



GALLANT IAS ACADEMY

QUARTERLY

DECODED

Environment

Current Affairs Magazine
May to July 2026

IN THIS ISSUE

01 India's 100th Ramsar Site

Surha Tal joins the global list of wetlands

02 The 1.5°C Warning

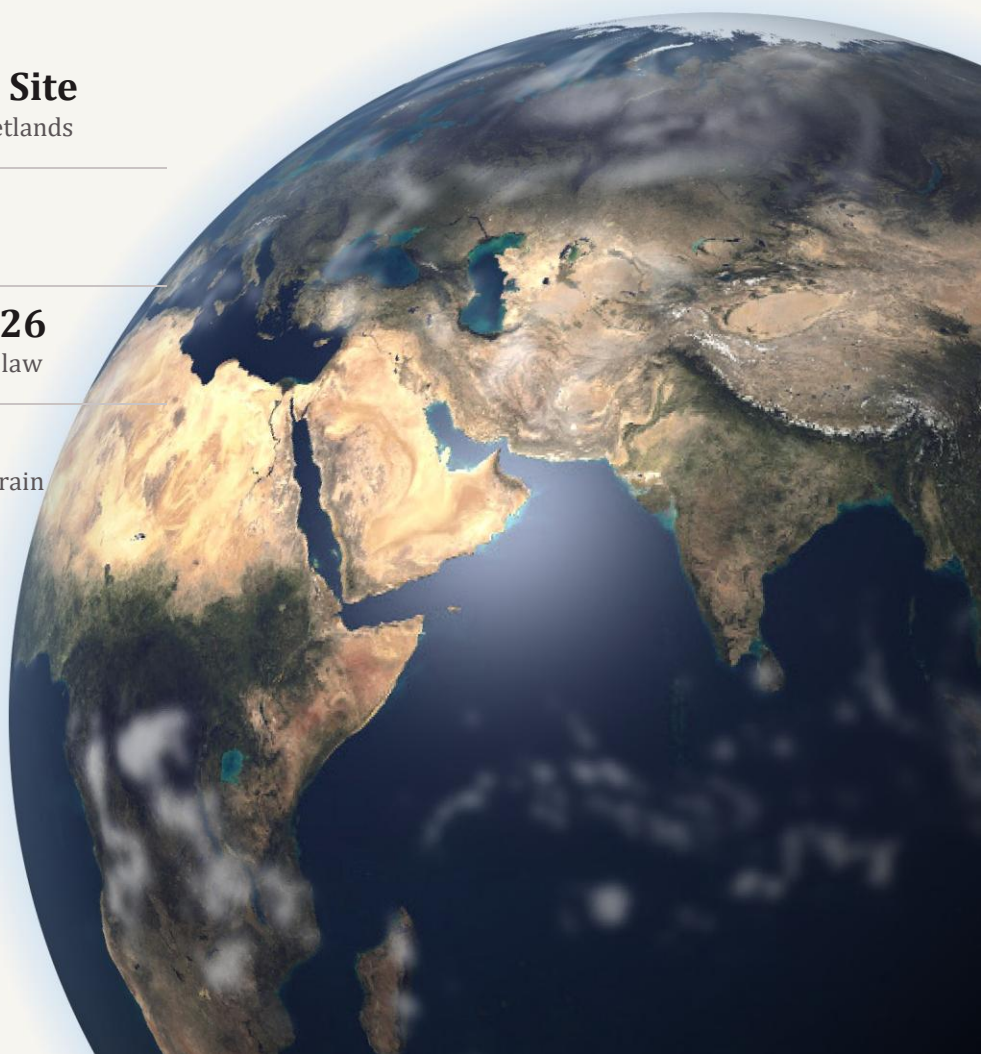
WMO's five-year outlook, decoded

03 Solid Waste Rules, 2026

Four-stream segregation becomes law

04 Hydrogen on Rails

India's first indigenous hydrogen train



IN THIS ISSUE

Topics

1 BIODIVERSITY & WILDLIFE CONSERVATION

Agarwood
 Amur Falcon
 Ayeyarwady Pit Viper
 Caracal
 Gharial
 Himalayan Brown Bear
 Odonata
 Peacock Tarantula
 Rusty-spotted Cat
 New Plant Species from Andhra Pradesh
 Western Hoolock Gibbon
 Giant "Potato Patch" Coral
 Agave americana
 Apis cerana and Malabar Tree Toad
 Black Tigers of Simlipal
 Yellow-throated Marten
 Flamingo Revolution
 Colobus congoensis
 Gee's Golden Langur
 Kewra
 Mugger Crocodile
 Transcaspian Marinka
 Sal Heartwood Borer
 White-bellied Heron
 New Solitary Bee Species

2 CLIMATE CHANGE & CLIMATE POLICY

Locally Led Adaptation (LLA)
 Amazon Rainforest near Tipping Point
 Antarctica's Sea-ice Loss
 Methane Alert & Response System
 State & Trends of Carbon Pricing
 17th Petersberg Climate Dialogue
 Bonn Climate Conference (SB64)
 Climate Finance in India
 India's Growing Cooling Demand
 WMO Climate Update (2026-2030)
 Aerosol Diversity and Climate Change
 Marine Cloud Brightening (MCB)
 Hindu Kush Himalaya (HKH) Region

3 ENVIRONMENTAL GOVERNANCE & SUSTAINABILITY REPORTING

Atacama Desert
 Ru-Soam Bridges
 Legal Personhood for Nature
 Access and Benefit Sharing (ABS)
 Amendment to EIA Notification, 2006
 Sustainable Development Report 2026

4 FORESTS, WETLANDS & LAND

Nicobarese Oppose New Sanctuaries
 Agasthyamala Biosphere Reserve
 Bhimgad Wildlife Sanctuary
 Surha Tal: India's 100th Ramsar Site
 Mesalina bishnoi
 Nemawashi
 Recovery of Mangrove Forests
 Borjuli Wetland
 Nameri Tiger Reserve

5 POLLUTION & WASTE MANAGEMENT

India's Circular Economy Transition
 Solid Waste Management Rules, 2026
 Swachh Sagar, Surakshit Sagar Campaign
 Istanbul Platform (Zero Waste)
 Biochar
 Mercury in Cosmetics
 Freshwater Browning

6 RENEWABLE ENERGY & CLEAN FUELS

Port-based Green Methanol Plant
 Floating Solar Potential in India
 Geothermal Project, Ladakh
 India's Wind Energy Sector
 Abhilasha Biofuel (ABF)
 E85 Fuel and Flex-Fuel Vehicles
 Indigenous Hydrogen Train
 Smart Algal Liquid Tree (SALT)

SECTION 1

Biodiversity & Wildlife Conservation

01 Agarwood

Assam ships first legal agarwood chips to West Asia [The Hindu](#)

PRELIMS POINTERS

- **What it is:** A highly valued aromatic resinous heartwood, mainly from **Aquilaria malaccensis**. The resin forms when the tree responds to injury or microbial infection, producing dark, fragrant wood used in oud oil, perfumes, incense and traditional medicine.
- **Distribution:** Concentrated in the Northeast, especially **Assam and Tripura**, with resources also in Manipur, Nagaland and Meghalaya. The region holds the overwhelming majority of India's agarwood resource base.
- **Regulation:** A. malaccensis is listed in **CITES Appendix II**, so its international trade is regulated. India has undertaken **Non-Detriment Findings (NDF)** to support sustainable use and legal trade.
- **Economic shift:** Government initiatives on cultivation, traceability, processing, value addition and exports are moving the sector from dependence on wild trees to organised cultivation, benefiting Northeastern farmers and enterprises.

02 Amur Falcon (*Falco amurensis*)

Satellite-tagged Amur falcons returning from Africa, set to cross India [The Hindu](#)

PRELIMS POINTERS

- **Migration:** A small raptor that breeds in eastern Siberia and northern China and winters in southern Africa via the Indian subcontinent. It makes one of the longest raptor migrations, including a sea crossing over the **Arabian Sea**, relying on favourable winds and insect availability.
- **India as a stopover:** Nagaland, Manipur and other parts of the Northeast are key staging areas. Large congregations gather around **Doyang Reservoir, Nagaland**.
- **Diet:** Mainly insects such as termites and grasshoppers, providing a natural pest-control service in farm landscapes.
- **Status: Least Concern (IUCN).** It faced mass hunting along migration routes, habitat loss and changing food availability; community-based campaigns in Nagaland have promoted its protection.



03 Ayeyarwady Pit Viper

New Myanmar snake species puzzles scientists with its shifting looks [The Indian Express](#)

PRELIMS POINTERS

- **Trimeresurus ayeyarwadyensis** is a venomous pit viper (family **Viperidae**) from Myanmar's Ayeyarwady and Yangon regions, associated with forested and wet habitats of the Ayeyarwady River system.
- It was recognised as a distinct species using morphological as well as genetic (species-delimitation) evidence. It is an example of a **cryptic species**: closely related species that are hard to distinguish by external appearance alone.



04 Caracal

Rare caracals spotted in Thar Desert near India-Pakistan border [The Hindu](#)

PRELIMS POINTERS

- **Caracal caracal** is a medium-sized wild cat with distinctive long black ear tufts, locally called **Siyah-gosh**. In India it lives in arid and semi-arid landscapes of **Rajasthan, Gujarat** and parts of **Madhya Pradesh**.
- **Protection**: Schedule I of the Wild Life (Protection) Act; CITES Appendix I (Asian population). Globally **Least Concern (IUCN)**, though regional populations face habitat loss, prey depletion and human-wildlife conflict.
- **WII Conservation Action Plan (2026)** for the Caracal, Fishing Cat and Clouded Leopard provides a science-based framework on priority landscapes, threats, habitat restoration, monitoring and community-oriented conservation.



05 Gharial (Gavialis gangeticus)

Critically endangered gharial spotted in Assam's Kaziranga after years [The Hindu](#)

PRELIMS POINTERS

- A specialised fish-eating crocodilian with an extremely long, slender snout. It depends on **deep, flowing rivers** and **sandy riverbanks** for basking and nesting.
- **Status**: Critically Endangered (IUCN); CITES Appendix I; Schedule I of the Wild Life (Protection) Act.
- **National Chambal Gharial Sanctuary** (Madhya Pradesh, Rajasthan, Uttar Pradesh) is its most important habitat. In 2026, the **Supreme Court's suo motu proceedings** on illegal sand mining there highlighted habitat degradation and directed stronger surveillance, enforcement, environmental flows and protection of the riverine ecosystem.



06 Himalayan Brown Bear (*Ursus arctos isabellinus*)

Himalayan bears appear at Rakchham Chitkul Wildlife Sanctuary after 7 yrs [The Indian Express](#)

PRELIMS POINTERS

- A high-altitude **subspecies of the brown bear**, not a separate bear species. It is omnivorous and occupies alpine meadows, mountain valleys and other high-altitude areas.
- **Range:** Jammu & Kashmir, Ladakh, Himachal Pradesh and Uttarakhand, with important populations in the trans-Himalaya. Recent sightings in **Kinnaur (Himachal Pradesh)** confirm its continued presence.
- **Threats:** Habitat fragmentation, climate change, reduced food availability and human-bear interactions.



07 Odonata

Survey records 143 Odonata species across Western Ghats, highlights 35% shortfall in known diversity [The Hindu](#)

PRELIMS POINTERS

- **Odonata** is the insect order of **dragonflies and damselflies**. As they depend on freshwater for breeding, they are widely used as **bioindicators** of wetland and freshwater health.
- **Western Ghats survey (2021-23, 144 sites, five states):** recorded 143 species (76 dragonflies, 67 damselflies), 40 of them endemic. This is only about 65% of the species historically known from the region, a **~35% shortfall** that points to habitat loss and ecological stress.
- **New Indian species (2026):** *Sarasaeschna dosdewaensis*, *S. nuboides* and *S. sigotaayo*, several new *Calicnemia* species, and ***Lestes paloti***, a new spreadwing damselfly from the Western Ghats of Kerala.

08 Peacock Tarantula

Andhra launches first-ever survey of critically endangered peacock tarantula [Deccan Herald](#)

PRELIMS POINTERS

- ***Poecilotheria metallica*** (Gooty Sapphire Ornamental) is a metallic-blue tarantula **endemic** to a very small area of the **Eastern Ghats of Andhra Pradesh**, a symbol of the region's endemism in fragmented dry-forest and rocky habitats.
- **Critically Endangered** due to its tiny range, habitat degradation and illegal collection for the international pet trade.
- **2026 survey:** The Andhra Pradesh Forest Department and the Eastern Ghats Wildlife Society began the first dedicated scientific survey, including the **Nagarjunasagar-Srisailem Tiger Reserve**.



09 Rusty-spotted Cat (*Prionailurus rubiginosus*)

10 seconds, a big discovery: Rusty-spotted cat breeding confirmed in Delhi-NCR [The Indian Express](#)

PRELIMS POINTERS

- One of the **smallest wild cats in the world**, found mainly in **India and Sri Lanka**.
- Shows considerable habitat flexibility: dry deciduous forests, scrublands, grasslands and agricultural landscapes. Records such as confirmed breeding in Delhi-NCR highlight the value of fragmented landscapes and **wildlife corridors**.
- **Near Threatened (IUCN)**. Threats include habitat loss, road mortality, prey depletion and rising human pressure.



10 New Plant Species from Andhra Pradesh

3 new, critically endangered plant species discovered in AP [The Times of India](#)

PRELIMS POINTERS

- The discoveries underline the **Eastern Ghats of Andhra Pradesh** as an important centre of plant diversity and endemism.
- **Ceropegia andhrlica** (family **Apocynaceae**), from the Paderu Forest Division of Alluri Sitharama Raju district, is a small tuberous herb with dark-purple flowers. Known only from its type locality (about **200 individuals**), it faces grazing, forest fires and habitat degradation and is tentatively assessed as **Critically Endangered**.

11 Western Hoolock Gibbon (*Hoolock hoolock*)

Assam hoolock gibbon: Ape gets artificial canopy bridge over railway line [The Indian Express](#)

PRELIMS POINTERS

- **India's only ape**. Unlike monkeys, gibbons are tailless and have long arms adapted for **brachiation** (swinging from branch to branch).
- **Range**: Northeast India (Assam, Arunachal Pradesh, Meghalaya, Nagaland, Manipur, Tripura), extending into Bangladesh and Myanmar. Inhabits tropical evergreen, semi-evergreen and moist deciduous forests.
- **Ecology**: Mainly **frugivorous** (also leaves, flowers, insects) and an important **seed disperser** aiding forest regeneration.
- **Status**: **Endangered (IUCN)**; Schedule I of the Wild Life (Protection) Act, 1972.
- **Threats and response**: Totally dependent on continuous canopy, so roads, railways, deforestation and farming isolate gibbon groups. Conservation now focuses on forest corridors, **canopy bridges** and community protection.



12 Giant "Potato Patch" Coral

Newly recorded Lakshadweep 'potato patch' coral could be one of the world's largest living colonies [Down To Earth](#)

PRELIMS POINTERS

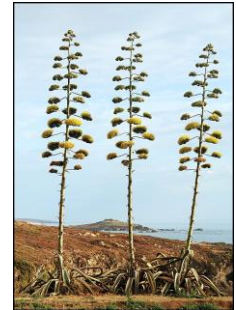
- A giant colony of **Pavona clavus** has been documented near **Kadmat Island, Lakshadweep**, covering about **4,250 sq m** at depths of roughly 5-20 m.
- Parts of the colony may be hundreds to over a thousand years old, though precise dating is still needed.
- **Significance:** Valuable for studying coral longevity, reef resilience and responses to marine heat stress and bleaching, to which Lakshadweep's reefs are highly vulnerable.

13 Agave americana (Century Plant)

[BBC News](#)

PRELIMS POINTERS

- Also called American Aloe or Maguey, it is a succulent **native to Mexico and the southwestern United States**. It is naturalised in India on dry and degraded land, wastelands, scrublands and roadsides.
- **Adaptation:** Thick, fleshy leaves store water, and it uses **Crassulacean Acid Metabolism (CAM)**: stomata open mainly at night to take in CO₂, reducing daytime water loss.
- **Misleading name:** It does not take 100 years to flower. It grows vegetatively for several years, **flowers only once** and the main rosette then dies, but basal **suckers/offsets** allow vegetative reproduction.



14 Apis cerana and Malabar Tree Toad

Apis cerana and Malabar tree toad to be declared Karnataka's state insect and amphibian [The Hindu](#)

PRELIMS POINTERS

Apis cerana (Asian/Eastern Honey Bee)

- **Native** honey bees of South and Southeast Asia, including India, unlike the introduced Apis mellifera.
- A major **pollinator** supporting crop yields, food security, honey production and wild plant diversity; well adapted to Indian conditions, with defensive and hygienic behaviour against pests and diseases.

Malabar Tree Toad (Pedostibes tuberculosus)

- An **arboreal toad endemic to the Western Ghats** (family **Bufo**idae), found in moist evergreen and semi-evergreen forests.
- An **indicator** of healthy forest and freshwater ecosystems; threatened by habitat degradation and loss of breeding sites.

15 Black Tigers of Similipal

Similipal's black tigers are getting help [The Hindu](#)

PRELIMS POINTERS

- Not a separate species or subspecies: they are **pseudo-melanistic Royal Bengal Tigers**, whose unusually broad, closely spaced dark stripes dominate the orange background.
- **Similipal Tiger Reserve, Odisha** holds the only known wild population with a high frequency of such tigers, making it important for understanding genetic diversity within tiger populations.



16 Yellow-throated Marten

Kaziranga records first yellow-throated marten [The Hindu](#)

PRELIMS POINTERS

- **Martes flavigula** (kharza) is a colourful **mustelid** with a yellow-orange throat and chest, dark body and elongated form.
- Found across South and Southeast Asia, including the Himalaya and Northeast India. An agile, largely **diurnal** predator that moves both in trees and on the ground.
- **Least Concern (IUCN)**; its first photographic record from Kaziranga, Assam, brought it into the news.



17 Flamingo Revolution

Albania's "Flamingo Revolution" protests against a luxury resort project near coastal wetlands [The Indian Express](#)

PRELIMS POINTERS

- A major civic protest movement in **Albania** in 2026, which began partly in opposition to a proposed luxury resort near environmentally sensitive coastal wetlands, including the **Vjosa-Narta** landscape.
- The **flamingo** became its symbol because these wetlands support important bird populations. The protests later widened into broader civic and political demands.
- **UPSC angle:** Links wetlands, migratory birds, coastal development and environmental activism.

18 Colobus congoensis (Likweli Monkey)

Likweli monkey: New species described in Congo [The Indian Express](#)

PRELIMS POINTERS

- A newly described colobus monkey from the forests of the **Democratic Republic of the Congo**, in the **Lomami National Park** landscape. It is mostly dark with distinctive orange markings around the mouth.
- Formally described in 2026 using morphological, acoustic and genetic evidence; only the **fifth new African monkey species in about 75 years**.

19 Gee's Golden Langur (*Trachypithecus geei*)

Golden langur rescue: Assam trafficking bust, langurs released into wild [The Indian Express](#)

PRELIMS POINTERS

- **Distribution:** Endemic to the India-Bhutan region; in India mainly in **western Assam between the Manas and Sankosh rivers**, and in the Bhutan foothills.
- **Features and ecology:** Golden-yellow/cream coat; social, **arboreal** and **folivorous**, feeding mainly on leaves, fruits and flowers in tropical/subtropical forests.
- **Status: Endangered (IUCN);** Schedule I of the Wild Life (Protection) Act, 1972.
- **Threats:** Habitat loss, forest fragmentation, linear infrastructure and population isolation.



20 Kewra (Fragrant Screw Pine)

Plant yielding the fragrant kewra is older than human civilisation and predates Himalaya formation [PIB](#)

PRELIMS POINTERS

- **Plant:** Kewra/Kewda (family **Pandanaceae**), with long spiny leaves and prop roots; found in tropical Asia and, in India, mainly in coastal Odisha and Andhra Pradesh.
- **2026 discovery:** Fossil Kewra-like leaves from the **Makum Coalfield, Assam** (Tikak Parbat Formation), about **24 million years** old.
- **Significance:** Shows the ancient presence of Pandanaceae in India and supports Northeast India as a **refuge for tropical plant lineages**.
- **Uses:** Fragrant male flowers yield kewra water, oil and attar, used in perfumery and food flavouring.

21 Mugger Crocodile

Kota mugger crocodile deaths: banned pesticide Aldrin found in Chandraloi River [Down To Earth](#)

PRELIMS POINTERS

- The Mugger (Marsh or Broad-snouted Crocodile; family **Crocodylidae**) is one of India's three crocodilians, with the Gharial and Saltwater Crocodile.
- A **freshwater generalist** of rivers, lakes, marshes, reservoirs, ponds and canals, widely distributed across India. It is an opportunistic predator; sandy banks are used for basking, and females dig **hole nests** in the dry season.
- **2026 WII study (Moyar River-Bhavanisagar, Tamil Nadu):** **fish biomass** was a key predictor of habitat use, linking prey availability to human-crocodile conflict with fishers.
- **Status: Vulnerable (IUCN);** Schedule I; CITES Appendix I. Threats include habitat degradation, fishing-related interactions and conflict.



Feature	Mugger	Gharial	Saltwater Crocodile
Scientific name	Crocodylus palustris	Gavialis gangeticus	Crocodylus porosus
Snout	Broad	Very long and narrow	Broad
Habitat	Mainly freshwater	Deep river systems	Estuaries, mangroves, coastal waters
Feeding	Generalist	Primarily fish	Generalist
IUCN	Vulnerable	Critically Endangered	Least Concern
In India	Widespread freshwater habitats	Mainly Ganga tributary systems	East coast; Andaman & Nicobar
CITES	Appendix I	Appendix I	Appendix I

22 Transcaspian Marinka (Schizothorax pelzami)

Arunachal clan launches drive to conserve endangered ray-finned fish, sustain tradition [The Hindu](#)

PRELIMS POINTERS

- A ray-finned fish of the carp and minnow family **Cyprinidae**, locally called **Ngarsing**, adapted to cold, fast-flowing mountain streams.
- In 2026, the **Sangno clan** (Nyishi) of **East Kameng, Arunachal Pradesh**, began a community-led translocation to conserve the fish.
- **UPSC angle:** An example of **community-based conservation of freshwater biodiversity**, beyond charismatic mammals.

23 Sal Heartwood Borer

Madhya Pradesh's Dindori seeks Centre's permission to cut 150,000 sal trees affected by borer infestation [Down To Earth](#)

PRELIMS POINTERS

- **Hoplocerambyx spinicornis** ("Hoplo") is a major insect pest of Sal forests; its principal host is **Shorea robusta**.
- Larvae bore towards the heartwood and seriously damage timber, so large outbreaks have both ecological and economic costs.
- **Remote sensing** and satellite techniques are increasingly used to identify and monitor infested areas.

24 White-bellied Heron (*Ardea insignis*)

Arunachal Pradesh: Dam project could destroy habitat of white-bellied heron, other endemic species [Scroll](#)

PRELIMS POINTERS

- **Status and habitat:** One of the world's rarest herons; **Critically Endangered (IUCN)**. Lives along clear, fast-flowing rivers with undisturbed banks.
- **Diet:** Highly fish-dependent (fish formed **over 95% of its diet** in WII's study landscape).
- **Indian range:** Mainly eastern Arunachal Pradesh: **Lohit, Noa-Dihing, Kamlang and Namdapha** landscapes, where WII runs conservation work.
- **Threats:** Altered river flows, riverine habitat degradation, disturbance, declining fish and development pressure such as dams.



25 New Solitary Bee Species

ATREE researchers discover two new bee species in Arunachal Pradesh [The Hindu](#)

PRELIMS POINTERS

- **New species (2026):** ATREE, Bengaluru, described **Elaphropoda triangulata** (named for triangular abdominal markings) and **Habropoda adi** (named after the Adi community) from the **Siang Valley**; each is so far known from a single male specimen.
- **Colletes bhutanicus** (family **Colletidae**), a rare high-elevation Himalayan bee previously known from Bhutan and China, was reported from **Tawang** in 2026, a significant range extension into India.
- **Solitary vs social bees:** Unlike honey bees (*Apis*), solitary bees do not form colonies; each female builds and provisions her own nest. They remain important pollinators of wild plants and crops.

MAINS POINTERS

Dangers of crossing climate tipping points

- 1 **Irreversible transformation:** Ecosystems can flip to alternative stable states, e.g. Amazon rainforest to a drier, savanna-like system.
- 2 **Self-reinforcing warming:** Positive feedbacks, e.g. permafrost thaw releasing CO₂ and methane.
- 3 **Sea-level rise:** Ice-sheet tipping commits the world to long-term rise, threatening coastal cities, islands and deltas.
- 4 **Water and food insecurity:** Disruption of glaciers, rainfall and monsoons, affecting the Ganga-Brahmaputra basin and rice-wheat production.
- 5 **Biodiversity and livelihood loss:** Coral reefs, fisheries, forests and forest-dependent communities.
- 6 **Cascading socio-economic risks:** Linked tipping points amplify disasters, migration, poverty and losses in vulnerable developing countries.

Way forward

- Rapid GHG emission cuts to limit warming; protect carbon sinks (forests, wetlands, mangroves, oceans).
- Ecosystem-based adaptation, climate-resilient infrastructure, and better early-warning and climate-risk monitoring.

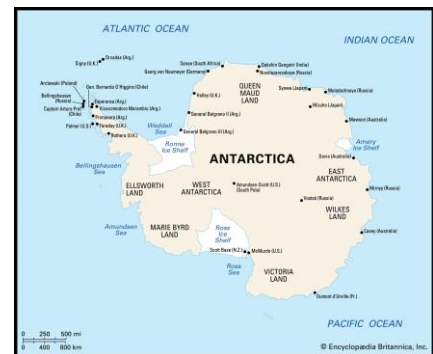
03 Antarctica's Sea-ice Loss

Antarctica's sea-ice collapse finally explained by scientists [The Indian Express](#)

MAINS POINTERS

Causes

- 1 **Ocean warming:** A warmer Southern Ocean melts sea ice from below and delays seasonal freezing.
- 2 **Atmospheric warming:** Fewer freezing days and earlier summer melt.
- 3 **Changing winds:** Shifts in the westerlies and polar winds push ice into warmer waters or away from the coast.
- 4 **Ocean circulation:** Relatively warm **Circumpolar Deep Water** reaches closer to the continental shelf.
- 5 **Climate variability:** El Niño and changing pressure patterns affect ice formation and distribution.



Consequences

- 1 **Amplified warming:** Loss of ice exposes darker ocean, lowering **albedo** and triggering an ice-albedo feedback.
- 2 **Ecosystem disruption:** Sea ice is habitat for **krill**, penguins and seals; poorer krill recruitment ripples up to whales, seals and penguins.
- 3 **Ocean circulation:** Altered salt and freshwater balance can weaken dense-water formation and Southern Ocean circulation.
- 4 **Carbon cycle:** Changes marine productivity, carbon uptake and air-sea gas exchange.

04 Methane Alert and Response System (MARS)

UN methane alert system expanded to coal and waste sectors after Indian landfill named among world's top emitters [Down To Earth](#)

PRELIMS POINTERS

- **What:** A global satellite-based system of **UNEP**, run through its **International Methane Emissions Observatory (IMEO)**. Announced at **COP27 (2022)**; fully operational in 2023-24.
- **How it works:** Uses methane-sensitive satellites, AI and scientific analysis to detect large plumes, trace their sources and estimate size, then alerts governments and companies and tracks mitigation.
- **Why methane:** A short-lived but powerful GHG, far more potent than CO₂ over 20 years. Major sources: oil and gas, coal mines, landfills, livestock and agriculture. Rapid cuts give quick climate benefits.
- **Global Methane Pledge:** MARS supports the pledge to cut global methane emissions by **at least 30% from 2020 levels by 2030**.

05 State and Trends of Carbon Pricing 2026

India among biggest new carbon markets as global carbon pricing covers 29 per cent of emissions [Down To Earth](#)

PRELIMS POINTERS

An annual **World Bank** report tracking carbon taxes, emissions trading systems (ETs) and carbon-crediting mechanisms. The 2026 edition covers data up to 1 April 2026.

Key findings

- **87 carbon-pricing instruments** now in force (7 more than last year), covering **over 29% of global GHG emissions**.
- Revenue exceeded **US\$107 billion** in 2025, about triple the level a decade earlier; average direct price nearly **US\$21 per tonne CO₂e**.
- All large middle-income economies have implemented or are planning direct carbon pricing; **India and Vietnam** are highlighted.
- Carbon-credit issuances rose **8%** between 2024 and 2025, though credit prices dipped slightly in 2025.

06 17th Petersberg Climate Dialogue 2026

17th Petersberg Climate Dialogue attempts to reaffirm multilateral climate action amid geopolitical tensions [Down To Earth](#)

PRELIMS POINTERS

- **When and where:** 21-22 April 2026, **Berlin, Germany**, ahead of **COP31 in Antalya, Türkiye**.
- **Implementation:** Focus on moving from pledges to real-world implementation of the Paris Agreement and strengthening the Global Climate Action Agenda.
- **Climate finance:** Better access for developing countries and the roadmap towards **US\$1.3 trillion a year**.
- **Priorities:** Grid modernisation, electrification, clean energy and methane cuts; adaptation through resilient cities and food security. Relevant to India's concerns on finance, technology transfer and adaptation.

07 Bonn Climate Change Conference 2026

Bonn Climate Conference 2026: What happened on climate finance in week one [Down To Earth](#)

PRELIMS POINTERS

- **When and where: Bonn, Germany, 8-18 June 2026** as the June Climate Meetings (**SB64**: SBSTA 64 and SBI 64); outcomes feed into **COP31/CMA8**.
- **Global Goal on Adaptation**: Talks under the **Baku Adaptation Road Map**, with adaptation finance a key demand of developing countries.
- **Global Stocktake**: Dialogue on turning the outcomes of the first GST into concrete action.
- **Technology, agriculture and markets**: Role of the **Climate Technology Centre and Network (CTCN)**; climate-resilient agriculture and food security; implementation of **Article 6** (carbon markets).
- **Science**: Climate risks, scenarios, transformation pathways, tipping points and sustained observations.

08 Climate Finance in India

Funding India's climate future: The trillion-dollar question [The Hindu](#)

PRELIMS POINTERS

Major instruments

- **Sovereign Green Bonds (framework 2022)**: Fund public projects in renewable energy, clean transport, energy efficiency, water and waste management, and adaptation.
- **RBI Green Deposit Framework**: Banks and deposit-taking NBFCs raise deposits for eligible green projects, with third-party verification and impact assessment to curb **greenwashing**.
- **Climate Finance Taxonomy**: Being developed by the **Department of Economic Affairs (DEA)** to classify climate-aligned activities and steer private capital; draft circulated for comments.
- **Carbon finance**: India is building its **Carbon Credit Trading Scheme (CCTS)**; **Prakriti 2026** focused on unlocking carbon finance for NDC implementation.

MAINS POINTERS

Challenges

- 1 **Financing gap**: Flows remain far below the needs of India's NDC and net-zero transition.
- 2 **High cost of capital** for renewables, storage and emerging technologies.
- 3 **Adaptation deficit**: Private capital prefers revenue-generating mitigation projects.
- 4 **Limited international finance**: Climate finance remains largely domestic.
- 5 **Greenwashing risk** from weak definitions and ESG data.
- 6 **Uneven access** for small firms, municipalities and vulnerable regions.

Way forward

Deepen domestic green finance, operationalise the taxonomy, expand green bonds and **blended finance**, strengthen carbon markets and climate-risk disclosure, and attract more concessional international and private capital, while channelling more funds to **adaptation and vulnerable communities**.

09 India's Growing Cooling Demand

India's challenge: Sustainable cooling amid extreme heat [The Indian Express](#)

MAINS POINTERS

Why is demand rising?

- **Heatwaves:** Higher day and night temperatures increase AC use and cooling hours.
- **Urbanisation:** Concrete and loss of vegetation intensify the **Urban Heat Island (UHI)** effect.
- **Incomes and AC penetration:** AC sales rose from **8.4 million (2021-22) to 10.9 million (2023-24)**; building stock is also expanding fast.

Measures

- 1 **Efficient appliances:** Stronger BEE star ratings; super-efficient ACs, fans and heat pumps.
- 2 **Passive cooling** through building codes: ventilation, shading, insulation, reflective surfaces.
- 3 **Cool roofs and urban greening**, e.g. Telangana Cool Roofs Programme; urban forests and street trees.
- 4 **District cooling** with renewables and **thermal energy storage** to cut peak demand.
- 5 **Low-GWP refrigerants** under the **Kigali Amendment**.
- 6 **Demand-side management:** Time-of-day tariffs, smart thermostats, automated demand response.

10 WMO Climate Update (2026-2030)

Global temperatures likely to hit near-record highs over next five years: report [DD News](#)

PRELIMS POINTERS

The **World Meteorological Organization (WMO)** released its **Global Annual to Decadal Climate Update** on 28 May 2026, produced by the **UK Met Office** from multiple prediction centres.

Key findings

- Global mean temperature in 2026-2030 is projected at **1.3-1.9°C above the 1850-1900 baseline**.
- **86% chance** that at least one year will beat **2024**, the warmest year on record at the time.
- **91%** probability that at least one year temporarily exceeds **1.5°C**; **75%** probability that the five-year average does. The chance of any year exceeding **2°C** stays below 1%.
- **Arctic amplification:** The Arctic will warm much faster than the global average.
- **El Niño** tendency, especially in 2027-28, may temporarily boost temperatures.

11 Aerosol Diversity and Climate Change

PIB release on aerosol diversity and its climate impacts [PIB](#)

PRELIMS POINTERS

- **Aerosols** are tiny solid particles or liquid droplets suspended in the atmosphere that influence climate, air quality, clouds, rainfall and visibility.
- **Sources:** Natural (volcanic ash, desert dust, sea salt, pollen, biological particles) and anthropogenic (vehicles, coal, industry, biomass/crop-residue burning, construction).
- **Black carbon** absorbs sunlight (warming); when deposited on snow and ice it lowers albedo and speeds glacier melt.

- **Sulphate aerosols** mainly scatter sunlight (cooling). **Dust** can warm or cool depending on composition, size and surface properties.
- Aerosols act as **Cloud Condensation Nuclei (CCN)**, shaping cloud formation, droplet size and precipitation.

12 Marine Cloud Brightening (MCB)

Seeding clouds with seawater could change Earth's weather and prevent a super El Niño: study [Down To Earth](#)

PRELIMS POINTERS

- **MCB** is a proposed **solar-geoengineering** technique: fine sea-salt particles are sprayed into the marine atmosphere to increase cloud droplets and make low marine clouds more reflective, temporarily cooling the Earth.
- **Solar Radiation Modification (SRM)** covers techniques that reflect part of incoming sunlight or raise Earth's reflectivity. It **does not remove greenhouse gases**.

Major SRM methods

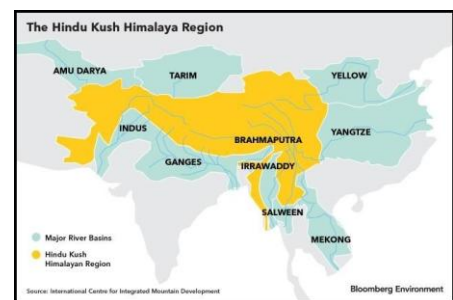
Method	Basic idea	Target
Stratospheric Aerosol Injection (SAI)	Inject reflective aerosols such as sulphates to scatter sunlight	Stratosphere
Marine Cloud Brightening (MCB)	Spray sea-salt particles to brighten low marine clouds	Marine boundary layer
Cirrus Cloud Thinning (CCT)	Thin high cirrus clouds so more outgoing infrared escapes to space	Upper troposphere
Surface Albedo Modification	Cool roofs and reflective urban surfaces	Land surface
Space-based reflectors	Reflective structures or particles in space	Outer space

13 Hindu Kush Himalaya (HKH) Region

Enhanced flash-flood risks in Hindu Kush Himalaya due to erratic monsoon and high temperatures: ICIMOD [Down To Earth](#)

PRELIMS POINTERS

- **Eight member countries:** Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan.
- Called the "**Third Pole**" for its vast snow and ice outside the polar regions; source of **10 major Asian river systems**. Its cryosphere includes glaciers, seasonal snow and permafrost.
- **ICIMOD** (International Centre for Integrated Mountain Development) is based in **Kathmandu, Nepal**.
- **ICIMOD 2026 assessment:** About **12% decline in glacier area (1990-2020)**; glacier ice-loss rates have roughly **doubled since 2000**.



SECTION 3

Environmental Governance & Sustainability Reporting

01 Atacama Desert

Light pollution threatens world's darkest skies in the Atacama [The Hindu](#)

PRELIMS POINTERS

- Located mainly in **northern Chile** along the Pacific coast; one of the **driest non-polar deserts**.
- **Causes of aridity:** The cold **Humboldt Current**, the subtropical high-pressure belt and the **rain-shadow of the Andes**.
- **Camanchaca:** Coastal fog that supplies moisture to plants and insects. **Desierto Florido:** Rare rains trigger mass flowering from dormant seeds and bulbs.
- **Resources:** Rich in **copper and lithium**, vital for EV batteries and the energy transition, though mining strains scarce water.



02 Ru-Soam Bridges

UNESCO, Sikkim govt partner to document Ru-Soam engineering practices [The New Indian Express](#)

PRELIMS POINTERS

- Traditional cane **suspension footbridges** of the **Lepcha** community of Sikkim, especially in the **Khangchendzonga Biosphere Reserve**; UNESCO and the Sikkim government are documenting them (2026).
- Built from local bamboo, cane and wood. **Soamgyang** = main parallel cane supports; **ahool** = swinging cane loops; **soamgur** = bamboo deck. Spans can reach about 100 m.
- Lightweight and flexible, they suit the earthquake-prone Himalaya, showing how indigenous engineering supports **disaster resilience and climate adaptation**.

03 Legal Personhood for Nature

India's hill stations need legal personhood [Hindustan Times](#)

PRELIMS POINTERS

- **Meaning:** Recognising rivers, forests, lakes and ecosystems as legal persons with enforceable rights, a shift from **anthropocentric to ecocentric** protection.
- **India:** Uttarakhand HC (2017) declared the **Ganga and Yamuna** juristic persons; the Supreme Court stayed the order. In 2026, the **Madras HC** recognised the **Thamirabarani River** as a juristic person with a limited right not to be polluted.
- **Global:** **Whanganui River**, New Zealand (Te Awa Tupua Act, 2017); **Ecuador** recognises rights of nature in its Constitution.

04 Access and Benefit Sharing (ABS) Framework

'Access and Benefit Sharing' Framework in India [PIB](#)

PRELIMS POINTERS

- **ABS** ensures that benefits from using biological resources and associated traditional knowledge are shared fairly with communities. It is the **third objective of the CBD** and guards against **biopiracy**.
- **India:** Governed by the **Biological Diversity Act, 2002 (amended 2023)** and Rules, 2004, through a three-tier structure: **National Biodiversity Authority**, State Biodiversity Boards and **Biodiversity Management Committees (BMCs)**.
- BMCs prepare **People's Biodiversity Registers (PBRs)** documenting local resources and knowledge. Benefits may be monetary (royalties) or non-monetary (technology transfer, capacity building, research collaboration).
- **Nagoya Protocol (2010)** under the CBD provides the international ABS framework; **India is a Party**.

05 Amendment to EIA Notification, 2006

The Centre's restructuring of India's environmental clearance procedure raises a big question over expertise [Down To Earth](#)

PRELIMS POINTERS

- The **EIA Notification, 2006**, issued under the **Environment (Protection) Act, 1986**, governs prior **Environmental Clearance (EC)** through screening, scoping, public consultation and appraisal.
- **July 2026 amendment (MoEFCC):** Ensures continuity when a State **SEIAA** or **SEAC** becomes non-functional. Their tenure is extended from **3 to 4 years**, and States must start reconstitution **six months** before expiry.
- The Centre can constitute a **State-level Alternative EIA Authority (SAEIAA)** to temporarily perform SEIAA functions and avoid appraisal delays.

MAINS POINTERS

Benefits of EIA

- 1 **Preventive governance:** Identifies risks and mitigation before a project starts.
- 2 **Sustainable development:** Builds environmental concerns into economic and infrastructure planning.
- 3 **Biodiversity protection:** Assesses impacts on forests, wildlife, water and ecological processes.
- 4 **Public participation:** Gives affected communities a formal voice.
- 5 **Better project design and accountability:** Encourages cleaner technology and sets enforceable clearance conditions.

Issues

- 1 **Poor-quality studies:** Weak baseline data and limited fieldwork.
- 2 **Conflict of interest:** Consultants are paid by project proponents.
- 3 **No cumulative assessment** of multiple projects in one landscape.
- 4 **Limited participation** due to technical documents, language and procedural barriers.
- 5 **Weak post-clearance monitoring** from limited staff and enforcement.
- 6 **Pressure for faster clearances** dilutes the precautionary principle.

Way forward

- Independent, scientifically rigorous EIA bodies; **cumulative and strategic environmental assessment**; transparent baseline data.
- More accessible public consultation and stronger post-clearance monitoring and enforcement.

06 Sustainable Development Report 2026

India climbs to its highest-ever rank in the 2026 UN SDG Index, but hunger remains a major challenge [Down To Earth](#)

PRELIMS POINTERS

- The **11th edition** of the annual report of the **Sustainable Development Solutions Network (SDSN)**, released in June 2026, assessing all **193 UN Member States** on the **17 SDGs** using **123 indicators**.
- Global progress is badly off track: only about **16% of SDG targets** are projected to be met by 2030.
- **India ranks 94th (score 68.33)**, its highest ever, improving 18 places; China improved 14 places. East and South Asia have made the strongest progress since 2015.
- **New features:** An Index of Countries' Support for UN-based Multilateralism (**UN-Mi**) and surveys of experts and the public on SDG efforts and post-2030 priorities.

SECTION 4

Forests, Wetlands & Land

01 Nicobarese Oppose Proposed Wildlife Sanctuaries

Nicobarese oppose proposal for three wildlife sanctuaries [The Hindu](#)

PRELIMS POINTERS

- The **Nicobarese Tribal Council** opposes three sanctuaries: **Leatherback Turtle Sanctuary** (Little Nicobar), **Megapode Sanctuary** (Menchal Island) and **Coral Sanctuary** (Meroe Island).
- They were notified in 2022 as **compensatory conservation measures** for the **Great Nicobar development project**, which may affect leatherback nesting beaches, coral reefs and other biodiversity.
- The community cites inadequate consultation and threats to customary rights, plantations, cultural practices and community-managed resources, raising the need to implement the **Forest Rights Act, 2006** (community and habitat rights).
- The islands host endemic species such as the **Nicobar megapode**, along with coral reefs, mangroves and leatherback nesting sites.

Tribes of Andaman & Nicobar

Tribe	Main location	Facts
Great Andamanese	Strait Island	Andaman group; PVTG
Jarawa	South & Middle Andaman	PVTG; hunter-gatherers
Onge	Little Andaman	PVTG
Sentinelese	North Sentinel Island	PVTG; highly isolated
Nicobarese	Nicobar Islands, especially Car Nicobar	Agriculture, fishing; not a PVTG
Shompen	Great Nicobar	PVTG; semi-nomadic forest community

02 Agasthyamala Biosphere Reserve

Supreme Court orders sweeping clean-up of Agasthyamalai landscape [Hindustan Times](#)

PRELIMS POINTERS

- In the **southern Western Ghats** across **Kerala and Tamil Nadu**; added to UNESCO's **World Network of Biosphere Reserves (MAB)** in 2016.
- About **3,500 sq km** of tropical forest with peaks up to 1,868 m. Around **2,254 species of higher plants**, about **405 endemic**; a genetic reservoir for crops such as cardamom, pepper, nutmeg, jamun and plantain.
- Includes **Shendurney, Peppara and Neyyar** Wildlife Sanctuaries and the **Kalakad-Mundanthurai Tiger Reserve**, with evergreen forests, grasslands and **Myristica swamps**.
- Home to the **Kani** tribe, integrating conservation, traditional knowledge and livelihoods.

03 Bhimgad Wildlife Sanctuary

State govt issues rules to regulate development work around Bhimgad Wildlife Sanctuary [The Hindu](#)

PRELIMS POINTERS

- In **Khanapur taluk, Belagavi district, Karnataka**, near the Goa border in the northern Western Ghats; about **190 sq km**.
- **Barapede Caves** are the only known roosting and breeding site in India of **Wroughton's free-tailed bat** (*Otomops wroughtoni*), a critically endangered endemic bat.
- A key **wildlife corridor** linking Dandeli WLS, Kali Tiger Reserve and Goa's protected areas.
- Lies in the **Mahadayi River** catchment, with evergreen and semi-evergreen forests, limestone caves and rich medicinal and endemic flora.

04 Surha Tal: India's 100th Ramsar Site

Surha Tal (Jai Prakash Narayan Bird Sanctuary) designated India's 100th Ramsar Site on World Environment Day, 5 June 2026 [PIB](#)

PRELIMS POINTERS

- **Surha Tal** (Jai Prakash Narayan Bird Sanctuary) in **Ballia district, Uttar Pradesh** became **India's 100th Ramsar Site** and **UP's 13th**.
- A natural freshwater **oxbow lake** formed from an old meander of the **Ganga**, in the middle Ganga basin.
- Surrounded by floodplains, marshes, seasonally inundated land and paddy fields, it is an important habitat for **migratory and resident waterbirds** and aquatic biodiversity.

05 Mesalina bishnoi

New lizard species found in Raj; Mesalina's first record in India [The Times of India](#)

PRELIMS POINTERS

- A new small desert lizard (family **Lacertidae**) found near **Gajner, Bikaner district, Rajasthan**, described in 2026 by researchers including the **Zoological Survey of India**.
- It is the **first specimen-based record of the genus Mesalina in India**, found on hard, rocky soil with sparse vegetation, highlighting the specialised biodiversity of the **Thar Desert**.

06 Nemawashi

Japan does not cut down centuries-old trees for development; instead experts spend months preparing their roots and relocating them [The Times of India](#)

PRELIMS POINTERS

- A Japanese term literally meaning **preparing the roots of a tree before transplanting**; also a consensus-building practice of consulting stakeholders informally before a formal decision.
- In environmental governance it stands for **early, participatory consultation** with communities, experts and authorities, improving acceptance, transparency and implementation of decisions.

07 Recovery of Mangrove Forests

Mangrove forests showing remarkable recovery worldwide, study finds [Down To Earth](#)

PRELIMS POINTERS

- **Salt-tolerant** trees and shrubs of intertidal zones (estuaries, deltas, lagoons, tidal creeks), adapted to salinity, waterlogging and low-oxygen soils.
- **Adaptations: Pneumatophores** for gas exchange, **prop roots** for stability, and **vivipary** (seeds germinate while attached to the parent plant).

MAINS POINTERS

Benefits

- 1 **Coastal protection and disaster-risk reduction:** Dampen waves, storm surges, cyclones and erosion as nature-based solutions.
- 2 **Blue carbon:** Store large amounts of carbon in biomass and waterlogged sediments.
- 3 **Biodiversity:** Breeding, nursery and feeding grounds for fish, crustaceans and birds.
- 4 **Livelihoods:** Fisheries, honey, ecotourism and other ecosystem-based incomes.
- 5 **Water quality:** Trap sediments and absorb nutrients and pollutants.

Issues

- 1 **Coastal development:** Ports, industry, tourism and roads cause loss and fragmentation.
- 2 **Aquaculture:** Conversion for shrimp farms alters coastal hydrology.
- 3 **Pollution:** Plastics, sewage, effluents, oil and farm runoff.
- 4 **Altered freshwater flow:** Dams and diversions change salinity and sediment supply.
- 5 **Climate change:** Sea-level rise, heat, rainfall shifts and extreme events.
- 6 **Overexploitation and weak governance:** Fuelwood extraction, fragmented institutions and poor monitoring.

Way forward

- Restoration based on **natural hydrology**, not plantation alone; protect tidal flows, sediment and freshwater regimes.
- Integrate mangroves into **Integrated Coastal Zone Management (ICZM)**; community-led conservation with livelihoods; remote sensing and GIS monitoring.

08 Borjuli Wetland

Assam's Borjuli Wetland notified as Biodiversity Heritage Site for wild rice conservation [DD News](#)

PRELIMS POINTERS

- A tiny (about **0.41 ha**) freshwater marshy wetland in **Sonitpur district, Assam**, in the **Brahmaputra floodplain**.
- Notified as a **Biodiversity Heritage Site (BHS)** under the **Biological Diversity Act, 2002** to conserve wild rice **Oryza rufipogon**, the wild progenitor of cultivated rice (*Oryza sativa*).
- *O. rufipogon* resists pests and diseases and tolerates flooding and salinity, making it valuable for breeding **climate-resilient rice**.
- Follows an **in-situ wild rice conservation project** (since 2022) by **ICAR-NBPGR** with the Assam State Biodiversity Board, funded by the National Rainfed Area Authority.

09 Nameri Tiger Reserve

Tiger population in Assam's Nameri reserve rises fourfold since 2022 [The Telegraph](#)

PRELIMS POINTERS

- **Sonitpur district, Assam**, along the Arunachal foothills; declared a Tiger Reserve in **2000**, with **Nameri National Park** as its core.
- It is contiguous with **Pakke Tiger Reserve** (Arunachal Pradesh), forming a key corridor in the Eastern Himalayan foothills.
- Drained by the **Jia-Bhoroli River**; tropical evergreen, semi-evergreen and moist deciduous forests with riverine grasslands, bamboo and cane.
- Known for the endangered **White-winged Wood Duck**; also tiger, elephant, gaur, clouded leopard, dhole and capped langur.

SECTION 5

Pollution & Waste Management

01 India's Circular Economy Transition

India's Circular Economy Transition [PIB](#)

PRELIMS POINTERS

- **Concept:** Moving from "take-make-use-dispose" to **reduce, reuse, repair, refurbish, remanufacture and recycle**, keeping resources in use longer.
- **Policy push:** NITI Aayog's **Circular Economy Cell (2022)** and 10 sectoral action plans (e-waste, batteries, end-of-life vehicles and others). In 2026 NITI Aayog released studies on end-of-life vehicles, waste tyres, e-waste and lithium-ion batteries.
- **Extended Producer Responsibility (EPR)** makes producers responsible for collecting and recycling their products.
- **Benefits:** Recovers **critical minerals** (lithium, cobalt, nickel) and cuts import dependence; eases landfill pressure; creates green jobs; lowers material and energy demand in support of **Net Zero 2070**.

02 Solid Waste Management Rules, 2026

Federalism in the bin: Why India's waste crisis cannot be solved by central decree [The Hindu](#)

PRELIMS POINTERS

- **Notified** by MoEFCC on **27 January 2026** under the EPA, 1986, replacing the 2016 Rules; effective **1 April 2026**.
- **Four-stream segregation** at source: **wet, dry, sanitary and special-care** waste. Coverage extended to **rural local bodies** and more establishments.
- **Bulk waste generators:** 20,000 sq m floor area, or 40,000 L/day water use, or 100 kg/day waste.
- **Processing:** Material Recovery Facilities, recycling and RDF; legacy dumpsites to be mapped, biomined and bioremediated, with landfills only for residual waste.
- **Accountability:** Digital monitoring, **Polluter Pays Principle** and environmental compensation.

MAINS POINTERS

Issues in solid waste management

- 1 **Poor source segregation** reduces recycling and treatment efficiency.
- 2 **Inadequate processing capacity** for composting, recycling, waste-to-energy and MRFs.
- 3 **Open dumping:** Leachate, groundwater contamination, methane, odour and health risks.
- 4 **Weak collection and transport** leading to littering.
- 5 **Low resource recovery** and dependence on informal waste pickers.
- 6 **Legacy waste** in old dumpsites is a large financial and administrative burden.
- 7 **Governance gaps:** Weak ULB capacity, fragmented roles, poor enforcement and data.
- 8 **Behaviour:** Low awareness and littering.

Measures

- Strict four-stream segregation; decentralised **composting and biomethanation**; more MRFs and recycling.
- Circular economy and EPR; scientific landfill and legacy-waste management; stronger ULBs with finance, technology and trained staff.

03 Swachh Sagar, Surakshit Sagar Campaign

Science & Technology Minister Jitendra Singh reviews preparations for Swachh Sagar, Surakshit Sagar campaign
[News On AIR](#)

PRELIMS POINTERS

- Launched in **2022** by the **Ministry of Earth Sciences** to tackle marine litter, plastic pollution and coastal degradation through citizen participation.
- Began as a 75-day campaign; now an annual movement around **International Coastal Cleanup Day** (third Saturday of September).
- **SSSS 5.0 (12-19 September 2026)**: Clean-ups at 100+ locations, ocean pledges, human chains and rallies, plus a new **National Ocean Olympiad** for students.
- Built on **Jan Bhagidari**, uniting communities, students, NGOs, government agencies and scientific institutions.

04 Istanbul Platform: Zero Waste Package for Climate Action

Why does the Global Zero Waste Forum matter for India's waste management? [Down To Earth](#)

PRELIMS POINTERS

- Launched in **June 2026** at the **Global Zero Waste Forum, Istanbul**, to strengthen zero-waste and circular-economy action within the Global Climate Action Agenda ahead of **COP31 (Antalya)**.
- Brings together governments, cities, businesses, financiers, civil society and youth, shifting focus from waste management to **waste prevention and resource efficiency**.
- Emphasises **waste-sector methane reduction**, mitigation and adaptation, finance, policy integration and just transitions.

05 Biochar

Biochar offers way to turn India's farm smoke into 'black gold' [The Hindu](#)

PRELIMS POINTERS

- A carbon-rich material made by **pyrolysis** of plant or animal biomass in **low-oxygen** conditions; unlike ordinary charcoal, it is meant for soil and environmental use.
- Improves **soil structure, water-holding capacity and nutrient retention**, and its pores host beneficial microbes.
- Its stable carbon resists decomposition, enabling long-term **carbon sequestration** in soil; it also offers an alternative to **crop-residue burning**.

06 Mercury in Cosmetics

Maharashtra FDA flags skin-lightening creams with mercury, lead [The Indian Express](#)

PRELIMS POINTERS

- Found in some **skin-lightening creams and soaps**, where mercury inhibits melanin production; prolonged skin contact causes toxic exposure.
- **Health impacts:** Kidney damage; rashes, discolouration and scarring; neurological effects (memory loss, tremors, neuropathy); digestive and immune harm; risks to the foetus.
- **Environment:** Washed-off mercury enters wastewater, soil and water, persists and **bioaccumulates** in aquatic food chains.
- **Minamata Convention** restricts manufacture, import and export of cosmetics with **more than 1 ppm mercury**. In 2026, **WHO** released a behavioural-insights toolkit to help countries eliminate such products.

07 Freshwater Browning

Freshwater browning explained: Why lakes are turning brown and fish populations are declining [The Times of India](#)

PRELIMS POINTERS

- Darkening of lakes, rivers and streams due to rising **dissolved organic matter (DOM)**, especially **dissolved organic carbon (DOC)** leached from soils, wetlands and vegetation.
- **Causes:** Heavier rainfall and runoff, erosion, wetland drainage, land-use change and climate variability; in some regions, **declining acid deposition**.
- **Impacts:** Reduced light penetration alters photosynthesis, phytoplankton and food webs, lowering aquatic plant productivity and fish populations.

SECTION 6

Renewable Energy & Clean Fuels

01 India's First Port-based Green Methanol Plant

India's first green methanol plant to turn Kutch's most invasive weed into marine fuel [The Hindu](#)

PRELIMS POINTERS

- Being set up at **Deendayal Port Authority (Kandla)**, Gujarat, by **Thermax and Ankur Scientific**, with a capacity of **18,000 tonnes a year**.
- Feedstock is **Ganda Baval (mesquite)**, an invasive weed; **biomass gasification** followed by methanol synthesis converts it into a low-emission marine fuel.

MAINS POINTERS

Benefits

- 1 **Decarbonises shipping** with a lower-carbon marine fuel.
- 2 **Circular economy**: Turns invasive or waste biomass into a value-added fuel.
- 3 **Energy security**: Diversifies the clean-fuel mix and cuts fossil-fuel dependence.
- 4 **Green ports and jobs**: Builds bunkering infrastructure and biomass-based employment.

Challenges

- 1 **Feedstock**: Reliable, sustainable biomass supply, collection and transport.
- 2 **Cost**: Green methanol is costlier than conventional methanol.
- 3 **Technology**: Gasification and synthesis need advanced infrastructure.
- 4 **Bunkering gap**: Limited methanol refuelling for ships.
- 5 **Sustainability**: Excessive biomass extraction may harm ecosystems and competing uses.

02 Floating Solar Potential in India

India's reservoirs can host 102 GW of floating solar, says first national assessment [The Hindu](#)

PRELIMS POINTERS

- **Floating Solar PV (FSPV)** places panels on floating platforms over reservoirs and lakes, generating power without large land parcels. **MNRE** released a dedicated **Floating Solar Potential Map** in 2026.
- **Potential**: The first national assessment puts reservoir potential at about **102 GW**, especially at dams and hydropower projects.
- **Benefits**: Saves land, **reduces evaporation**, improves panel efficiency through water cooling and can use existing hydropower **transmission** lines.

03 India's First Geothermal Project in Ladakh

Ladakh gets clean energy boost as ONGC geothermal project pact extended [Business Standard](#)

PRELIMS POINTERS

- **Puga Valley, Ladakh** (over 14,000 ft, in the Himalayan geothermal belt) is being developed by the **ONGC Energy Centre** for India's first geothermal power project.

- **July 2026:** Two **1,000-metre-deep wells** were commissioned, paving the way for a **1 MW demonstration plant**.
- Geothermal energy uses the Earth's internal heat for electricity or direct heating and, unlike solar and wind, can supply **round-the-clock** power.

MAINS POINTERS

Benefits

- 1 **24x7 low-carbon power**, supporting Net Zero 2070 and energy security.
- 2 **Remote areas:** Decentralised power for high-altitude regions like Ladakh.
- 3 **Multiple uses:** Heating, agriculture, aquaculture and cooling, with a small land footprint.

Issues

- 1 **High exploration and drilling costs** and **geological uncertainty** about reservoirs.
- 2 **Harsh terrain** complicates construction and maintenance.
- 3 **Limited domestic experience** in commercial geothermal power.
- 4 **Geothermal fluids** carry minerals and gases needing careful handling; resources are **site-specific**.

Way forward

- Implement the **National Policy on Geothermal Energy, 2025**; expand geological mapping; R&D in Enhanced/Advanced Geothermal Systems (EGS/AGS).
- Indigenous drilling technology, financial risk-sharing, hybrid geothermal-solar projects, direct-use applications and strong environmental safeguards.

04 India's Wind Energy Sector

Charting India's path to 100 GW of wind and beyond [PIB](#)

MAINS POINTERS

Issues

- 1 **Land and site constraints:** Good sites are concentrated; land and clearances delay projects.
- 2 **Grid constraints:** Weak transmission and evacuation in wind-rich regions.
- 3 **Intermittency** complicates grid balancing.
- 4 **Slow repowering:** Old low-capacity turbines occupy prime sites.
- 5 **Offshore wind:** High capital cost, harsh marine conditions, limited port infrastructure.
- 6 **Environmental and social concerns:** Land-use conflicts; impacts on birds and bats.
- 7 **Technology dependence** for advanced turbines and components.

Way forward

- 1 Accelerate **repowering** with modern high-capacity turbines.
- 2 Strengthen transmission in renewable-energy zones; better forecasting and storage.
- 3 Promote **wind-solar hybrids**.
- 4 Develop offshore wind through **viability-gap funding**, surveys and port infrastructure.
- 5 Support domestic manufacturing through **ALMM-Wind** and indigenous R&D.

05 Abhilasha Biofuel (ABF)

DBT-DST supports Greenjoules, Pune, to commercialise indigenous second-generation diesel-equivalent biofuel [PIB](#)

PRELIMS POINTERS

- An indigenous **second-generation (2G)** renewable diesel and naphtha alternative developed by **Greenjoules Pvt. Ltd., Pune**, from agricultural residues and agro-industrial waste.
- **Technology:** Thermo-chemical conversion: thermal cracking, catalytic upgrading and refining of biomass into liquid fuel.
- **Drop-in fuel:** Directly replaces diesel with no changes to engines, fuel systems or distribution.
- **Benefits:** Waste-to-energy, lower fossil-fuel dependence and lifecycle emissions, and less **open burning of crop residue**.

06 E85 Fuel and Flex-Fuel Vehicles

E85 rollout begins at 48 public-sector OMC outlets; India's first flex-fuel passenger vehicle launched [PIB \(E85\)](#) · [PIB \(Flex-fuel vehicles\)](#)

PRELIMS POINTERS

- **E85:** About **80-85% ethanol** and 14-19% petrol, meant only for **Flex-Fuel Vehicles (FFVs)**. Launched nationally in **June 2026** at 48 public-sector OMC outlets, with expansion proposed through dedicated outlets.
- **FFVs** can run on any ethanol-petrol blend from **E20 to E100**, using modified fuel systems, engine parts and electronic controls that adjust to ethanol content. India's first flex-fuel passenger vehicle was launched in June 2026.
- **Performance:** Ethanol's high octane (RON ~108) gives better knock resistance, allowing higher compression ratios.
- **Benefits:** Lower oil imports, support for domestic ethanol and farmers, and lifecycle GHG cuts of around **61%** versus petrol.
- **Key distinction:** E85 is not for ordinary petrol vehicles, and it does **not** raise the national blending mandate beyond **E20**.

07 India's First Indigenous Hydrogen Train

Greener and more energy efficient: First indigenous hydrogen train all set to start [PIB](#)

PRELIMS POINTERS

- Developed by **Indian Railways** with design approval by **RDSO**; flagged off on **17 July 2026** on the **Jind-Sonipat** section (Northern Railway, Haryana).
- **Technology:** Hydrogen and oxygen react in a **Proton Exchange Membrane (PEM) fuel cell** to produce electricity, with only water vapour and heat as by-products.
- **Features:** 10 coaches (two hydrogen driving power cars, eight passenger coaches), **2,400 kW**, operating speed **75 kmph**.

MAINS POINTERS**Benefits**

- 1 **Zero tailpipe emissions** and lower diesel use on **non-electrified routes**, without full overhead electrification.
- 2 Advances **green mobility**, energy diversification and Net Zero 2070.
- 3 Builds **indigenous capability** in fuel cells, hydrogen storage and rail engineering.

Issues

- 1 **High cost** of fuel cells, storage and refuelling infrastructure.
- 2 **Climate benefit depends on green hydrogen**, not fossil-based hydrogen.
- 3 **Safety**: Highly flammable gas needing high-pressure storage.
- 4 **Immature technology** with limited operational experience.
- 5 **Efficiency losses** in the electricity-hydrogen-electricity chain versus direct electric traction.

08 Smart Algal Liquid Tree (SALT)

What is SALT, India's first mobile 'liquid tree' to fight pollution? [Business Standard](#)

PRELIMS POINTERS

- An air-purification system developed by **CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad**, for dense areas where planting trees is difficult.
- **Working: Microalgae** in water absorb CO₂ and release oxygen through photosynthesis as polluted air is passed through.
- **Unique feature**: Unlike other "liquid trees", SALT is **mobile** and runs on solar power or electricity, with artificial lighting when sunlight is unavailable.
- **Deployment**: Transport hubs, industrial areas, parks and campuses; first units at CSIR-CIMFR, Dhanbad and **Northern Coalfields Limited, Singrauli**.



GALLANT IAS ACADEMY
TRIVANDRUM

