DAILY CURRENT AFFAIRS 03-04-2026

Mapping Perspective

1. **Spain**

Prelims Perspective

2. **Bio-Bitumen**
3. **Himalayan Tahr**

Mains Perspective

4. **Artemis II**
5. **Nagoya Protocol**

Spain

Syllabus: GS-1: World Geography – Mapping.

Context:

- Recently, Spain has **closed its airspace to American aircraft involved in military operations against Iran** → reflects **strategic autonomy, geopolitical positioning, and European security sensitivities**

About Spain

Location & Boundaries

- Located on the **Iberian Peninsula in southwestern Europe**
- Shares borders with:
  - Portugal (west)
  - France and Andorra (northeast)
  - British Overseas Territory of Gibraltar (south)

Maritime Boundaries

- Bounded by:
    - Mediterranean Sea (southeast and east)
    - Bay of Biscay (north)
    - Atlantic Ocean (northwest and southwest)

Capital City

- Madrid

Geographical Features of Spain

Relief & Physiography

- **Mountain ranges**: Pyrenees Mountains form a **natural barrier between Spain and France**
- **Plateaus**: Meseta Central – **vast interior plateau dominating central Spain**

Drainage System

- Major rivers:
    - **Ebro River** – flows into the Mediterranean
    - **Tagus River** – shared with Portugal

Climatic/Unique Features

- **Tabernas Desert (Andalusia)** – only true desert in mainland Europe

Natural Resources

- Includes: **copper, fluorspar, gypsum, iron ore, kaolin, lead, magnesite, mercury, pyrites, sepiolite, tungsten, uranium, zinc**

Relevance

- **Geography**: Iberian Peninsula, Meseta, Pyrenees → map-based prelims + mains enrichment
- **International Relations**: Airspace closure → **Europe–US relations, West Asia conflict spillover**
- **Economic Geography**: Mineral resources → industrial base and trade

Prelims Pointer

- Tabernas Desert in Spain is the only true desert in mainland Europe.

Bio-Bitumen

Syllabus: GS-3: Sustainable Infrastructure.

Context:

- Recently, the **Council of Scientific and Industrial Research (CSIR)** organised a Technology Transfer Event in New Delhi
- Technology showcased: **"Bio-Bitumen from Lignocellulosic Biomass – From Farm Residue to Roads"**
- Objective: **Large-scale industry adoption** of sustainable road construction material

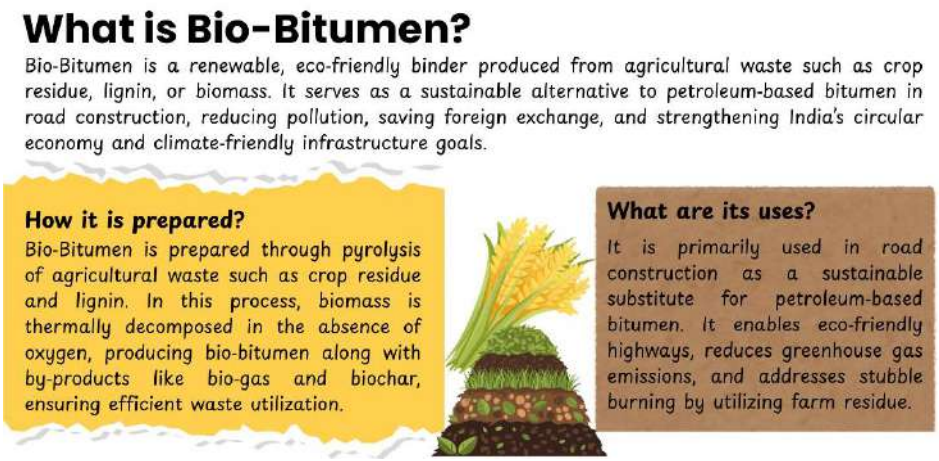
About Bio-Bitumen

- **Definition:**
  - It is made using **non-petroleum-based renewable resources**
  - Can be derived from **vegetable oils, synthetic polymers, or both**
- **Materials Used:**
  - Renewable organic materials such as **plant-based oils, agricultural waste, or biomass**
- **Production Process:**
  - These materials undergo a **special processing method** to create a high-quality binder
  - Binder is **similar to traditional bitumen**
- **Nature:**
  - It is an **alternative to petroleum-based bitumen**
  - Helps in **lowering carbon emissions and import dependency**
  - Production involves **multiple steps depending on source material**

Advantages of Bio-Bitumen

- **Sustainability:**
  - Generated from **renewable materials**, making it environmentally friendly compared to petroleum-based bitumen
- **Low Carbon Footprint:**
  - Derived from organic materials that **absorb carbon dioxide during growth**, leading to lower environmental impact

- **Improved Environmental Performance:**
  - **Less toxic and less detrimental** to environment than regular bitumen
  - Contains **fewer heavy metals and hazardous pollutants**
- **Economic & Strategic Aspect:**
  - Reduces **import dependency on crude-based bitumen**
  - Supports **circular economy (farm residue utilisation)**



Applications

- Road paving
- Roofing
- Waterproofing
- Overall, it is **versatile across infrastructure sectors**

Himalayan Tahr

Syllabus: GS-3: Wildlife

Context:

- From alpine slopes to waste sites: **Garbage is an emerging threat to the Himalayan Tahr in the Himalayas**, indicating anthropogenic pressure even in high-altitude ecosystems

About Himalayan Tahr

- It is a **large hoofed mammal** that lives in the Himalayas
- Scientific Name: *Hemitragusjemlahicus*

Habitat and Distribution

- Found in **southern Tibet, northern India, western Bhutan, and Nepal**
- Adapted for **cool, rocky mountain areas**
- In the Himalayas, mostly found on slopes between **2,500 and 5,000 meters**

Features

- **Body & Size:** average male weighs about **73 kg**, females around **36 kg**; shorter in height than length
- **Head & Sensory:** small head, small pointed ears, large eyes
- **Horns:** sexual dimorphism present; male horns up to **46 cm**, females smaller; horns curve backward preventing injuries during mating fights
- **Coat Adaptation:** thick, reddish wool coat with thick undercoat suited for cold Himalayan weather
- **Locomotion:** as an ungulate (even-toed), can grip both smooth and rough surfaces efficiently

Conservation Status

- Classified as **'Near Threatened' under the IUCN Red List**

Analytical Insight

- Highlights **human-induced threats (waste pollution)** in fragile Himalayan ecosystems
- Reflects need for **integrated conservation approach** combining wildlife protection with sustainable tourism and waste management

Artemis II

Syllabus: GS-3: Science and Technology – Space Exploration.

Context:

- NASA's **Artemis II mission** will send four astronauts on a **10-day journey around the Moon**, marking the **first human mission to Moon's vicinity since 1972**
- Mission is a **flyby (no landing)**; a **future mission (2028)** aims for **human landing on lunar surface**

NASA's Plan for Permanent Moon Base

Long-Term Vision

- NASA unveiled a roadmap to establish a **permanent human presence on the Moon** → shift from **short visits to sustained exploration**

- Aims to support **frequent and extended astronaut stays over next decade**
- Coincides with Artemis II, marking **return to lunar space after 50+ years**

Shift from Apollo Missions

- Unlike **Apollo missions (1969–1972)** → focused on **brief landings**
- Current objective → **long-term habitation and continuous exploration**

Role of Artemis Missions

- **Artemis programme** is central to lunar strategy
  - **Artemis I (2022)** → uncrewed mission around Moon (system testing)
  - **Artemis II** → first **crewed lunar flyby mission**
  - Followed by **another test mission + human landing (2028)**
- NASA aims for **regular lunar missions every 6 months**
- Involves **international partners + private companies**

Travel Time: Fast vs Fuel-Efficient Routes

- Artemis II → reaches Moon vicinity in **3–4 days (similar to Apollo)**
- **Recent uncrewed missions (e.g., Chandrayaan-3)** → take **weeks/months** (fuel-efficient trajectories)
- **Trade-off:**
  - Faster travel → **more powerful rockets required**
  - Slower travel → **fuel efficiency**

Launch Systems

- Artemis II uses **Space Launch System (SLS)** → NASA's **most powerful rocket**
- Apollo used **Saturn V** → historically most powerful
- **SLS + Orion spacecraft** → first tested in **Artemis I (2022, ~25 days)**
- Artemis II → **first crewed use of these systems**

Artemis II Flight Path & Significance

- Mission profile:
  - **Earth orbit (twice)** → then **trajectory toward Moon**
  - **Lunar flyby + travel 6,500 km beyond far side**
- Marks **farthest distance humans have travelled in space**
  - Far beyond Apollo (~110 km above lunar surface)

Significance

- Acts as a **test flight to validate systems**
- Critical precursor to **planned human landing (2028)**

India in the New Lunar Race

Changing Global Dynamics

- During **Apollo 11 (1969)** → ISRO not yet established
- Present scenario → **multi-country lunar race** (India, China, Japan, etc.)
- Shift from **US–USSR dominance → multipolar competition + collaboration**

India's Moon Mission Ambitions

- India plans **human Moon landing by 2040**
- China targets **2030**
- Increasing role of **European partners + multiple nations** in collaboration

Strategic Alignment with NASA

- India is a **signatory to Artemis Accords** → aligns with **peaceful & sustainable space exploration framework**
- Enables **ISRO–NASA cooperation in lunar & deep-space missions**

Ongoing Cooperation

- Example: **NISAR Earth observation mission** (joint ISRO–NASA project)
- NASA ecosystem includes **private sector + academia + international partners**
- Provides India with **technological exposure + operational experience** for long-term lunar goals

Analytical Insight

- Represents **transition from exploration → exploitation & habitation of space**
- Reflects **commercialisation + internationalisation of space governance**
- Enhances **strategic competition (China vs US-led bloc)** while promoting **collaborative frameworks (Artemis Accords)**
- India positioned as **both collaborator and emerging competitor in lunar geopolitics**

Nagoya Protocol

Syllabus: GS-3: Environment – Biodiversity – Conventions and Protocols.

Context:

- **Ministry of Environment, Forest and Climate Change (MoEFCC)** submitted **India's First National Report** on implementation of **Nagoya Protocol on Access and Benefit Sharing (ABS)** to the **Secretariat of Convention on Biological Diversity (CBD)**

About Nagoya Protocol

- **Nagoya Protocol on** Access to Genetic Resources and Fair & Equitable Sharing of Benefits **(ABS)** is a **supplementary agreement to CBD**
- **Adopted:** 29 October 2010 at **Nagoya, Japan**
- **Entered into force:** 12 October 2014 (after 50th ratification + 90 days)
- **Objective:** Provides **transparent legal framework** for effective implementation of **fair and equitable benefit sharing** from utilisation of genetic resources
- **India ratification:** 2012

Scope / Coverage

- **Applies to:** Genetic resources covered under CBD + benefits arising from their utilisation
- **Includes:** Traditional Knowledge (TK) associated with genetic resources + benefits from its utilisation

Convention on Biological Diversity (CBD) – Key Facts

- **Nature:** Most comprehensive **binding international agreement** on conservation & sustainable use of natural resources
- **Adopted at:Rio Earth Summit (1992)**
- **Core Objectives:**
    - **Conservation of biodiversity** (genetic, species, ecosystem levels)
    - **Sustainable use of biodiversity**
    - **Fair & equitable sharing of benefits** arising from genetic resources

Analytical Insight

- Strengthens **biodiversity governance + bio-economy** through ABS mechanism
- Protects **indigenous communities' rights over traditional knowledge**
- Critical for **bioprospecting, pharmaceuticals, agriculture, and IPR debates**