact tops.
- Grows in **Africa, Madagascar and Australia.**
  - Also found in Mandu, in Dhar district of Madhya Pradesh.
- Also known as **upside-down tree**.
- **Fiber from bark** is used to make rope, cloth, musical instrument strings etc.

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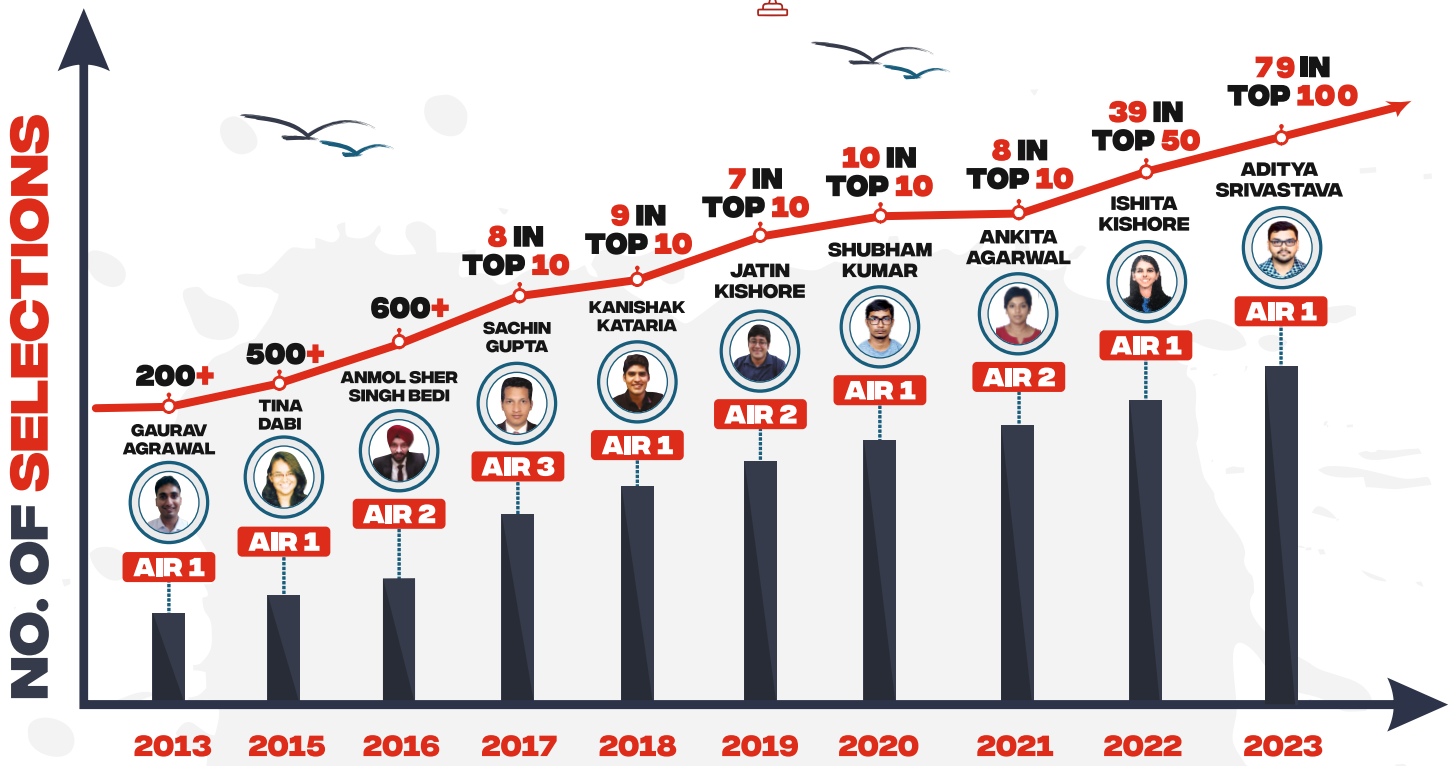

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