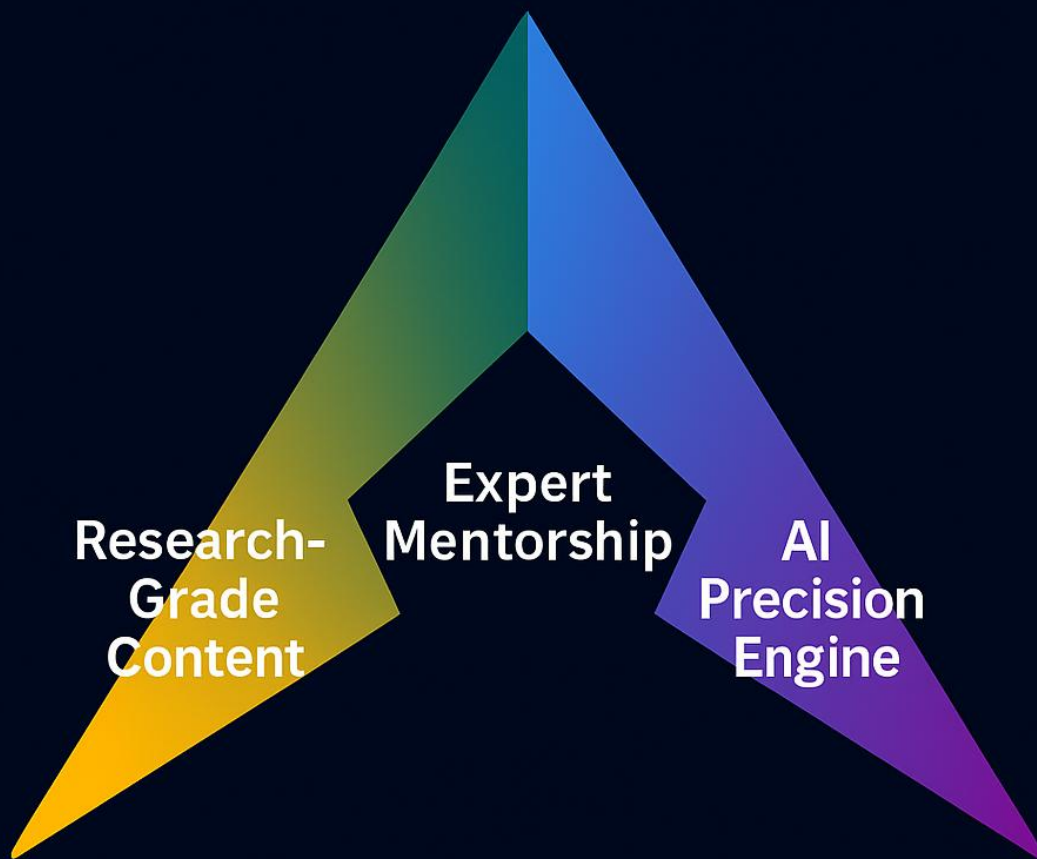


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DAILY CURRENT AFFAIRS DATED 11.05.2026

GS Paper II: Polity

1: Governor's Role in Government Formation in a Hung Assembly

a. Introduction

The issue recently resurfaced after political developments in Tamil Nadu raised questions regarding the Governor's role in inviting parties to form the government in a situation where no single party secured a clear majority in the Legislative Assembly. Such situations often revive debates concerning the scope and limits of the Governor's discretionary powers.

b. Constitutional Position of the Governor in Government Formation

i. Article 164(1): Appointment of the Chief Minister

Article 164(1) of the Constitution provides that:

"The Chief Minister shall be appointed by the Governor and the other Ministers shall be appointed by the Governor on the advice of the Chief Minister."

This provision establishes the Governor as the formal appointing authority for the Chief Minister. However, the nature of the Governor's role differs depending upon the political composition of the Legislative Assembly.

Constitutional Significance

- The Governor functions as the constitutional head of the State.
- The real executive authority is exercised by the Council of Ministers headed by the Chief Minister.
- The Governor's discretion expands only in exceptional political situations such as a hung Assembly.

The constitutional scheme therefore balances ceremonial authority with limited discretionary responsibility in extraordinary circumstances.

ii. Normal Situation: Clear Majority

When a single political party secures an absolute majority in the Assembly:

Role of the Governor

- The Governor invites the elected leader of the majority party to form the government.
- The Governor acts according to established parliamentary convention.
- Discretion is minimal because the democratic mandate is clear.

Thus, in ordinary circumstances, the Governor's role remains largely ceremonial.

Democratic Logic

- The electorate's mandate is unambiguous.
- Stability of government is presumed.
- Constitutional conventions operate smoothly without controversy.

However, the constitutional position becomes more complex when no party secures a clear majority, leading to a hung Assembly.

iii. Hung Assembly Situation

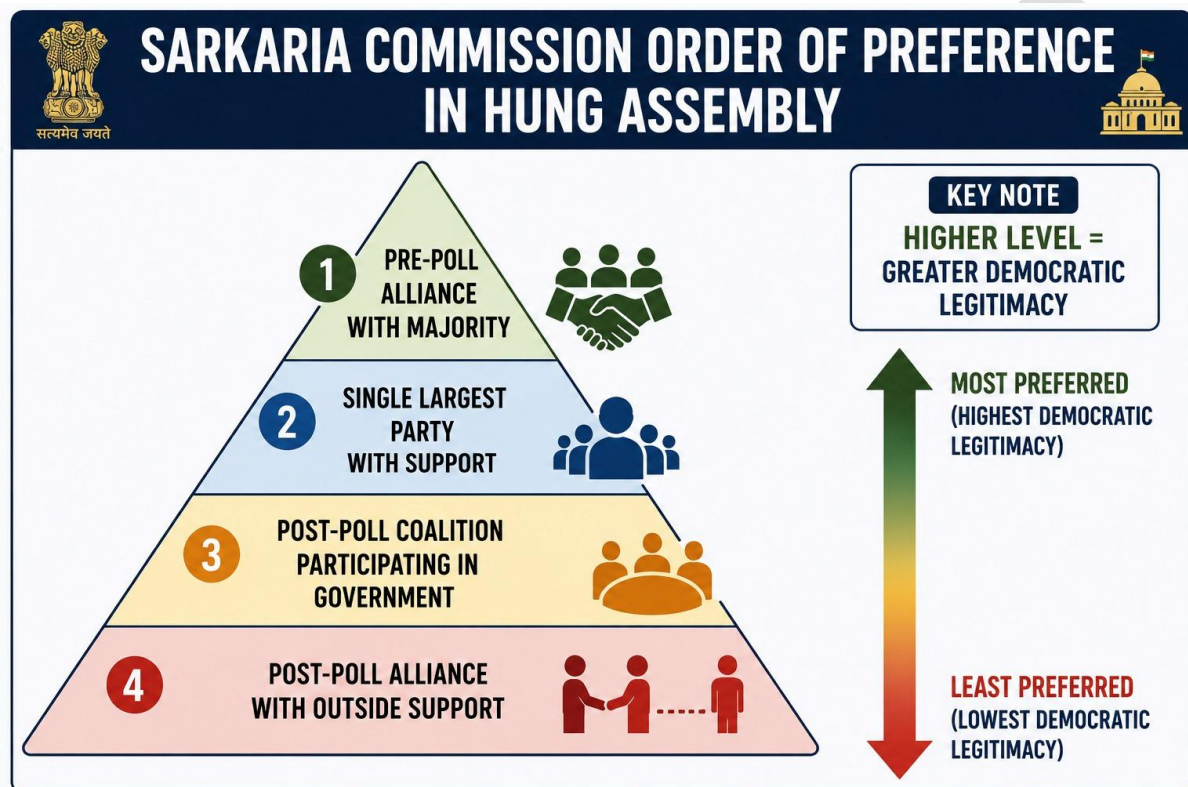
A hung Assembly emerges when:

No political party or pre-poll alliance secures the required majority in the Legislative Assembly.

Constitutional Implications

- The Constitution does not prescribe a detailed procedure for government formation.
- The Governor must exercise discretion to identify the individual most likely to command majority support in the House.
- Questions of constitutional morality and neutrality become significant.

This discretionary sphere has become one of the most debated aspects of Indian federal politics.



c. Nature of the Governor's Discretionary Powers

The Governor's discretion becomes relevant in situations such as:

Circumstances Triggering Discretion

- Hung Assembly
- Collapse of a coalition government
- Withdrawal of support by alliance partners
- Uncertainty regarding legislative majority

Constitutional Objectives

- Ensure continuity of governance
- Prevent constitutional breakdown
- Facilitate formation of a stable government capable of enjoying legislative confidence

Constitutional Limitations

Constitutional convention requires that such discretion must remain:

- Politically neutral
- Constitutionally guided
- Transparent and objective

The Governor is not expected to function as a political actor but as an impartial constitutional authority.

The need to regulate and guide such discretionary powers led various constitutional commissions to recommend structured principles for government formation.

d. Recommendations of Constitutional Commissions

i. Sarkaria Commission (1987)

The Sarkaria Commission examined Centre–State relations and proposed guidelines for government formation in a hung Assembly.

Order of Preference Suggested

- A pre-poll alliance or coalition commanding majority
- The single largest party with support of others
- A post-poll coalition in which all partners participate in government
- A post-poll alliance with outside support

Significance

- Attempted to reduce arbitrariness in gubernatorial discretion
- Sought to develop convention-based constitutional practice
- Emphasised democratic legitimacy and stability

ii. Punchhi Commission (2010)

The Punchhi Commission broadly endorsed the Sarkaria framework while placing greater emphasis on:

- Constitutional morality
- Transparency in decision-making
- Non-partisanship of Governors

Core Concern

- The Commission stressed that discretionary power must not become an instrument of political convenience.

Although these commissions attempted to create guiding conventions, differing interpretations by Governors continued to generate political controversies.

e. Major Political Controversies

Different Governors have adopted varying standards in similar political circumstances, leading to allegations of inconsistency and bias.

State and Year	Governor's Action	Major Concern
Goa (2017)	BJP-led post-poll coalition invited despite Congress being largest party	Departure from convention

Manipur (2017)	BJP coalition invited over Congress	Questions regarding neutrality
Karnataka (2018)	Single largest party invited despite post-poll alliance claiming majority	Contradictory application
Maharashtra (2019)	Early morning swearing-in amidst uncertainty	Transparency concerns

Major Criticisms

- Governors sometimes favour the ruling party at the Union level
- Constitutional conventions are selectively interpreted
- Federal balance is weakened
- Public confidence in neutrality declines

These controversies intensified demands for judicial safeguards and clearer constitutional standards.

f. Supreme Court's Position

i. S. R. Bommai v. Union of India

S. R. Bommai v. Union of India established a crucial constitutional principle:

Legislative majority must be tested on the floor of the House.

Significance

- The Governor's subjective satisfaction cannot substitute a floor test.
- Democratic legitimacy must be established within the Assembly.
- Judicial review is permissible where constitutional processes are undermined.

The judgment became foundational to later cases concerning government formation and dismissal.

ii. Rameshwar Prasad v. Union of India

The Supreme Court reiterated that:

- Constitutional authorities should avoid speculative assumptions regarding majority support.
- The appropriate mechanism for determining confidence is a floor test in the Legislature.
- Democratic processes within the House must prevail over executive discretion.

These judgments collectively strengthened parliamentary democracy by limiting arbitrary constitutional action.

g. Constitutional and Governance Concerns

i. Threat to Federalism

Perceived partisan behaviour by Governors can:

- Disturb Centre-State relations
- Undermine cooperative federalism
- Create political instability in States

Since the Governor is appointed by the Union government, allegations of political influence often arise during coalition disputes.

ii. Scope for Misuse of Discretion

The absence of codified constitutional rules creates space for:

- Arbitrary interpretation
- Selective application of conventions
- Political manipulation

This legal ambiguity contributes to recurring constitutional crises.

iii. Erosion of Constitutional Morality

Constitutional morality requires adherence not merely to the text of the Constitution but also to democratic values and institutional restraint.

Expected Role of Governors

- Neutral constitutional heads
- Guardians of democratic legitimacy
- Facilitators of stable governance

Frequent political controversies weaken public confidence in constitutional institutions.

The growing frequency of such disputes has led to proposals for formal constitutional reform regarding gubernatorial discretion.

h. Justice Kurian Joseph Committee Recommendation

The Justice Kurian Joseph Committee recommended:

Creation of a new constitutional schedule dealing specifically with discretionary powers of Governors

Intended Objectives

- Establish uniform standards
- Reduce arbitrariness
- Enhance constitutional clarity
- Strengthen institutional credibility

This recommendation reflects growing concern regarding recurring disputes over government formation.

i. Core Constitutional Principle

Majority Means Majority of Members Present and Voting

Under parliamentary practice:

- A government is not required to demonstrate support of the total House strength at all times.
- Majority is determined on the basis of members present and voting during the confidence motion.
- Abstentions may alter the effective majority mark.

Consequently, the ultimate constitutional test of legitimacy remains the floor test conducted in the Legislative Assembly.

This principle reinforces the supremacy of the Legislature in determining political legitimacy within a parliamentary democracy.

j. Way Forward

Several reforms have been suggested to reduce controversies surrounding the Governor's role in hung Assemblies.

Institutional Reforms

- Codification of conventions relating to government formation
- Mandatory floor test within a fixed and short timeframe
- Greater transparency in gubernatorial decisions
- Strict adherence to Sarkaria and Punchhi Commission recommendations
- Reinforcement of constitutional morality and political neutrality

Such reforms can strengthen democratic trust while reducing constitutional uncertainty during political transitions.

Conclusion

The office of the Governor occupies a delicate position within India's federal and parliamentary framework. In a hung Assembly, discretionary powers become constitutionally significant, but such discretion must remain guided by democratic legitimacy, neutrality, and constitutional morality.

Ultimately, the floor of the Legislative Assembly, and not the subjective satisfaction of constitutional authorities, remains the true test of majority support in a parliamentary democracy.

GS Paper III: Security

2. TARA Glide Weapon System – India's Indigenous Precision Strike Capability

a. Introduction

Defence Research and Development Organisation, in collaboration with the Indian Air Force, successfully conducted the first flight trial of the Tactical Advanced Range Augmentation (TARA) system.

TARA represents India's first indigenous glide weapon system designed to convert conventional unguided bombs into precision-guided glide weapons. The development marks an important milestone in strengthening India's indigenous defence technology base and modern precision warfare capability.

b. Background and Strategic Context

Broader Strategic Relevance

The development of TARA is linked to India's broader emphasis on:

- defence indigenisation,
- strategic autonomy,
- modernisation of armed forces, and
- precision-strike capability.

The initiative also aligns with national programmes such as:

- Atmanirbhar Bharat,
- Make in India in Defence, and
- Defence Production and Export Promotion Policy.

Institutional Linkages

Institution**Role**

Defence Research and Development Organisation	Developed the TARA system
Indian Air Force	Conducted operational flight trials
Research Centre Imarat	Lead development centre

Strategic Importance of Indigenous Defence Systems

Indigenous weapons development is increasingly important because it helps India:

- reduce dependence on foreign suppliers,
- strengthen strategic sovereignty,
- secure supply chains during conflicts, and
- build long-term technological capability.

The strategic push toward self-reliance in defence has accelerated India's investment in smart and precision-guided weapon systems such as TARA.

OPERATIONAL ARCHITECTURE OF TARA GLIDE WEAPON SYSTEM**c. What is the TARA System?****Concept and Design**

- TARA, or Tactical Advanced Range Augmentation, is a modular glide weapon kit attached to conventional unguided bombs in order to transform them into precision-guided smart munitions.
- Unlike traditional gravity bombs that fall directly toward the target, TARA-equipped bombs glide through the air using aerodynamic control surfaces and navigation systems. This significantly enhances strike range and targeting accuracy without requiring rocket propulsion.

Core Objective

- The system enables India to upgrade existing bomb inventories into advanced precision-strike weapons in a cost-effective manner.

Nature of the Technology

- TARA essentially functions as a force multiplier because it transforms conventional “dumb bombs” into precision-guided munitions capable of stand-off attacks.

d. Operational Mechanism

Integrated Components of the System

Component	Function
Modular Glide Kit	Converts conventional bombs into guided glide weapons
Foldable Wings	Enable extended gliding after release
Guidance System	Uses inertial navigation and satellite-based positioning
Aerodynamic Control Surfaces	Maintain stable and controlled flight trajectory
Aircraft Launch Parameters	Altitude and release speed determine operational range

Working Process

- The weapon is released from a fighter aircraft at a designated altitude and speed. After release, foldable wings deploy automatically. Instead of falling vertically, the bomb glides toward the target while onboard navigation systems continuously adjust the trajectory to ensure precision targeting.
- This mechanism enables stand-off attacks from safer operational distances.

Importance of Stand-Off Delivery

- Stand-off capability allows combat aircraft to strike targets without entering heavily defended enemy airspace, thereby reducing operational vulnerability.

The operational architecture of TARA provides several important tactical and technological advantages for modern warfare.

e. Major Features of TARA

Technical and Operational Features

Feature	Details
Nature	Indigenous glide weapon kit
Type	Precision-guided munition
Range Enhancement	Extends strike range without rocket propulsion

Compatibility	Can be integrated with multiple Indian Air Force platforms
Variants	Available in three weight categories
Warhead Capacity	Suitable for 250–500 kilogram bomb class
Cost Profile	Lightweight and comparatively low-cost
Production Model	Developed with Development-cum-Production Partners

Significance of Modular Design

The modular architecture of the system improves:

- adaptability across aircraft platforms,
- scalability in production, and
- operational flexibility.

The combination of precision guidance and range augmentation gives TARA significant strategic relevance in modern air warfare environments.

f. Strategic Significance

i. Enhancement of Stand-Off Strike Capability

One of the most important advantages of TARA is its ability to improve stand-off strike capability. Aircraft can release weapons from beyond enemy air defence zones, thereby reducing operational risk.

This improves:

- aircraft survivability,
- pilot safety,
- mission flexibility, and
- deep-strike capability.

Relevance in Modern Warfare

- Stand-off warfare has become increasingly important because modern air defence systems are highly sophisticated and layered.

ii. Transformation of Conventional Bombs into Smart Weapons

TARA enables conventional bombs to function as precision-guided munitions.

This provides several operational advantages:

- rapid modernisation of existing stockpiles,
- expansion of precision-strike inventory,
- lower procurement costs, and
- reduced dependence on expensive missile systems.

Thus, the system combines affordability with operational effectiveness.

iii. Strengthening Indigenous Defence Manufacturing

The development of TARA contributes significantly to India's defence manufacturing ecosystem.

It supports:

- reduction in import dependence,
- development of indigenous technology,
- expansion of domestic manufacturing capability, and
- stronger public-private collaboration.

The project reflects India's broader objective of achieving strategic autonomy in critical defence technologies.

g. Technological Importance

Relevance in Contemporary Warfare

Modern warfare increasingly relies on:

- precision-guided munitions,
- network-centric operations,
- long-range engagement capability, and
- smart weapon systems.

Indigenous Technological Capability

TARA demonstrates India's growing expertise in:

- indigenous navigation systems,
- aerodynamic weapon design,
- guidance and control technologies, and
- affordable precision warfare solutions.

Link with Future Warfare

- The system complements India's transition toward advanced smart-weapon ecosystems and integrated battlefield management systems.

h. Global Context

International Comparison

Country	Comparable System
United States	Joint Direct Attack Munition kits
Russia	Guided glide bomb systems
China	Precision glide weapon upgrades

India's Strategic Position

- With TARA, India joins a select group of countries possessing indigenous glide-weapon conversion capability.

This strengthens India's status as an emerging defence technology power.

i. Analytical Perspective

Operational Efficiency

- The system extends strike range without increasing missile complexity. Existing bomb stockpiles can be upgraded rapidly, reducing logistical and procurement burdens.

Cost Optimisation

Compared to developing entirely new missile systems, glide kits involve:

- lower developmental expenditure,
- faster deployment cycles, and
- reduced maintenance requirements.

This makes precision warfare more economically sustainable.

Strategic Deterrence

- Precision-guided strike capability strengthens India's conventional deterrence posture by enhancing tactical flexibility and deep-strike options.
- Such systems improve the credibility of military preparedness in both conventional conflict and limited-war scenarios.

Despite these advantages, the system also faces important technological and operational challenges that require sustained policy attention.

j. Challenges and Limitations

Key Challenges

Challenge	Explanation
Navigation Dependence	Vulnerability to satellite signal disruption and jamming
Platform Integration	Requires compatibility testing across multiple aircraft
Operational Validation	Needs extensive developmental and user trials
Electronic Warfare Risks	Guidance systems may face enemy countermeasures
Industrial Scaling	Large-scale production requires sustained manufacturing capacity

Emerging Warfare Concerns

Future battlefields increasingly involve:

- electronic warfare,
- cyber disruption, and
- satellite denial capabilities.

Therefore, navigation resilience and anti-jamming capability are critical for operational effectiveness.

Following the successful initial trial, the system now enters the next phase of validation and operational integration.

k. Path Toward Operational Deployment

Recent Validation

The successful flight trial conducted near the Odisha Coast marks the first major validation stage of the system.

Next Stages of Development

The subsequent phases include:

- developmental trials,
- user trials,
- aircraft integration testing, and
- operational induction.

Industrial Participation

- The Defence Ministry has indicated that Indian industry partners have already initiated production-related activities.

The successful operationalisation of TARA will depend upon sustained technological innovation, industrial collaboration, and strategic planning.

1. Way Forward

Strengthen Indigenous Precision Warfare Capability

India should continue investing in:

- advanced seekers,
- Artificial Intelligence-assisted targeting, and
- smart guidance systems.

Improve Navigation Resilience

The system's resistance to electronic warfare should be enhanced through:

- anti-jamming technologies,
- secure communication systems, and
- greater integration with NavIC.

Deepen Defence Industrial Collaboration

- Public-private partnerships and participation of Micro, Small and Medium Enterprises should be expanded to strengthen supply chains and manufacturing capability.

Explore Defence Export Potential

- Affordable indigenous glide weapon systems may emerge as competitive exports for friendly nations seeking low-cost precision-strike solutions.

Integration with Joint Theatre Commands

- Precision glide weapons can significantly strengthen integrated theatre operations and coordinated battlefield management.

Conclusion

TARA represents an important step in India's journey toward indigenous precision-strike capability. By converting conventional unguided bombs into smart glide weapons, it enhances stand-off attack capacity, improves aircraft survivability, reduces dependence on imported systems, and supports India's broader defence indigenisation goals. However, its long-term effectiveness will depend on successful operational trials, platform integration, anti-jamming resilience, and scalable domestic production.

GS Paper III: Disaster Management

3: Urban Heat Island Effect and Delhi's Heat Crisis

a. Introduction

The Urban Heat Island Effect refers to:

A condition in which urban regions record higher temperatures than nearby rural areas because of dense built-up surfaces, vehicular emissions, industrial activity, and declining vegetation cover.

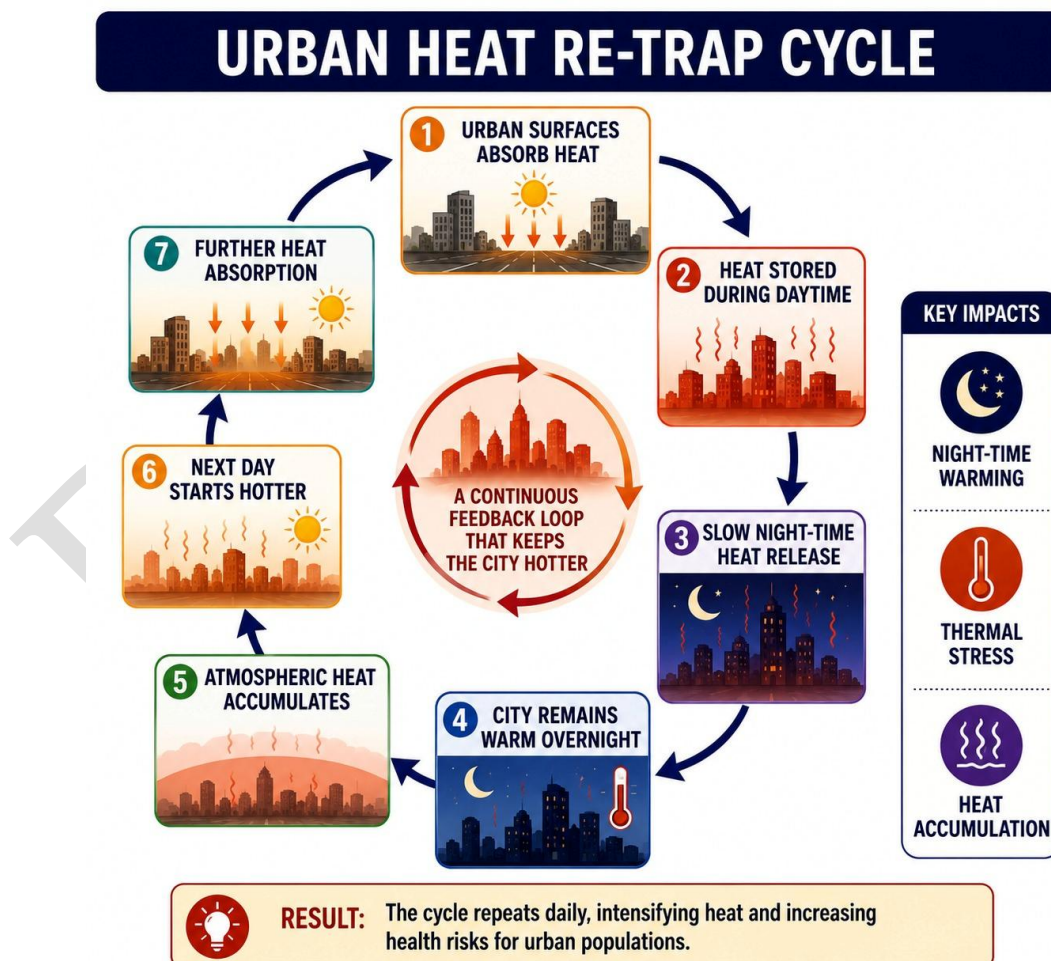
Urban areas absorb, store, and re-radiate large amounts of heat. In megacities such as Delhi, this process has intensified into what many experts describe as a “heat re-trap” phenomenon, where the city continuously retains and circulates heat even after sunset.

As a result, urban temperatures remain elevated during both day and night.

Key Characteristics of UHI

- Urban centres remain hotter than surrounding rural regions
- Night-time temperatures decline slowly in cities
- Built-up surfaces trap and re-radiate heat
- Human activities intensify local warming

The phenomenon becomes particularly severe in rapidly urbanising metropolitan regions with declining ecological balance.



b. Why is Delhi Retaining Excessive Heat?

i. Concrete-Dominated Urbanisation

Rapid urbanisation has transformed large parts of Delhi and adjoining regions into dense concrete landscapes dominated by:

- Concrete
- Asphalt
- Steel
- Glass structures

These materials possess high heat-absorption capacity.

Heat Retention Mechanism

During daytime:

- Built surfaces absorb substantial solar radiation.

During night-time:

- Stored heat is released slowly into the atmosphere.

Major Consequences

- Surface temperatures rise significantly in urban zones
- Night-time cooling becomes weak and ineffective
- Urban areas function like artificial heat reservoirs

The extensive replacement of natural land surfaces with impervious infrastructure has therefore intensified thermal stress across the city.

ii. Glass-Heavy Commercial Architecture

Modern commercial complexes, especially in areas such as Gurgaon and Noida, increasingly depend upon:

- Glass façades
- Sealed high-rise buildings

Although visually modern, such structures create significant thermal stress.

Major Consequences

- Glass surfaces permit large-scale solar heat entry
- Buildings become heavily dependent on air conditioning
- Heat expelled from cooling systems raises surrounding temperatures

This creates an artificial cooling dependence that further intensifies urban heating.

iii. Vehicular Heat Emissions

Delhi's dense traffic network contributes substantially to urban heat accumulation.

Sources of Heat Generation

- Engine heat
- Exhaust emissions
- Asphalt-based heat retention
- Traffic congestion and idling

Resulting Urban Conditions

- Thermal corridors emerge along major highways
- Persistent urban heat hotspots develop
- Ambient temperatures remain elevated

Vehicular congestion therefore functions both as a pollution source and as a direct contributor to urban warming.

iv. Decline of Traditional Cooling Urban Design

Traditional Indian settlements historically incorporated climate-sensitive features such as:

- Courtyards
- Verandahs
- Narrow shaded streets
- Natural ventilation pathways

These designs promoted airflow and passive cooling.

Impact of Modern Urban Design

Modern urban construction has resulted in:

- High-density vertical structures
- Reduced wind circulation
- Greater heat stagnation

The disappearance of climate-responsive architecture has weakened natural urban cooling mechanisms.

v. Loss of Green and Blue Infrastructure

Delhi has witnessed substantial ecological degradation in recent decades, including:

- Shrinking green cover
- Encroachment upon wetlands
- Degradation of Yamuna floodplains

Ecological Impacts

- Reduction in evapotranspiration
- Decline in soil moisture retention
- Weakening of natural temperature regulation

Vegetation and water bodies normally absorb and dissipate heat. Their decline has therefore intensified urban thermal stress.

The cumulative effect of infrastructure expansion, ecological degradation, and unsustainable urban design has transformed Delhi into a highly heat-vulnerable metropolitan region.

c. Role of Air Conditioning in Urban Heating

Air conditioners cool indoor spaces but simultaneously expel waste heat into the external environment.

Urban Feedback Cycle

- Rising temperatures increase dependence on air conditioning
- Cooling systems discharge additional heat outdoors

- Ambient temperatures rise further
- Demand for cooling increases again

This creates a dangerous feedback loop:

More heat leads to higher air-conditioner use, which releases additional heat and further raises ambient temperatures.

Thus, excessive dependence on mechanical cooling can unintentionally intensify the Urban Heat Island Effect.

The consequences of extreme urban heat are not limited to environmental discomfort but extend deeply into economic and developmental sectors.

d. Economic Impact of Extreme Urban Heat

i. Decline in Productivity

Extreme temperatures adversely affect:

- Worker efficiency
- Industrial productivity
- Construction activity
- Machine performance

Vulnerable Groups

Outdoor workers such as:

- Construction labourers
- Street vendors
- Delivery personnel
- Informal workers

are particularly vulnerable to heat stress.

Research indicates that labour productivity declines sharply when temperatures exceed optimal working conditions.

ii. Supply Chain and Infrastructure Stress

Heatwaves disrupt:

- Transportation systems
- Storage facilities
- Warehousing operations
- Urban infrastructure

Infrastructure Impacts

- Rail tracks may deform under thermal stress
- Roads experience surface deterioration
- Power systems face operational disruptions
- Cooling demand strains electricity networks

iii. National Economic Losses

Heat-related productivity decline and infrastructure stress impose major economic costs upon India annually.

Broader Implications

- Reduced economic efficiency
- Increased healthcare expenditure
- Greater infrastructure maintenance costs
- Slower urban productivity growth

Urban heat therefore represents not merely an environmental challenge but also a developmental and economic concern.

e. Ecological Consequences

i. Weakening of Urban Ecological Resilience

Reduction in:

- Trees
- Wetlands
- Urban forests
- Floodplains

has weakened the natural capacity of cities to regulate temperature and moisture.

Consequences

- Reduced climate resilience
- Increased vulnerability to extreme weather events
- Decline in biodiversity and ecosystem stability

ii. Rising Energy Demand

Cooling demand is projected to increase sharply in coming decades.

Likely Outcomes

- Greater pressure on electricity grids
- Increased risk of power shortages
- Higher fossil fuel consumption
- Rising greenhouse gas emissions

Thus, urban heat and energy demand reinforce each other in a mutually intensifying cycle.

The growing severity of urban heat necessitates structural and long-term planning interventions rather than temporary seasonal responses.

f. Structural Measures Required to Address the Heat Crisis

i. Climate-Sensitive Urban Planning

Urban planning must integrate climate resilience into city design.

Ventilation Corridors

Cities should preserve:

- Open spaces

- Wind pathways
- Proper street orientation

Benefits

These measures improve:

- Air circulation
- Heat dissipation
- Urban cooling efficiency

ii. Cool Roofs and Reflective Surfaces

High-Albedo Infrastructure

Materials with high reflectivity absorb less heat.

Use of:

- Reflective paints
- Cool roofs
- Light-coloured pavements

can significantly reduce surface temperatures.

High Albedo Principle

Albedo = Reflected Solar Radiation/Incoming Solar Radiation

Higher albedo implies greater reflection of sunlight and lower heat absorption.

iii. Passive Cooling Architecture

Buildings should adopt climate-responsive features such as:

- Cross-ventilation
- Shading devices
- Thermal insulation
- Courtyards
- Natural airflow systems

Passive cooling reduces dependence on energy-intensive air conditioning systems.

iv. Expansion of Green and Blue Infrastructure

Green Infrastructure

Cities should expand:

- Urban forests
- Parks
- Green belts
- Rooftop gardens

Blue Infrastructure

Protection and restoration of:

- Lakes
- Wetlands

- Riverfront ecosystems
- Rainwater harvesting systems

can improve humidity balance and lower surrounding temperatures.

These ecological systems function as natural cooling networks.

v. Sustainable Mobility Systems

Urban transport reforms are essential for reducing waste heat generation.

Required Measures

- Expansion of public transport
- Promotion of electric mobility
- Encouragement of cycling and walking infrastructure
- Reduction in private vehicle dependence

Benefits

These measures reduce:

- Vehicular emissions
- Fuel consumption
- Urban heat generation

vi. Energy-Efficient Cooling Systems

Cities must encourage:

- Energy-efficient appliances
- District cooling systems
- Green building standards

Outcomes

These measures reduce:

- Peak electricity demand
- Waste heat discharge
- Carbon emissions

vii. Social Protection Measures

Extreme heat disproportionately affects vulnerable populations such as:

- Urban poor
- Informal workers
- Slum residents
- Elderly persons

Required Interventions

- Community cooling centres
- Heat Action Plans
- Drinking water access
- Affordable housing improvements
- Early warning systems

Urban heat management must therefore incorporate social justice and public health dimensions.

g. Role of Urban Planning in Heat Mitigation

Urban planning remains central to long-term heat resilience.

Importance of Planning-Based Interventions

Urban planning can help:

- Regulate building density
- Protect ecological zones
- Integrate green infrastructure
- Promote climate-resilient construction

Developmental Transition Required

The broader developmental shift needed is:

From concrete-intensive expansion towards climate-responsive urbanisation.

This transition is essential for ensuring sustainable and liveable cities under changing climatic conditions.

h. Government Initiatives Relevant to Heat Management

Initiative	Purpose
National Action Plan on Climate Change (NAPCC)	Climate adaptation and resilience
Heat Action Plans	Heatwave preparedness
Smart Cities Mission	Sustainable urban infrastructure
AMRUT Mission	Urban water and green spaces
Energy Conservation Building Code (ECBC)	Energy-efficient construction

i. Challenges in Implementation

Challenge	Impact
Unplanned urbanisation	Greater heat retention
Weak enforcement of building norms	Unsustainable infrastructure
Loss of wetlands and forests	Reduced ecological cooling
Dependence on fossil fuels	Increased emissions

Urban inequality

Higher vulnerability of poor communities

Governance Constraints

- Limited urban planning capacity
- Weak coordination among agencies
- Financial constraints in local bodies
- Inadequate enforcement of environmental regulations

These implementation barriers often weaken the effectiveness of climate adaptation policies.

j. Way Forward

Long-Term Urban Reforms

India's urban future must incorporate climate-sensitive development strategies.

Key Priorities

- Mainstream climate-responsive urban planning
- Mandate cool roofs and green buildings
- Restore urban ecosystems
- Integrate heat resilience into master plans
- Strengthen urban local governance capacity

Strategic Focus

Future urbanisation must prioritise:

- Sustainability
- Ecological restoration
- Public health resilience
- Inclusive urban development

Such reforms can help Indian cities become both climate-resilient and socially sustainable.

Conclusion

The Urban Heat Island Effect represents one of the most serious emerging urban environmental challenges in India. Delhi's heat crisis demonstrates how rapid urbanisation, ecological degradation, and unsustainable infrastructure can combine to intensify climate vulnerability.

Addressing this challenge requires a shift from reactive heat management towards long-term climate-responsive urban planning rooted in sustainability, ecological restoration, and social equity.

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.

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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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