PrepAlpine

The Next-Generation UPSC Institution

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A Next-Generation Learning Institution

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First Edition: January 2026

Printed and published by PrepAlpine

DAILY CURRENT AFFAIRS DATED 08.01.2026

GS Paper III: Environment

1. India's Climate Commitments: Achievements, Gaps and the Way Forward

a. Introduction

India's approach to climate change is shaped by the need to balance developmental imperatives with environmental responsibility. As a developing country with low historical and per-capita emissions, India has adopted a calibrated strategy that focuses on reducing emissions intensity, expanding renewable energy, and enhancing natural carbon sinks, rather than committing to immediate absolute emissions cuts. This approach reflects both equity considerations and development realities.

Over the past decade, India has recorded notable progress across several climate indicators, particularly in renewable energy capacity and emissions efficiency. At the same time, structural challenges remain in converting these gains into cleaner electricity generation and moderating absolute emissions. India's climate journey, therefore, represents a mix of genuine achievement and unresolved transition challenges.

b. India's Climate Commitments under the Paris Agreement

India's climate pledges are anchored in the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR–RC), which recognises historical responsibility for emissions while allowing policy space for developing countries.

Core Commitments

- **Emissions Intensity Reduction**
  Reduction of emissions intensity of GDP by 33–35 percent from 2005 levels by 2030.
- **Non-Fossil Energy Capacity**
  Achieving 40 percent non-fossil fuel capacity in installed electricity capacity by 2030, later enhanced to around 50 percent.
- **Renewable Energy Expansion**
  Initial target of 175 GW by 2022, scaled up to 500 GW by 2030.
- **Carbon Sink Creation**
  Creation of an additional 2.5–3 billion tonnes of CO_2 equivalent through forests and tree cover.

c. Major Areas of Achievement

i. Decline in Emissions Intensity

India has already achieved an estimated 35–36 percent reduction in emissions intensity compared to 2005 levels, effectively meeting its Paris target ahead of schedule.

Drivers of Improvement

- Sustained economic growth with relatively slower emissions growth
- Expansion of the services and digital economy
- Energy-efficiency initiatives such as Perform, Achieve and Trade (PAT)

- Mass adoption of LED lighting under UJALA

Global Comparison
India's emissions intensity has declined faster than that of several G20 economies, placing it among the better performers in emissions efficiency.

ii. Expansion of Non-Fossil Energy Capacity

India has crossed the milestone of over 50 percent non-fossil fuel capacity in total installed electricity capacity.

- **Solar Energy as the Main Driver**
  Growth supported by the National Solar Mission, solar parks, rooftop solar, and PM-KUSUM.
- **Diversified Clean Energy Mix**
  Wind, hydropower, and nuclear energy have contributed steadily.
- **Cost Competitiveness**
  Falling renewable technology costs have strengthened policy momentum and investor confidence.

iii. Progress on Carbon Sink Targets

Official forest assessments indicate a gradual increase in forest and tree cover, suggesting numerical progress towards India's carbon sink commitments under the Paris Agreement.

d. Structural Gaps and Emerging Challenges

i. Emissions Intensity versus Absolute Emissions

While emissions per unit of GDP have declined, India's total greenhouse gas emissions continue to rise.

Reason for the Gap
Strong economic growth remains energy-intensive, and national emissions have not yet peaked.

Conceptual Distinction

- Relative (partial) decoupling – growth faster than emissions
- Absolute decoupling – emissions decline in absolute terms

India has achieved the former, but not yet the latter.

ii. Renewable Capacity–Generation Mismatch

Although non-fossil sources account for over half of installed capacity, they contribute only around one-fifth to one-quarter of actual electricity generation.

Coal Dominance
Coal still accounts for over 70 percent of power generation.

Structural Reasons

- Intermittency of solar and wind
- Lower capacity utilisation rates
- Absence of adequate storage

Coal continues to provide reliable baseload power, making it central to grid stability.

iii. Energy Storage and Grid Constraints

- **Storage Deficit**
  Battery storage and pumped hydro capacity remain far below projected requirements.
- **Grid Adaptation Challenges**
  Transmission infrastructure and grid management systems are still adjusting to variable renewable energy inputs.

iv. Continued Dependence on Coal

India has over 250 GW of coal-based capacity, and coal remains critical for energy security, industry, and affordable electricity.

The absence of a clearly articulated coal transition or phase-down roadmap creates uncertainty about long-term emissions pathways and just transition planning for coal-dependent regions.

v. Forest Carbon Sink: Quantity versus Quality

- **Accounting Concerns**
  Forest cover estimates often include plantations and orchards, inflating carbon sink figures.
- **Ecological Limitations**
  Such approaches may not ensure biodiversity conservation, ecosystem resilience, or long-term carbon storage.

This reflects a broader tension between numerical targets and ecological integrity.

vi. Governance and Implementation Challenges

- **Under-utilisation of Funds**
  Climate programmes often face delays and low absorption capacity.
- **Project Bottlenecks**
  Renewable projects encounter land acquisition and transmission delays.
- **Coordination Gaps**
  Fragmentation across ministries and states weakens implementation.

e. Sector-Specific Emissions Pressures

- **Industry**
  Emissions from steel and cement continue to rise due to limited low-carbon alternatives.
- **Transport**
  Growing vehicle ownership and freight demand drive emissions upward.
- **Hidden Disparities**
  National averages mask sharp regional and sectoral differences, requiring targeted strategies.

f. Way Forward

- **Convert Capacity into Clean Generation**
  Rapid expansion of battery storage, pumped hydro, and grid flexibility is essential.
- **Manage Coal Transition**
  Focus on efficiency, flexible operation, and a gradual, just transition, rather than abrupt phase-outs.
- **Strengthen Forest Governance**
  Prioritise natural regeneration, improve transparency in carbon accounting, and integrate biodiversity goals.
- **Sector-Specific Decarbonisation**
  Develop clear roadmaps for steel, cement, and transport, including green hydrogen and cleaner processes.
- **Improve Climate Governance**
  Enhance centre–state coordination, streamline approvals, strengthen data quality, and ensure transparent monitoring.

Conclusion

India has made meaningful progress in meeting its climate commitments, particularly in emissions intensity reduction and renewable energy capacity expansion. However, the central challenge lies in translating these gains into moderation of absolute emissions and genuine ecological sustainability. The coming decade will be decisive. Success will depend not on announcing new targets alone, but on

effective implementation, structural energy transition, and strengthened climate governance that aligns development with long-term environmental stability.

GS Paper III: Security

2. NATGRID and Digital Surveillance in India: Security Needs and Constitutional Concerns

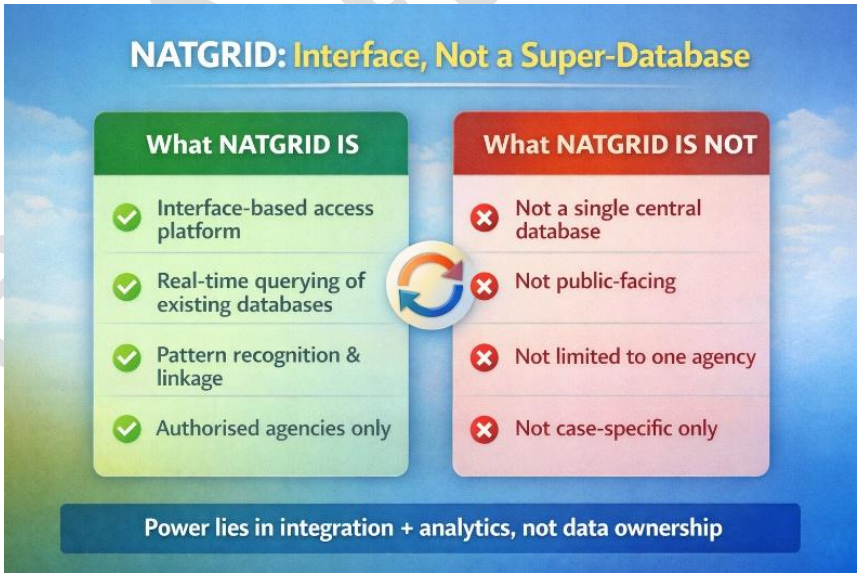
a. Introduction

Contemporary internal security increasingly relies on the collection, integration, and analysis of digital data. In this context, the National Intelligence Grid (NATGRID) represents a significant shift in India's intelligence architecture towards data-driven surveillance. Conceived in the aftermath of the 26/11 Mumbai terror attacks, NATGRID was designed to prevent intelligence failures by enabling faster and more coordinated access to information dispersed across multiple government databases.

At the same time, the expanding scope and reach of NATGRID raise serious constitutional and governance concerns. Issues relating to privacy, accountability, misuse of power, and the broader risk of digital authoritarianism have come to the forefront. The central challenge lies in balancing legitimate security imperatives with the protection of constitutional freedoms and democratic oversight.

b. Why NATGRID Was Created

Lessons from the 26/11 Attacks



- **Failure of Coordination, Not Information**
  The 26/11 attacks exposed deep structural weaknesses in India's intelligence system. Multiple agencies possessed fragments of relevant information, but these were not connected in time to prevent the attack.
- **Siloed Intelligence Architecture**
  The problem lay in institutional silos and the absence of a mechanism for real-time information sharing across agencies.
- **Policy Response**
  NATGRID was conceived as a technological solution to integrate dispersed datasets and enable authorised agencies to access information quickly and seamlessly.

c. Conceptual Understanding of NATGRID

NATGRID is best understood as a technology platform, not a single centralised database.

i. Nature and Function

Interface-Based System
It functions as an interface that enables authorised agencies to access data stored in multiple existing databases in real time.

Categories of Data Accessed
These include:

- Immigration and travel records
- Banking and financial transactions
- Telecommunications and KYC data
- Vehicle registration and identity databases

Stated Purpose
The objective is to identify patterns, track suspects, and prevent terrorism and organised crime through timely data analysis.

d. Evolution and Expansion of NATGRID

i. Initial Design and Scope

- **Restricted Access**
  Initially, access was limited to a small number of central intelligence and investigative agencies.
- **Narrow Security Focus**
  Its mandate was confined largely to counter-terrorism and grave national security threats, with access restricted to senior officials and specific cases.

ii. Recent Expansion

- **Scale of Operations**
  The number of queries processed has increased sharply, with reports of tens of thousands of searches each month.
- **Broader Institutional Access**
  Access has expanded to include state police units and officers at lower levels of hierarchy.
- **Database Integration**
  There have been indications of linkage with large population databases such as the National Population Register.

e. From Targeted Search to Systemic Surveillance

Traditional intelligence systems were largely reactive, focused on known suspects and defined threats.

- **Algorithmic Surveillance**
  Modern platforms like NATGRID employ analytics and techniques such as entity resolution to link fragmented data.
- **Predictive Logic**
  Behaviour, associations, and potential intent can be inferred even without a specific suspect.
- **Population-Wide Reach**
  Surveillance becomes predictive and systemic, rather than case-specific.

f. Key Constitutional and Governance Concerns

i. Absence of a Clear Legal Framework

- **Executive-Based Operation**
  NATGRID operates primarily through executive decisions and cabinet approvals.

- **Lack of Parliamentary Legislation**
  There is no dedicated law defining its scope, limits, safeguards, or accountability mechanisms.
- **Democratic Deficit**
  Large-scale surveillance without statutory backing lacks democratic legitimacy and increases the risk of executive overreach.

ii. Weak Oversight and Accountability

- **No Independent Oversight**
  NATGRID is not subject to routine parliamentary supervision or judicial authorisation for data access.
- **Limitations of Internal Controls**
  Internal audits and access logs, while necessary, cannot substitute for independent oversight.
- **Concentration of Power**
  Unchecked surveillance power creates serious risks of misuse and abuse.

iii. Implications for the Right to Privacy

- **Puttaswamy Judgment (2017)**
  The Supreme Court recognised privacy as a fundamental right and laid down tests of legality, necessity, and proportionality.
- **Constitutional Compliance Concerns**
  Continuous, broad-based access to personal data raises questions about compliance with these standards, especially when surveillance is not case-specific.

g. Algorithmic Bias and Social Consequences

- **Embedded Biases**
  Surveillance algorithms reflect the data and institutional practices that generate them, including historical policing biases.
- **Disproportionate Impact**
  Marginalised communities face higher risks of false positives and disproportionate scrutiny.
- **Social Consequences**
  While privileged individuals may experience inconvenience, vulnerable groups may face harassment, stigma, and legal vulnerability.

h. Security Effectiveness and the Limits of Data

- **False Assumption of Data Sufficiency**
  More data does not automatically translate into better security outcomes.
- **Institutional Weaknesses**
  Intelligence failures often arise from poor training, weak accountability, and organisational dysfunction.
- **Lesson of 26/11**
  The failure was primarily institutional, not technological.

i. Digital Authoritarianism: A Conceptual Concern

- **Meaning**
  Digital authoritarianism refers to the use of digital technologies to normalise mass surveillance and weaken democratic dissent.
- **Risk in the Indian Context**
  When intelligence platforms operate without legal limits or oversight, they risk becoming permanent architectures of suspicion.

- **Democratic Erosion**
  Security narratives may then justify intrusive surveillance detached from democratic control.

j. Way Forward

- **Comprehensive Surveillance Law**
  Enact legislation defining purpose limitation, access controls, data retention, and deletion norms.
- **Independent Oversight**
  Establish parliamentary intelligence committees and require judicial authorisation for sensitive data access.
- **Technological Safeguards**
  Mandate algorithmic audits, bias testing, and human oversight in decision-making.
- **Institutional Reform**
  Strengthen investigation quality, police training, and accountability for intelligence failures.

Conclusion

NATGRID reflects India's legitimate need to strengthen internal security in an era of terrorism, cybercrime, and digital mobility. However, security cannot be pursued at the cost of constitutional freedoms. In the absence of a clear legal framework, independent oversight, and accountability mechanisms, NATGRID risks evolving into an instrument of digital authoritarianism rather than effective intelligence. A constitutional democracy must ensure that technology serves the law and democratic values, not the other way around.

Reader's Note — About This Current Affairs Compilation

Dear Aspirant,

This document is part of the PrepAlpine Current Affairs Series — designed to bring clarity, structure, and precision to your daily UPSC learning.

While every effort has been made to balance depth with brevity, please keep the following in mind:

1. Orientation & Purpose

This compilation is curated primarily from the UPSC Mains perspective — with emphasis on conceptual clarity, analytical depth, and interlinkages across GS papers.

However, the PrepAlpine team is simultaneously developing a dedicated Prelims-focused Current Affairs Series, designed for:

- factual coverage
- data recall
- Prelims-style MCQs
- objective pattern analysis

This Prelims Edition will be released separately as a standalone publication.

2. Content Length

Some sections may feel shorter or longer depending on topic relevance and news density.
To fit your personal preference, you may freely resize or summarize sections using any LLM tool (ChatGPT, Gemini, Claude, etc.) at your convenience.

3. Format Flexibility

The formatting combines:

- paragraphs
- lists
- tables
- visual cues

—all optimised for retention.

If you prefer a specific style (lists → paras, paras → tables, etc.), feel free to convert using any free LLM.

4. Monthly Current Affairs Release

The complete Monthly Current Affairs Module will be released soon, optimized to a compact 100–150 pages — comprehensive yet concise, exam-ready, and revision-efficient.

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- **Peer-to-Peer Discussions**
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- **Insight Threads**
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  A serious, supportive, and intelligent peer environment — no noise, no clutter. Learning grows here through interaction, reflection, and structured peer collaboration.

"From Isolation to Interaction — Learn the UPSC Way, the Smart Way."

6. Suggest Topics for Coverage

If you feel any important theme is missing or under-covered, simply post it in the "Suggestions" channel on our Discord server.

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