DAILY CURRENT AFFAIRS 10-01-2026

Mapping Perspective

1. **Bura Chapori Wildlife Sanctuary**

Prelims Perspective

2. **Mpemba Effect**
3. **Calamaria Mizoramensis**

Mains Perspective

4. **ISRO and the next big challenge**
5. **Madhav Gadgil**

Bura Chapori Wildlife Sanctuary

Syllabus: GS-3; Biodiversity

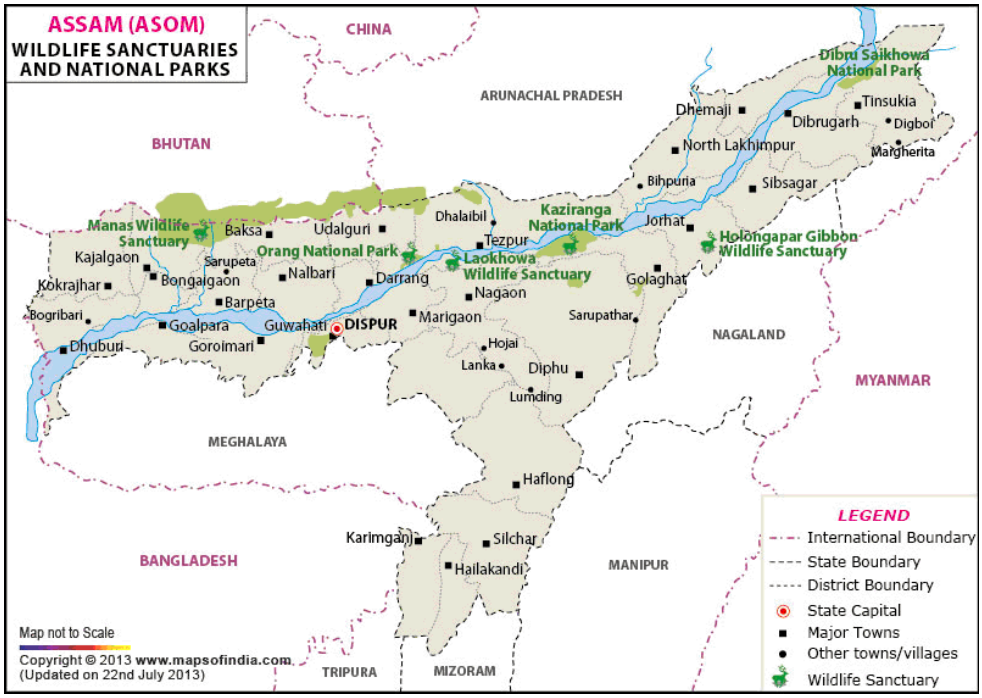
Context:

- A team of government officials recently visited **encroached areas** earmarked for **compensatory afforestation** within **Bura Chapori Wildlife Sanctuary**.
- The issue highlights challenges related to **encroachment, habitat restoration, and floodplain conservation** in Assam's grassland ecosystems.

About Bura Chapori Wildlife Sanctuary

Location & Extent

- **State/District:** Assam – Sonitpur district
- **Physiographic setting:** Southern bank of the **Brahmaputra**
- **Area:** 44.06 sq. km
- Lies **north of Laokhowa Wildlife Sanctuary**, forming a **contiguous landscape**.



Ecological Significance

- Together with Laokhowa WLS, it constitutes the **Laokhowa–Burachapori ecosystem**.
- **Notified as a buffer zone (2007)** of **Kaziranga Tiger Reserve**.
- Represents a critical **Brahmaputra floodplain grassland ecosystem**.

Hydrology & Climate

- Predominantly **low-lying terrain**.
- **Highly flood-prone during summer/monsoon**, influencing grassland regeneration and species movement.

Biodiversity

Flora

- Dominated by:
  - **Wet alluvial grasslands**
  - **Riparian vegetation**
  - **Semi-evergreen forests**
- Several plant species possess **commercial and medicinal importance**.

Fauna

- **Mammals:**
  - Tiger
  - Elephant
  - Wild buffalo
  - One-horned rhinoceros
  - Hog deer
  - Wild boar
- **Avifauna (important for Prelims):**
  - Bengal florican (critically endangered)
  - Black-necked stork
  - Open-billed stork
  - White-eyed pochard
  - Mallard
  - Spot-billed duck
  - Large whistling teal

Mpemba Effect

Syllabus: GS-3; General Science - Physics

Context

Researchers at **JNCASR** used supercomputers to simulate ice formation, validating the **Mpemba Effect**.

About Mpemba Effect

- Phenomenon where hot water freezes faster than cold water under certain conditions.
- First described by **Aristotle**.
- Named after **Erasto Mpemba** (1969).

Possible Explanations

- Presence of micro-bubbles
- Enhanced evaporation
- Faster convection due to lower density
- Frost acting as an insulator in cold water
- Changes in dissolved compounds

Recent Findings

- Not unique to water.
- Can occur in other fluid-to-solid phase transitions.

Calamaria Mizoramensis

Syllabus: GS-3; Environment- Species Discovery

Context

A new species of reed snake, **Calamaria mizoramensis**, was discovered in Mizoram.

About the Species

- Non-venomous, nocturnal, semi-fossorial.
- Found at elevations of **670–1,295 m**.
- Habitat: Humid forested hills, near human settlements.
- Appearance: Dark brown to black body with faint stripes and yellow underside.
- Likely distribution: Mizoram, Manipur, Nagaland, Assam.

Reed Snakes: Key Facts

- Genus: *Calamaria*
- Family: Colubridae
- Small, slender, non-venomous
- Found in moist forests of South & Southeast Asia
- Feed on soft-bodied invertebrates

ISRO and the next big challenge

Syllabus: GS-3: Science and Technology – Satellite.

Context:

- India has demonstrated **scientific and technological excellence** in space missions.
- The next phase for **ISRO** is not just *mission success*, but **industrial-scale execution**.
- Focus is shifting from:
  - Occasional high-impact missions
  - To **high-frequency launches, mass manufacturing, and commercial viability**

What Does "Industrial-Scale Success" Mean?

Industrial-scale success implies:

- **Mass production** of rockets, satellites, and subsystems
- **High launch cadence** with predictable schedules
- Development of a **robust domestic supply chain**
- Strong **private sector participation**
- Cost competitiveness in the **global commercial space market**
- Transition from a *research-driven agency* to an *ecosystem enabler*

India's Strengths So Far

A. Mission Successes

- Successful interplanetary and lunar missions
- Demonstrated reliability of launch vehicles
- Advanced capabilities in navigation, communication, and earth observation satellites

B. Indigenous Technology Base

- Development of launch vehicles, cryogenic engines, avionics
- Increasing indigenisation of components and materials

C. Cost Efficiency

- Low-cost access to space compared to global peers
- Competitive pricing in satellite launch services

Why Industrial Scale Is a Challenge for ISRO

Limited Manufacturing Ecosystem

- ISRO traditionally **designs and integrates**, but does not mass-manufacture
- Dependence on:
    - Small number of public sector units
    - Fragmented private suppliers
- Shortage of advanced tooling and aerospace-grade manufacturing hubs

Supply Chain Constraints

- Dependence on imports for:
    - High-end alloys
    - Precision electronics
    - Specialised materials
- Vulnerability to geopolitical and export-control disruptions

Private Sector Integration Issues

- Private industry participation historically limited to:
    - Low-value components
    - Fabrication rather than system-level responsibility
- Challenges include:

- Technology transfer concerns
- Risk-sharing mechanisms
- Long gestation period for returns

Production and Testing Bottlenecks

- Existing testing and integration facilities were designed for:
  - Limited annual missions
- Industrial scale requires:
  - Parallel production lines
  - Continuous testing infrastructure
  - Faster certification cycles

E. Global Competition

- International players operate with:
  - Vertical integration
  - Reusable launch systems
  - High launch frequency
- India must compete on:
  - Cost
  - Reliability
  - Turnaround time

Institutional and Policy Support

A. Space Sector Reforms

- Opening up of the space sector to private players
- Separation of roles:
  - ISRO → R&D and technology development
  - Industry → Manufacturing and operations

B. Key Institutions

- **IN-SPACe**
  - Facilitates private sector participation
  - Acts as regulator and promoter

- **NewSpace India Limited (NSIL)**
  - Commercial arm for launches and satellite services
  - Focus on outsourcing manufacturing to industry

Way Forward: Achieving Industrial-Scale Success

A. Building a Space Manufacturing Ecosystem

- Creation of **space industrial clusters**
- Incentives for MSMEs and startups
- Long-term procurement visibility to industry

B. Deepening Private Sector Role

- End-to-end responsibility for launch vehicles and satellites
- Public-private partnerships in:
  - Rocket production
  - Satellite constellations
  - Ground infrastructure

C. Strengthening Supply Chains

- Indigenous development of:
  - Advanced materials
  - Electronics and sensors
- Reducing import dependence for critical components

D. Human Resource and Skill Development

- Industry-ready aerospace workforce
- Collaboration between:
  - ISRO
  - Academia
  - Private industry

Significance for India

- Positions India as a **global space manufacturing hub**
- Boosts:
  - High-technology exports

- Employment generation
- Strategic autonomy

- Enhances India's role in:
  - Commercial launches
  - Satellite services
  - Global space governance

Madhav Gadgil

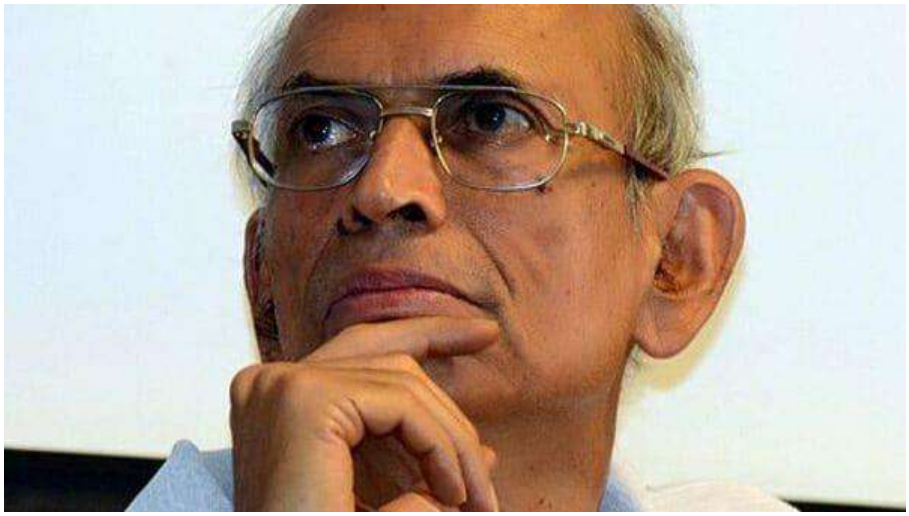
Syllabus: GS-3: Ecology and GS-4: Environmental Stewardship.

Context:

- Recently eminent ecologist **Madhav Gadgil** passed away.

Who is Madhav Gadgil?

- Renowned **Indian ecologist**, environmental thinker, and public policy advisor
- Known for pioneering work on **biodiversity conservation**, **ecological democracy**, and **people-centric environmental governance.**



Academic & Professional Background

- Former **Professor at the Indian Institute of Science (IISc), Bengaluru**
- Founder of the **Centre for Ecological Sciences (CES), IISc**
- Major contributor to ecology, conservation biology, and environmental policy in India

Key Contributions

1. Western Ghats Ecology

- Chairperson of the **Western Ghats Ecology Expert Panel (WGEEP)**, 2010
- Produced the **Gadgil Committee Report (2011)**

Core Recommendations:

- Declared the **entire Western Ghats** as an **Ecologically Sensitive Area (ESA)**
- Classified the region into **ESZ-1, ESZ-2, ESZ-3** based on ecological fragility
- Strong restrictions on:
  - Mining
  - Thermal power plants
  - Large dams
  - Polluting industries
- Emphasised **bottom-up governance** and **local community participation**

2. Ecological Democracy

- Advocated **decentralised environmental decision-making**
- Supported **Gram Sabhas** and local bodies in resource management
- Criticised top-down, technocratic conservation models

3. People and Biodiversity

- Strong proponent of **People's Biodiversity Registers (PBRs)**
- Influenced implementation of the **Biological Diversity Act, 2002**
- Highlighted the role of **indigenous knowledge systems** in conservation

Gadgil Committee vs Kasturirangan Committee

Aspect	Gadgil Committee (WGEEP)	Kasturirangan Committee (HLWG)
Coverage	Entire Western Ghats	~37% of Western Ghats
Approach	Ecological priority	Development-friendly
Governance	Decentralised, local	Centralised, technocratic
Restrictions	Strong, comprehensive	Relatively diluted

Major Publications

- Ecology Is for People
- This Fissured Land: An Ecological History of India (with Ramachandra Guha)
- Mapping India's Natural Resources

Mains Perspective

- **GS Paper III:** Environment – conservation models, ESA, sustainable development
- **GS Paper IV:** Ethics – participatory governance, environmental ethics

Criticism & Challenges

- Recommendations viewed as **anti-development** by some states
- Strong opposition from **mining, infrastructure, and plantation lobbies**
- Partial dilution of recommendations by later committees

Conclusion

- Madhav Gadgil represents a **scientific, ethical, and participatory vision of environmental governance**
- His ideas remain central to debates on **sustainable development**, **federalism**, and **ecological justice** in India