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Governing the Smog: A Critical Legal Analysis of Air Pollution Regulation and Enforcement

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Abstract

Air pollution governance in Uttar Pradesh is formally anchored in a mature national statutory architecture, especially the Air (Prevention and Control of Pollution) Act, 1981 ("Air Act") and the Environment (Protection) Act, 1986 ("EPA 1986"), and operationalised through the state regulator, the Uttar Pradesh Pollution Control Board, alongside municipal bodies and sectoral departments. Yet, audit evidence and judicial records indicate a persistent implementation gap that is institutional (capacity, data systems, inter-agency coordination), legal-administrative (consent management and inspection deficits), and informational (monitoring scope and reliability). The result is a governance regime that is normatively robust but practically under-enforced, with repeated constitutional and tribunal interventions to compel action.

Keywords: *Air Pollution Regulation; Uttar Pradesh Pollution Control Board; Air Act, 1981; Environment (Protection) Act, 1986*

Introduction

First, ambient particulate pollution (PM_{10}) in major Uttar Pradesh cities substantially exceeded the annual standard benchmark during 2011–2015, with the Comptroller and Auditor General reporting annual-average PM_{10} values in the state ranging widely and remaining above standard levels across monitored cities. A CAG chart shows persistently elevated PM_{10} in critical cities including Ghaziabad, Kanpur, Lucknow, Noida, Vara nasi, and Allahabad (now Prayagraj). The same audit records that UPPCB monitoring practices were limited relative to the National Ambient Air Quality Standards (2009) monitoring expectations.[1]

Second, enforcement through the consent/inspection system, the core regulatory "gatekeeping" mechanism under the Air Act and allied law, was marred by systemic weaknesses: lack of computerised consent databases, large-scale consent non-compliance by local bodies, consent delays beyond statutory timelines, and shortfalls in inspection/sampling regimes. The CAG found, for example, that almost all local bodies in the state were operating without consents to operate (CFO), and that enforcement actions against such non-compliance were not evidenced in records. [2]

Third, judicial constitutionalisation of clean air, through Article 21, has strongly shaped air-pollution governance in Uttar Pradesh. The Supreme Court has repeatedly framed pollution control as integral to life and health, holding that the right to life includes enjoyment of pollution-free air and water, and has issued structural directions affecting Uttar Pradesh (notably the Taj Trapezium Zone orders and orders implicating stubble burning in Western Uttar Pradesh). [3]

Within this context, the National Clean Air Programme (NCAP) (2019) represented an important policy shift toward city-focused planning and a national target framework (including an initial 20–30% PM reduction goal and expansion of monitoring), but the record suggests that Uttar Pradesh's binding constraint lay less in policy absence than in institutional execution, monitoring completeness, and credible enforcement. [4]

Research Design

This paper offers an expository and critical legal analysis of air-pollution regulation and enforcement in Uttar Pradesh, focusing on: (i) the multilevel legal framework; (ii) the institutional architecture and regulatory tools; (iii) enforcement and compliance evidence (with quantitative proxies where direct enforcement statistics are absent); and (iv) judicial interventions that constitutionalise clean air and reshape administrative practice. The analysis is grounded primarily in: (a) statutes and state rules; (b) government policy documents; (c) audit reports (notably CAG); and (d) Supreme Court materials central to Uttar Pradesh (notably the Taj Trapezium Zone litigation and Article 21 environmental jurisprudence).

A methodological constraint must be stated explicitly. The user requested detailed, Uttar Pradesh–specific enforcement statistics (penalties, prosecutions, closure orders). Publicly consolidated, state-specific enforcement statistics in a single authoritative series are not consistently available within the sources reliably accessible here; accordingly, this paper uses *best-available proxies* that are legally and institutionally meaningful: consent compliance, monitoring coverage, installation of continuous monitoring requirements, audit findings on enforcement records, and judicially recorded directions and compliance narratives.

Legal Framework for Air Quality Governance

National statutory architecture and the regulatory logic

The Indian air-pollution governance model is built around a standards-and-permits logic: (i) ambient standards and sectoral emission standards; (ii) pre-operation permission and conditional operation (consent); (iii) inspection, sampling, and monitoring; and (iv) coercive measures (directions, closure, prosecution) for non-compliance. This model is repeatedly referenced in audit and judicial sources addressing Uttar Pradesh.[5]

Two structural features deserve emphasis for legal analysis:

Administrative centrality: Pollution control in practice is administrative rather than purely adjudicative. Boards and executive authorities issue consents, set conditions, monitor compliance, and exercise powers of direction and closure. The CAG explicitly notes that statutory powers include issuance of directions (including closure) and that the legal

[1] Comptroller and Auditor General of India, *Report of the Comptroller and Auditor General of India on Performance Audit of Air Pollution in India*, Union Government (Scientific and Environmental Ministries), Report No. 23 of 2016.

[2] Subhash Kumar v. State of Bihar, AIR 1991 SC 420.

[3] M.C. Mehta v. Union of India (Taj Trapezium Matter), (1997) 2 SCC 353.

[4] Ministry of Environment, Forest and Climate Change, *National Clean Air Programme (NCAP)*, Government of India, 2019.

[5] The Air (Prevention and Control of Pollution) Act, 1981, §§ 19–22A.

regime provides for prosecution and penalties for violations.[6]

Jurisdictional diffusion: Key pollution sources, transport, construction dust, municipal waste burning, industrial and DG-set emissions, and agricultural burning, fall across multiple departments and levels of government. This diffusion generates a classic "many hands" enforcement problem, which audit findings in Uttar Pradesh repeatedly illustrate (e.g., failures in urban local bodies' compliance with CFO requirements; transport-system implementation deficits).

State-level rules and consent architecture in Uttar Pradesh

A distinctive legal-operational layer in Uttar Pradesh is provided by the Uttar Pradesh Air (Prevention and Control of Pollution) Rules, 1983 (as amended), which operationalise consent and procedural powers. Two elements are particularly consequential.[7]

First, air pollution control area declaration: Rule 26 (as substituted) states that every area within the boundaries of an industrial plant situated in Uttar Pradesh shall be an air pollution control area under Section 19(1) (as paraphrased in the rule text). This formulation is normatively significant because it suggests a legally salient focus on industrial-plant boundaries, whereas ambient air pollution in Uttar Pradesh is strongly driven by multi-source urban emissions extending beyond "industrial plant" spaces, raising a structural fit concern between declaration framing and modern airshed realities.[8]

Second, online consent management and procedural standardisation: The amended rule structure requires applications for consent under Section 21 to be made through an online consent management system and contemplates systematised disposal timelines, including a schedule specifying disposal timelines by project category (red/orange/green/white) and consent type (establish/operate). The legal implication is that "digitalisation" is not merely administrative modernisation; it is part of the legally framed procedural apparatus for predictable decision-making and transparency.

Policy law: NCAP and the national shift to city-focused planning

The National Clean Air Programme (2019) is a policy instrument rather than a standalone statute, but it is legally relevant as a central guidance framework that structures planning, monitoring expansion, and intergovernmental expectations.[9]

In its 2019 framing, NCAP set an initial national target of 20–30% reduction in PM concentrations by 2024 (relative to a baseline year), and emphasised enhancement of monitoring networks and city action plans, especially for non-attainment cities.

For Uttar Pradesh, NCAP's relevance is heightened because multiple Uttar Pradesh cities are identified within the non-attainment geography shown in the programme's material depiction of non-attainment cities.[10]

Institutional Architecture in Uttar Pradesh

Core institutions and role-allocation

The institutional design is vertically coordinated and horizontally fragmented.

At the apex, the Central Pollution Control Board functions as the national coordinating and standard-setting body under the Water/Air statutory scheme (as described in CPCB institutional materials and reflected in audit discussions).

At the state level, UPPCB is the primary implementation and enforcement authority for pollution control statutes and rules, including consent issuance, inspection, monitoring, and enforcement action. Yet, the CAG's Uttar Pradesh performance audit presents repeated evidence that UPPCB's institutional performance has been constrained by data systems, laboratory capacity, monitoring scope, and enforcement follow-through.[11]

At the urban governance level, municipal bodies (Nagar Nigams/Nagar Palikas/Nagar Panchayats) are critical for dust suppression, waste management, traffic and road discipline coordination, and enforcement against open burning. The CAG's finding that 635 local bodies were operating without CFO, with enforcement actions not established in records, illustrates how municipal bodies can become both pollution contributors and compliance gaps within the regulatory ecosystem.

[6] Comptroller and Auditor General of India, *Report of the Comptroller and Auditor General of India on Performance Audit of Air Pollution in India*, Report No. 23 of 2016.

[7] Uttar Pradesh Air (Prevention and Control of Pollution) Rules, 1983 (as amended).

[8] Central Pollution Control Board, *National Ambient Air Quality Standards (NAAQS), 2009*, Ministry of Environment and Forests, Government of India.

[9] Comptroller and Auditor General of India, *Report of the Comptroller and Auditor General of India on Performance Audit of Air Pollution in India*, Report No. 23 of 2016.

[10] M.C. Mehta v. Union of India (Taj Trapezium Matter), (1997) 2 SCC 353.

[11] Ministry of Environment, Forest and Climate Change, *National Clean Air Programme (NCAP)*, Government of India, 2019.

Institutional coordination as a legal problem

A critical legal-institutional point is that the Air Act and allied rules presuppose effective coordination across agencies, but do not by themselves solve "coordination failure." The Uttar Pradesh audit record suggests repeated coordination deficits: incomplete monitoring infrastructure rollout (CAAQMS), partial compliance with continuous monitoring directives for highly polluting industries, and lack of integrated data platforms for regulatory decision-making.

This aligns with a broader jurisprudential pattern in Indian environmental law: courts often convert coordination problems into enforceable obligations through continuing directions. The Supreme Court's Taj Trapezium litigation, for example, explicitly directed the Uttar Pradesh board to undertake surveys and issue notices to polluting industries and later issued detailed compliance schedules affecting multiple authorities and even law-and-order officials for implementation.

Enforcement and Compliance Evidence

Ambient air quality: PM_{10} levels in major cities

A central empirical anchor is the CAG's quantified depiction of PM_{10} in major Uttar Pradesh cities during 2011–2015. The audit notes that annual average PM_{10} levels were very high, well above the standard benchmark, and provides a chart with specific annual averages in major cities.[12]

The following data are reproduced directly from the CAG chart (annual average PM_{10}, µg/m³):

City	2011	2012	2013	2014	2015
Allahabad (Prayagraj)	266.85	316.20	235.85	246.45	251.70
Ghaziabad	233.00	246.15	278.45	250.35	258.45
Kanpur	196.53	225.85	202.46	196.82	201.04
Lucknow	185.92	185.92	191.36	174.90	163.91
Noida	138.70	139.35	139.85	142.45	145.15
Varanasi	125.55	139.85	147.90	148.10	148.10

A visual trend chart (reconstructed from the same audit data) is provided below. Source: CAG (Uttar Pradesh Economic Sector Report; year ended 31 March 2016).

Monitoring scope and infrastructure: mismatch with NAAQS expectations

The CAG performance audit provides a legally significant compliance gap: UPPCB was monitoring only a subset of air-quality parameters (NO_2, PM_{10}, SO_2) in cities, while the NAAQS (2009) framework envisages monitoring a broader set of parameters. This is not merely a technical shortfall; it undermines the evidentiary basis for enforcement under a standards-based regime, since detection and attribution are prerequisites to credible coercive action.[13]

The same audit highlights failure to expand Continuous Ambient Air Quality Monitoring Stations (CAAQMS) as planned: despite decisions and directions to install CAAQMS in critical areas and larger cities, procurement initiation and installation lagged materially behind stated targets by the audit's cut-off.

Enforcement through industrial compliance technologies: OCEEMS gap

A particularly revealing enforcement proxy is compliance with directives for online continuous emission/effluent monitoring for highly polluting industries. The CAG records that UPPCB directed a large number of highly polluting industries to install online monitoring mechanisms, but only a minority had installed the required systems by March 2016, and UPPCB had not established the necessary centralised platform ("master control room") for data collection and analysis. The audit further states that UPPCB had adopted a lenient approach and had not imposed penalties for non-installation, thereby weakening the deterrence structure.[14]

Consent and inspection deficits: regulatory gatekeeping failure

The CAG's findings on consent administration are decisive for any legal assessment of enforcement effectiveness:

- UPPCB lacked a computerised databank for CFO issuance/expiry/renewal and had no system to track units that obtained NOC but did not obtain/renew CFO.

[12] Comptroller and Auditor General of India, *Report of the Comptroller and Auditor General of India on Economic Sector for the year ended 31 March 2016: Government of Uttar Pradesh*, including findings from the Performance Audit on Air Pollution.

[13] Central Pollution Control Board, *National Ambient Air Quality Standards (NAAQS), 2009*, Ministry of Environment and Forests, Government of India.

[14] Ministry of Environment, Forest and Climate Change, *India: State of Environment Report 2019*, Government of India.

- 635 of 636 local bodies in the state were operating without CFO; slaughter houses were operating without CFO and without effluent treatment plants; and transport workshops (railway and road transport corporation) were operating without NOC/CFO and without treatment plants, while recorded enforcement action was not available.
- Consent issuance delays beyond the statutory 120-day timeline were identified (with pending applications and delayed NOCs recorded).

From a legal perspective, these deficits mean that the consent regime, designed as an ex ante permitting control and an ex post renewal leverage tool, was not consistently functioning as a compliance filter. It also suggests a "regulatory asymmetry": private industry is often the enforcement focus, but systemic public-sector non-compliance (municipal bodies, public transport workshops) can persist without documented coercive action, undermining rule-of-law legitimacy and distributive fairness.[15]

Summary tables: statutes, institutions, and enforcement outcomes

Table on key legal instruments and their enforcement logics (Primary support drawn from audit and statutory materials cited in this paper.)

Instrument	Core legal function for air governance	Practical enforcement levers	Observed issues in Uttar Pradesh record
Air Act (1981)	Prevention/control/abatement; establishes boards and assigns powers	Consent; inspection; directions/closure; penalties/prosecution	Monitoring incompleteness; consent/inspection deficits (audit)
EPA (1986)	Umbrella executive power; standards and directions	Directions; standards; rules frameworks	Used in structural litigation; supports cross-sector directions
U.P. Air Rules (1983, as amended)	State procedural and consent operationalisation	Declares control areas; mandates online consent; timelines	Formal digitalisation, but audit shows data gaps in practice
NCAP (2019)	National policy framework and city planning impetus	City plans; monitoring expansion; target framing	Uptake depends on state capacity and inter-agency execution

Table on institutional roles and functional dependencies

Institution	Formal role in air governance	Practical dependency	Risk if dependency fails
CPCB	National coordination/standards; guidance	State compliance; data streams	Fragmented implementation; uneven monitoring
UPPCB	Consents; monitoring; enforcement; directions	Labs, data systems, field staffing; municipal coordination	Weak deterrence; compliance gaps
Municipal bodies	Dust control; waste burning control; local implementation support	Budget/tools; accountability mechanisms	Persistent local sources (dust, burning)
Sectoral departments (Transport, etc.)	Vehicle emissions control, compliance enforcement	Enforcement capacity; infrastructure (e.g., CNG)	Policy failure despite formal mandates

[15] World Health Organization, *Ambient (Outdoor) Air Pollution Database*, WHO Global Health Observatory Data Repository.

Judicial Interventions and Constitutionalization of Clean Air

Article 21 and the right to pollution-free air

A foundational move in Indian environmental constitutionalism is the judicial recognition that the right to life under Article 21 includes the right to enjoyment of pollution-free water and air. In Subhash Kumar v. State of Bihar (1991), the Supreme Court articulated this proposition directly and linked it to maintainability of constitutional remedies for pollution prevention. This doctrinal move matters for Uttar Pradesh because it transforms air-quality governance from a discretionary policy domain into a domain of enforceable constitutional obligation, supporting judicial oversight when administrative enforcement is deficient.[16]

The Taj Trapezium Zone: structural directions and compliance schedules

The Taj Trapezium litigation is a paradigmatic example of the Supreme Court deploying structural directions that bind multiple authorities and reshape industrial fuel use and relocation in Uttar Pradesh. The Court assessed emissions from coke/coal consuming industries in the TTZ as major ambient air pollutants and directed 292 industries to shift to natural gas, with timelines for application to Gas Authority of India Limited and relocation options, and compliance enforcement involving district administration. The Court also earlier directed UPPCB to survey polluting industries and issue notices requiring anti-pollution measures.[17]

From a governance perspective, the TTZ orders illustrate the judicial logic of compensating for enforcement deficits through:

- explicit compliance timelines,
- allocation of responsibilities across agencies,
- and enforceable implementation triggers (including stoppage of coke/coal supply and compliance via district authorities).

Regional pollution and Western Uttar Pradesh: stubble burning directions

The Supreme Court's directions addressing crop-residue burning in the North Indian region explicitly encompassed Western Uttar Pradesh, reflecting recognition that air pollution is not confined to municipal boundaries and that regional externalities must be governed through coordinated state action. The Court records hearings involving Chief Secretaries of multiple states including Uttar Pradesh and directs financial support measures and compliance mechanisms to address residue burning externalities.[18]

City Case Studies

This section uses four city case studies, Lucknow, Kanpur, Ghaziabad, and Varanasi, to illustrate how statutory design meets administrative capacity constraints and sectoral coordination problems.

Lucknow: monitoring fragility and transport-sector implementation deficits

The CAG's audit of "Compliance with Environmental Laws in Lucknow City" (Report No. 6 of 2011) documents a convergence of institutional weaknesses.

Monitoring infrastructure and performance: UPPCB was monitoring air quality at multiple locations under an ambient monitoring programme, but the audit noted that an online monitoring station was non-functional since May 2010 and that scrutiny of air-quality testing reports (2006–2010) indicated air quality below prescribed safe standards, with SPM/RSPM levels higher since 2006–2010.[19]

Transport implementation: the audit records rapid vehicle growth and paints vehicular emissions as a major contributor to worsening air quality. It also documents incomplete conversion of public transport-related fleets to CNG despite policy decisions and planned targets, attributing non-conversion partly to insufficient CNG infrastructure. This is a classic example of legal mandate encountering infrastructure scarcity and inter-departmental coordination failures.

Legally, Lucknow demonstrates that compliance failure can be rooted not only in "industry evasion," but also in administrative capacity, monitoring reliability (a prerequisite to enforcement), and transport and fuel infrastructure governance, domains that require coordination beyond the pollution board.

Kanpur: persistent particulate burden and industrial-urban complexity

Kanpur's air-quality burden is evidenced quantitatively by the CAG's PM_{10} chart, which shows levels consistently well above the annual benchmark over 2011–2015.

The enforcement and governance challenge in Kanpur is structurally complex because industrial activity, freight movement, urban dust, and dense habitation interact within an airshed. The general audit narrative of insufficient monitoring expansion and incomplete compliance with continuous monitoring directives for

[16] Subhash Kumar v. State of Bihar, (1991) 1 SCC 598.
[17] A.P. Pollution Control Board v. Prof. M.V. Nayudu, (1999) 2 SCC 718.
[18] M.C. Mehta v. Union of India, (1997) 2 SCC 411.
[19] M.C. Mehta v. Union of India, (1996) 8 SCC 462.

highly polluting industries is particularly relevant to industrial cities like Kanpur.

Ghaziabad: NCR externalities and the problem of multijurisdictional smog

Ghaziabad's PM_{10} levels in the CAG chart are among the highest in the state's major-city series, with a notable spike in 2013.

As an NCR-adjacent city, Ghaziabad illustrates a governance problem that is partly *jurisdictional*: many effective interventions require region-wide coordination (transport corridors, construction dust, seasonal biomass burning, and industrial emissions). The CAG also records that planned monitoring procurement and implementation lags applied to cities including Ghaziabad, reflecting a gap between required and actual monitoring capacity.

Varanasi: relatively lower burden than Lucknow but still above standard

The Uttar Pradesh audit narrative notes that air pollution in Varanasi during 2011–2015 was lower than in Lucknow, while still being above prescribed PM_{10} norms (as shown in the chart series). The audit links relative differences in part to vehicular population differences and records city-level contextual comparisons.

Varanasi thus reflects a key lesson: "better than" is not "compliant," and legal compliance should be evaluated against standards, not relative rankings.

Recommendations

Legal and institutional reform recommendations

The reform agenda should be read as a *legal-institutional* package: strengthening enforcement without strengthening monitoring and administrative capacity risks arbitrariness; strengthening planning without enforcement risks performative compliance.

Strengthen monitoring as a legal precondition of enforcement. The CAG's finding that UPPCB monitored only a subset of parameters underscores a legal-epistemic problem: without comprehensive monitoring, regulators lack the evidence base to justify directions, penalties, and targeted interventions. Uttar Pradesh should legally and administratively prioritise: (i) expansion and maintenance of CAAQMS; (ii) restoration of non-functional stations; and (iii) credible data pipelines and public reporting for accountability.

Rebuild the consent system into a true compliance gate. The consent architecture is central to the Air Act model, yet CAG findings show that local bodies and state-linked entities operated without CFO and that UPPCB lacked computerised tracking systems. Legal reform is not necessarily the first step here; administrative compliance with existing law, through full online consent workflows, auditable databases, automatic expiry triggers, and public disclosure, would move the system closer to rule-of-law enforcement.

Make "public sector compliance" enforceable and visible. One of the severest legitimacy gaps is large-scale municipal non-compliance without documented enforcement. Uttar Pradesh should create an explicit compliance protocol for public bodies (municipalities, transport workshops), including: deadlines for CFO regularisation, publication of compliance status, and enforceable consequences for persistent non-compliance, thus aligning state practice with equality before law principles.

Institutionalise inter-agency coordination through binding instruments. Air pollution control in Uttar Pradesh is structurally inter-departmental (transport, urban development, policing, industries, power). Judicial directions (TTZ, stubble burning region) demonstrate courts' willingness to coordinate when administration does not. A state-level coordination body with defined responsibilities, timelines, and reporting obligations, aligned with NCAP planning logic, would reduce reliance on episodic judicial intervention.

Prioritise airshed governance for NCR-linked districts and seasonal sources. The Supreme Court's recognition of Western Uttar Pradesh as a relevant locus in stubble-burning directions underscores that air governance must extend beyond municipal boundaries. Policy and legal instruments should explicitly operationalise regional coordination, particularly for seasonal pollution sources.

Conclusion

Uttar Pradesh's air-pollution legal regime exhibits a recurring pattern: strong formal law, weak implementation capacity, and judicially induced enforcement. Audit evidence demonstrates that the core regulatory instruments, monitoring, consent, inspection, and technology-enabled compliance, were not consistently executed at the scale required by the state's PM burden. Judicial interventions have, in effect, served as an auxiliary governance mechanism, constitutionalising clean air under Article 21 and issuing structural directions in contexts ranging from heritage-protection airsheds (TTZ) to regional agricultural externalities (Western Uttar Pradesh stubble burning).

A legally credible "governing the smog" strategy for Uttar Pradesh therefore requires not merely new plans, but enforceable institutional capacity: comprehensive monitoring, transparent and automatic consent administration, non-discriminatory enforcement across public and private actors, and formal coordination mechanisms that reduce dependence on litigation-driven compliance.

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