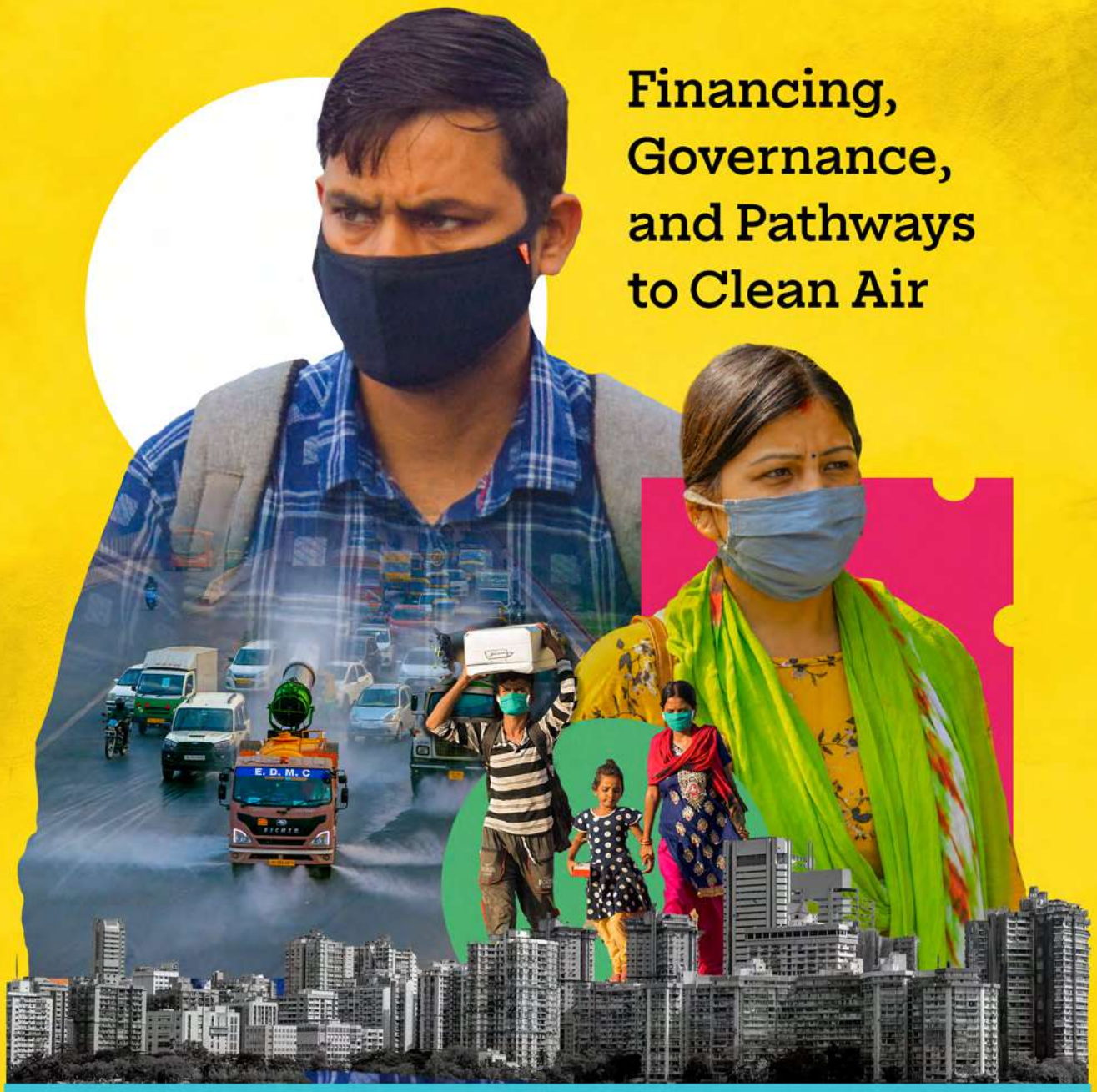
JANAAGRAHA

Financing, Governance, and Pathways to Clean Air




# Whose Air is it Anyways?

Janaagraha is a non-profit working to transform quality of life in India's cities and towns. For over two decades, the organisation has strengthened the city-systems that enable urban India to plan, design, govern, fund, and manage itself.

The organisation's work focuses on three foundational city-systems: Planning and Design, Decentralised Participatory Governance, and State Capacities. Through these, it advances outcomes across climate, health, and equity — addressing the urgent challenges India's cities face.

Janaagraha is driven by a fundamental conviction: how well India urbanises will determine how well India develops. The organisation champions sustainable urban development through systemic reforms, partnering with constitutional bodies, union and state governments, and civil society organisations. Its engagements span the XIII, XIV, XV, and XVI Finance Commissions, State Finance Commissions, Second Administrative Reforms Commission, Comptroller and Auditor General of India, NITI Aayog, Ministry of Housing and Urban Affairs, and state governments including Assam, Odisha, Uttar Pradesh, and Karnataka.

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# Whose Air is it Anyways?

## Financing, Governance, and Pathways to Clean Air

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This work allows us at Janaagraha to develop city-systems thinking at the intersections of air quality, a critical agenda for India, and its citizens, and urban local governments.

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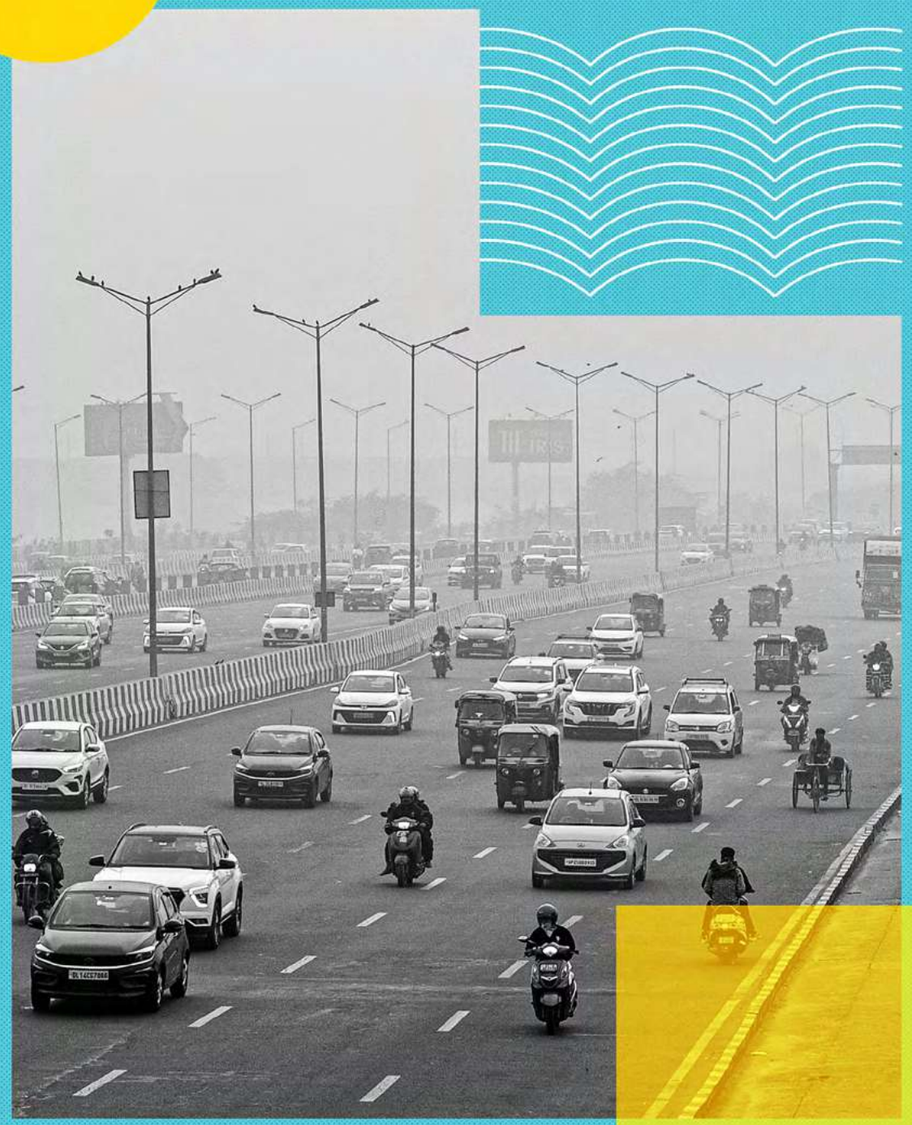
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# Introduction



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01

Nearly 200 Indian cities fall short of the nationally set standards for concentration of PM10, while more than 100 cities do not comply with the standards for PM2.5 - both airborne particles fine enough to penetrate deep into the lungs and bloodstream.

Nearly 200 Indian cities fall short of the nationally set standards for concentration of PM10, while more than 100 cities do not comply with the standards for PM2.5 — both airborne particles fine enough to penetrate deep into the lungs and bloodstream. As India urbanises rapidly, addressing air pollution becomes essential not only for protecting public health but also for ensuring liveable, economically competitive, and climate-resilient cities.[1]

Air is fundamental to human life. It is the one resource that everyone relies on unceasingly, regardless of geography, income, or social standing. However, clean air in Indian cities is becoming an increasingly unassured necessity.

For millions of people living in urban India, in cities big or small, polluted air is no longer an occasional environmental issue, but rather an everyday reality. It affects how people travel, work, study, exercise, and navigate their cities. Poor air quality has severe consequences for public health, economy, productivity, and overall quality of life.

**In 2024, 35 of the 50 most polluted cities globally were in India, with concentrations above**

**66.4 µg/m3[2]**

This figure is at least 13 times the particulate matter concentration as per the World Health Organisation (WHO) air quality guidelines[3] and at least 1.6 times the National Ambient Air Quality Standards (NAAQS)[4] in India.

India's urbanisation story is unfolding alongside a deepening air pollution crisis. As cities expand, construction intensifies, vehicle ownership rises, industrial activity grows, energy demand increases, and particulate pollution remains persistently high across many urban centres. The challenge is no longer confined to a few metropolitan regions. Nearly 200 Indian cities exceed the nationally prescribed standards for PM10 concentrations, while more than 100 cities exceed standards for PM2.5.[5] Even cities outside traditionally recognised pollution hotspots are increasingly experiencing deteriorating air quality.

**100+**

**Indian Cities Exceed PM2.5 Standards**

This fine particulate matter, produced by combustion, industry, and biomass burning, is the pollutant most damaging to health.

**200+**

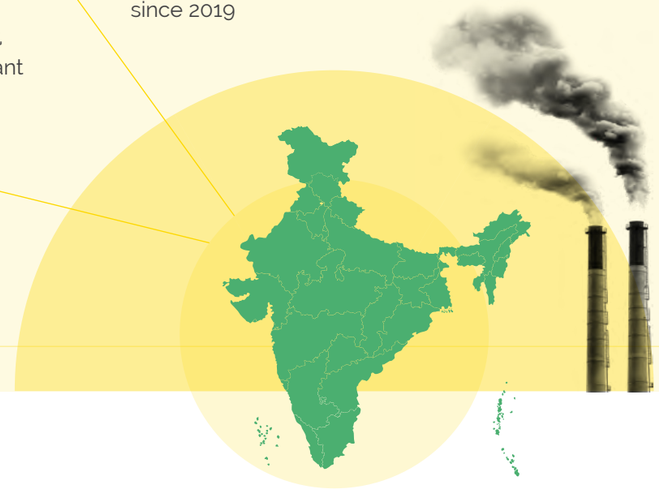
**Indian Cities Exceed PM10 Standards**

This coarse particulate matter is produced by dust, construction, and vehicular emissions.

**130**

**Non-Attainment[6] Cities Under NCAP[7]**

Identified for priority intervention since 2019



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Air pollution in India emerges from multiple sectors. Industry, transport, power generation, construction, residential combustion, and agricultural activities all contribute to urban particulate pollution. Residential combustion and industrial activity account for a significant share of PM2.5 emissions,[8] while vehicular emissions, industrial activity, dust, and biomass burning remain major contributors to PM10 concentrations.[9] The complexity of these emission sources means that urban air pollution cannot be addressed through isolated interventions or by any single institution acting alone.

The implications of polluted air extend far beyond environmental degradation. Air pollution directly affects public health outcomes and increases exposure to respiratory and cardiovascular risks. PM2.5 and PM10 concentrations continue to remain significantly above prescribed standards across several Indian cities monitored under the National Clean Air Program (NCAP), initiative by the Ministry of Environment, Forest and Climate Change (MoEFCC) with time-bound targets focused on improving air quality across cities.[10] The persistence of these pollution levels raises concerns not only because of their intensity, but because of the duration and scale of exposure experienced by urban populations. For city residents, especially vulnerable populations including children, elderly citizens, and outdoor workers, polluted air is not episodic but ever-present.

At the same time, air pollution imposes significant economic costs on cities and states. Poor air quality affects labour productivity, increases public health expenditure burdens, disrupts urban liveability, and weakens the long-term economic competitiveness of cities.  It undermines India's potential urban-driven economic growth projected for the coming decades. The issue therefore cannot be viewed only through an environmental lens. It is equally a public health challenge, a governance challenge, and a development challenge.



The growing recognition of these risks has resulted in increasing policy and institutional attention toward urban air quality management over the last decade. Air pollution has gradually moved from being treated narrowly as a technical issue to becoming a governance and public policy concern. Citizens, courts, civil society organisations, researchers, and governments have all contributed to bringing air quality into national policy discourse. This shift has also resulted in significant expansion of monitoring infrastructure, city action plans, research, and public financing mechanisms targeted toward cleaner air outcomes.

The launch of the National Clean Air Programme (NCAP) in 2019 marked an important shift in India's approach to urban air quality management. NCAP aimed to improve air quality across the 130 non-attainment cities where PM2.5 and PM10 concentrations exceeded the national standard. Among these, million-plus cities — highly populated urban centres — received dedicated funding under the Fifteenth Finance Commission's Million-Plus Cities Challenge Fund. With NCAP, for the first time, air pollution mitigation was framed as a coordinated national programme involving multiple levels of government and centred around measurable improvements in particulate pollution.

Yet despite growing public attention and expanding institutional focus, air quality outcomes across many Indian cities continue to remain poor. This persistence despite increasing policy attention raises deeper questions about how Indian cities govern, finance, and implement air quality management.

Air pollution today is no longer only an environmental issue. It is a governance challenge that sits at the intersection of urban development, public health, infrastructure, institutional capacity, and inter departmental coordination. Understanding why Indian cities continue to struggle with air quality therefore requires examining not only pollution levels, but also the systems designed to address them.

Poor air quality affects labour productivity, increases public health expenditure burdens, disrupts urban liveability, and weakens the long-term economic competitiveness of cities.



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# How are Clean Air Efforts Financed in India?



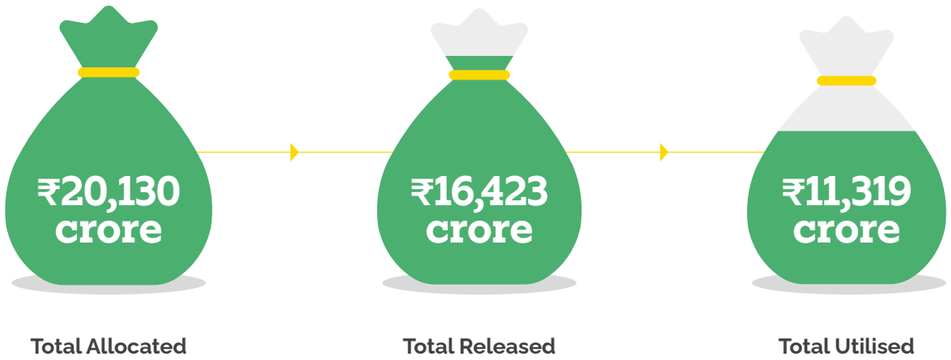
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02

The National Clean Air Programme initially targeted reductions of 20 to 30 per cent in particulate matter concentrations, later revised to 40 per cent reduction in PM10 levels compared to 2019-20 baseline levels or attainment of national standards by 2025-26.

In 2019, India began efforts to finance air quality improvements. It has since directed INR 20,130 crore[11] towards improving air quality across 130 non-attainment cities under the National Clean Air Programme (NCAP) and related funding mechanisms. This marked a significant shift in how air pollution was approached in India. With the launch of NCAP, air quality management is no longer positioned only as an environmental or regulatory issue, but is viewed as a governance, financing, and urban implementation challenge requiring coordinated action across multiple institutions and levels of government.

**Figure 1** **Fifteenth Finance Commission and NCAP - Total Allocation, Release, and Utilisation (FY 2020–21 to Sep 2025)**




The National Clean Air Programme sought to improve air quality across non-attainment cities where PM10 and PM2.5 concentrations exceeded nationally prescribed standards. The programme initially targeted reductions of 20 to 30 per cent in particulate matter concentrations, later revised to 40 per cent reduction in PM10 levels compared to 2019-20 baseline levels or attainment of national standards by 2025-26.

A major turning point came with the integration of the Fifteenth Finance Commission's performance-linked grants for million-plus cities. Historically, Finance Commission grants to Urban Local Governments (ULGs) were largely unconditional. The Fifteenth Finance Commission altered this structure by introducing performance-based funding linked directly to measurable outcomes in sectors such as air quality, water, and sanitation. Million-plus cities received grants tied to improvements in air quality indicators, marking the first large-scale use of outcome-linked financing for urban air pollution management in India.

Between FY 2020-21 and FY 2025-26, a total of INR 20,130 crore was allocated under NCAP-related funding mechanisms:

## ₹ 16,539 crore

**was allocated toward 48 million-plus cities across 42 urban agglomerations through the Million-Plus Cities Challenge Fund (MCF) linked to the Fifteenth Finance Commission grants.**

## ₹ 3,591 crore

**was allocated under the Ministry of Environment, Forest and Climate Change's Control of Pollution Scheme for the remaining non-attainment cities.**

The performance assessment framework included strengthening pollution monitoring systems, source-wise pollution analysis, implementation of city action plans, and measurable reductions in PM10 concentrations, along with improvements in the number of good air quality days.

The release of funds was linked to a combination of performance indicators and procedural compliance requirements. States and urban local governments were required to sign Memorandums of Understanding with the Ministry of Environment, Forest and Climate Change, detailing city-level action plans and intended outcomes. Additional entry-level conditions included the publication of audited financial statements, notification of property tax floor rates, linking of accounts with Public Financial Management System (PFMS), and the existence of duly elected urban local bodies.

Despite the scale of allocation, the amount ultimately released to cities remained lower than the total sanctioned amount. As of September 2025, INR 13,415 crore, approximately 66 per cent of the allocated amount, had been released to the cities (revised to INR 16,424 crore as of June 2026). The release of funds varied across cities and financial years depending on performance assessments, procedural compliance, and administrative conditions. Field interactions revealed that delays in municipal elections, staggered approvals, and procedural checks affected the timing and predictability of releases in several cities. In some cases, cities received multiple years' worth of funds together, compressing implementation timelines.

Of the INR 13,415 crore released, approximately INR 9,929 crore had been utilised by cities as of September 2025 (revised to INR 11,319 crore as of June 2026, including revisions to utilisation reported for earlier financial years). However, utilisation patterns varied significantly across urban centres. Cities reported that implementation timelines were often shaped by delayed fund releases, procurement cycles, staffing limitations, and coordination requirements across departments and parastatals. In several cases, planning and budgeting processes had to proceed in parallel because annual fund release information was unavailable at the time municipal budgets were being prepared.



In addition to direct financial support, the NCAP framework also attempted to strengthen institutional and technical capacity for air quality management. This included the deployment of NCAP consultants to support cities with coordination, reporting, and implementation-related functions. Cities also gained access to the PRANA portal, a web-based platform developed to monitor physical and financial progress under NCAP and to disseminate information related to air quality management efforts.

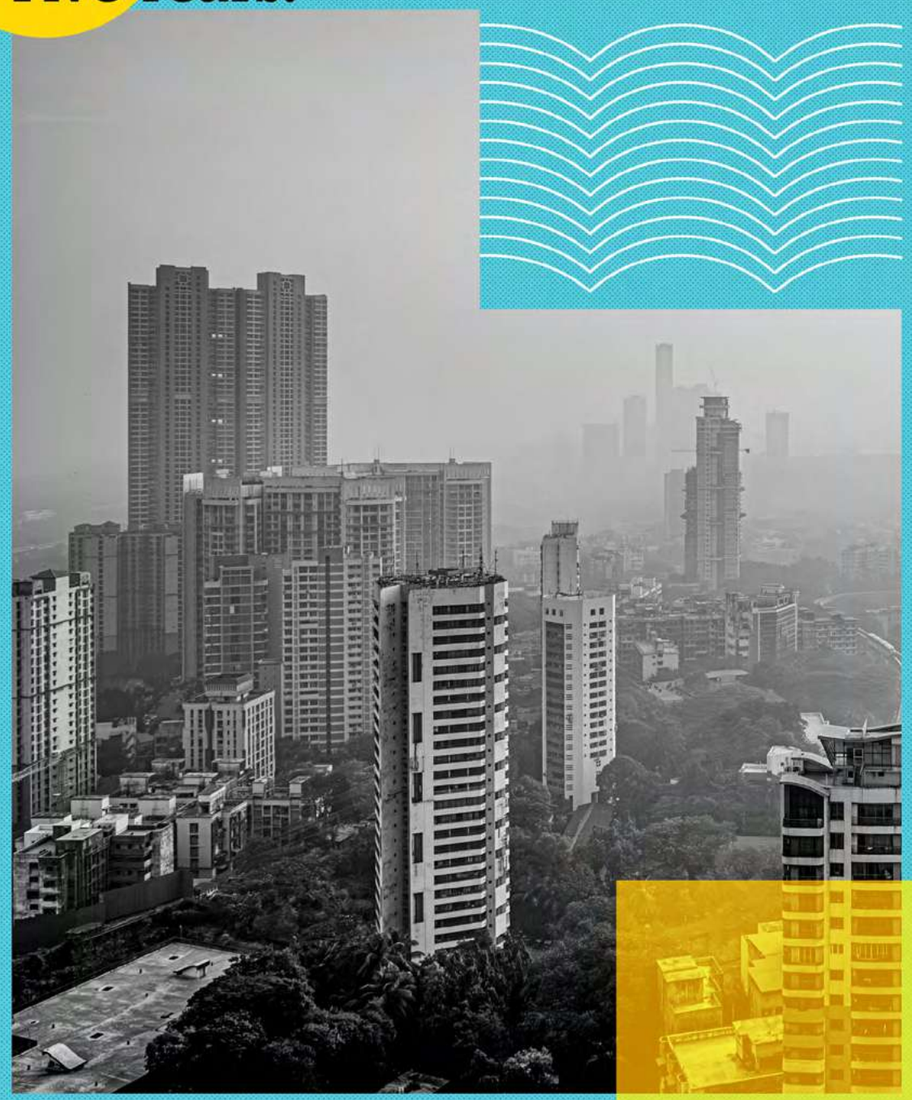
Alongside financing support, monitoring infrastructure across Indian cities also expanded significantly over the last decade. The Central Pollution Control Board's National Ambient Air Quality Monitoring Programme and Continuous Ambient Air Quality Monitoring Stations formed the backbone of data generation under NCAP. India's monitoring network presently includes hundreds of manual and continuous monitoring stations across states and union territories. However, monitoring infrastructure remained uneven across cities, with several non-attainment cities still lacking Continuous Ambient Air Quality Monitoring Stations as of 2025. Cities also highlighted challenges related to maintenance, calibration, expansion of monitoring networks, and identification of technically suitable locations for new stations.

Taken together, the NCAP and Fifteenth Finance Commission framework represented a major institutional and financial anchor in urban air quality governance. For the first time, Indian cities were expected to combine monitoring systems, city action plans, institutional coordination, and performance-linked financing toward measurable improvements in air quality outcomes. The scale of funding, infrastructure creation, and institutional mechanisms reflected the growing recognition that air pollution could no longer be addressed through fragmented or purely regulatory approaches alone.



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# What Has Been the Outcome of This Funding in the Last Five Years?



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03

Despite the scale of funding, measurable progress on air quality has remained poor. This section examines what five years of funding has delivered, and where the money was spent.

As mentioned in the previous section, India has allocated INR 20,130 crore to 130 non-attainment cities under the NCAP framework. Of this, as of June 2026, only INR 16,424 crore reached the cities and cities only utilised INR 11,319 crore. Yet despite this scale of funding, measurable progress on air quality has remained poor. This section examines what five years of funding has delivered, and where the money was spent.

## 3.1 The results reveal a pattern of widespread underperformance against mandated targets

Of the 69 cities with usable data[12] on PM10, only 10 (14.5 per cent) met or exceeded their PM10 reduction targets for 2024-25. In this, 38 cities (55 per cent) showed an absolute decrease in PM10 levels relative to the 2019–20 baselines, but the improvements were generally insufficient to meet mandated targets in most cases as only 10 cities met reduction targets. The remaining 31 cities (45 per cent) recorded worsening PM10 levels compared to the baseline, i.e., air quality in these cities was measurably worse after five years of funded intervention.

**Figure 2** **Performance against mandated PM10 reduction targets[13]**

**Source:** CPCB Air Quality Monitoring Data

**10 Cities**
**Met target**

**28 Cities**
**Improved, missed target**

**31 Cities**
**Air quality worsened**



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For PM2.5, the picture is equally concerning. Only 21 cities had usable data between 2019–20 and 2024–25. Of these, 13 showed some improvement, but only two met the equivalent of the PM2.5 reduction target thresholds.

It bears emphasis that both million-plus cities (recipients of the Fifteenth Finance Commission's performance-linked Million-Plus Cities Challenge Fund) and non-million-plus cities (funded through the MoEFCC's CoP scheme) show broadly similar patterns of underperformance. The performance-linked mechanism has not produced systematically better outcomes than the less differentiated scheme.

## Box 1: A Note on Data Availability

NCAP covers 130 cities, of which 30 have not yet installed Continuous Ambient Air Quality Monitoring Stations (CAAQMS). Consequently, PM10 levels were analysed for the remaining 100 NCAP cities with CAAQMS. Of these 100 cities, only 75 reported usable data after the data cleaning and validation process adopted in the study; of which six are clubbed with bigger cities as they form part of urban agglomerations (UAs), i.e., Navi Mumbai, Thane, Ulhasnagar, Badalapur with Greater Mumbai UA; Raniganj with Asansol UA; and Howrah, and Barrackpore with Kolkata UA. The assessment of PM10 level reductions in this study is based on data from 69 cities/UAs which are tracked and directly funded under NCAP from 2019–20 (the baseline year) till 2024–25. (Table 1).

The data cleaning methodology applied was rigorous: it excluded invalid readings, removed anomalous spikes, required at least 75 per cent data availability at hourly, daily, monthly, and annual levels, and appropriately handled missing data.

**Table 1** **PM10 data availability and exclusions**

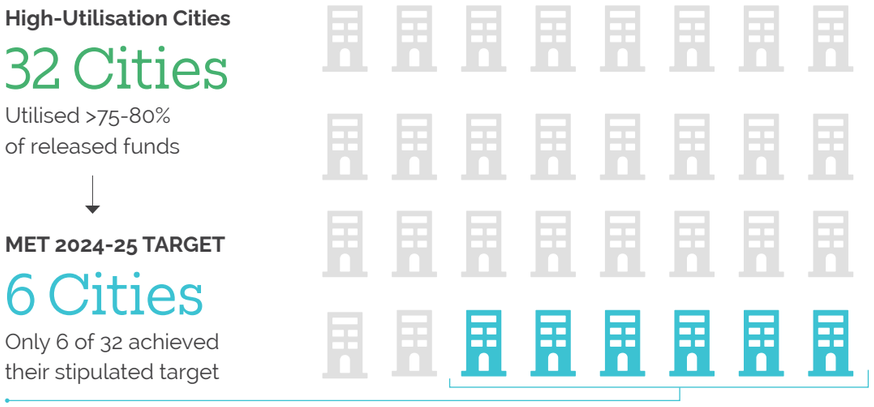
| Particulars | MPC[14] | Non-MPC[15] | Total |
|---|---|---|---|
| **Total number of cities covered under NCAP** | **48** | **82** | **130** |
| Cities with no CAAQMS | 4 | 26 | 30 |
| Cities where CAAQMS data did not meet quality checks/ conditions for continuous availability | 4 | 21 | 25 |
| Cities not separately considered because they form part of UA | 6 | - | 6 |
| **Cities where $PM_{10}$ data is usable for final analysis** | **34** | **35** | **69** |



## 3.2 There is a clear disconnect between spending and outcomes

There is an absence of any meaningful correlation between fund utilisation and air quality improvement. This relationship, or lack thereof, is striking when the fund utilisation of cities is compared with their PM10 performance. Of the 32 cities with fund utilisation above 75-80 per cent, only six achieved their stipulated 2024-25 targets. Moreover, cities that utilised less than 50 per cent[16] of the funds released to them did not systematically perform worse in air quality than high-utilisation cities, directly undermining the assumption that spending drives outcomes.

**Figure 3** **Only 6 out of 32 high utilisation cities met their air quality targets**



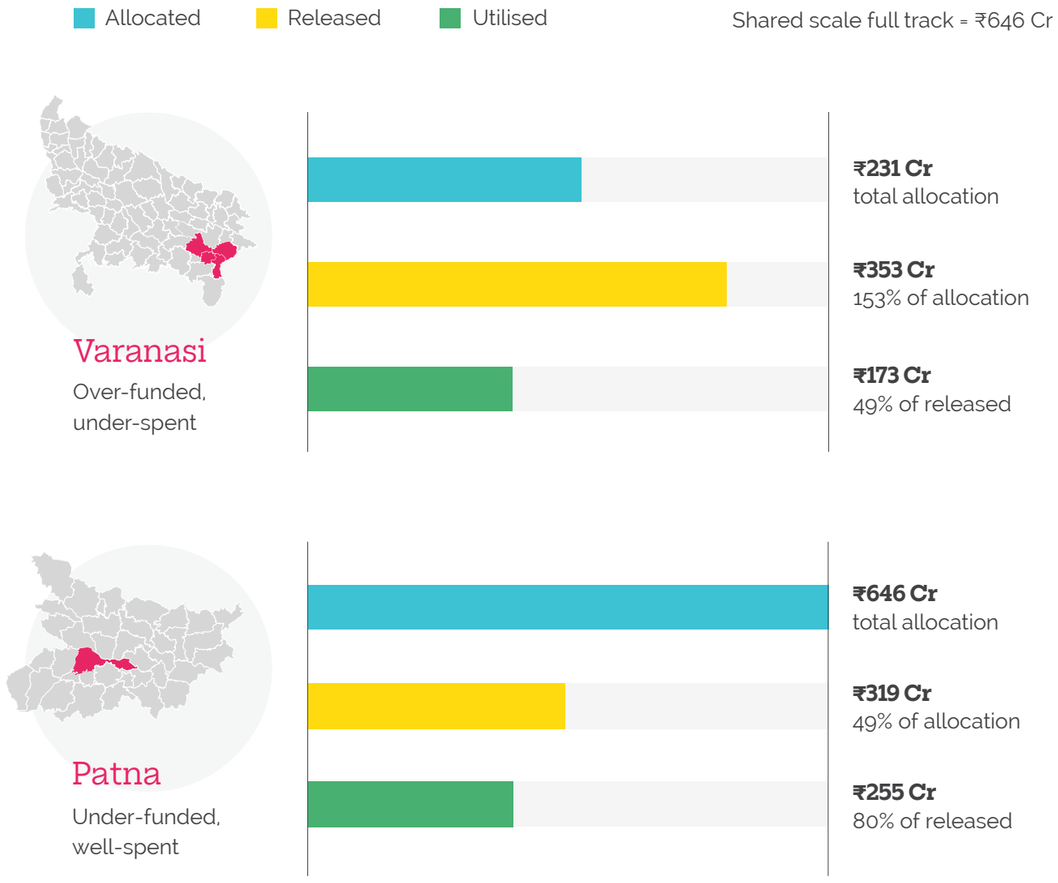

The contrast between individual cities makes the point concrete: Varanasi received 153 per cent of its allocated amount (due to performance incentive funds) while other cities like Patna received only 49 per cent of allocated amounts between FY 2020–21 to FY 2024-25.[17] Clearly, correlation between receipt and outcomes do not hold universally.




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Bengaluru is a striking illustration of the fact that spending under NCAP does not have a correlation with improved air quality outcomes. An analysis of the financing pattern against PM10 levels of Bengaluru shows that the city's air was the cleanest when no NCAP funds were being utilised and worsened after spending began. PM10 levels declined from 73 µg/m³ in 2019-20 to 62 µg/m³ in 2020-21. Bengaluru reported zero utilisation of funds in both FY 2020–21 and FY 2021–22, despite achieving its lowest PM10 concentration during these years. Fund utilisation commenced only in FY 2022–23, amounting to INR 132.6 crore, followed by

**Figure 4** Varanasi vs Patna: Allocation, Release, & Utilisation between FY2020-21 and FY 2024-25



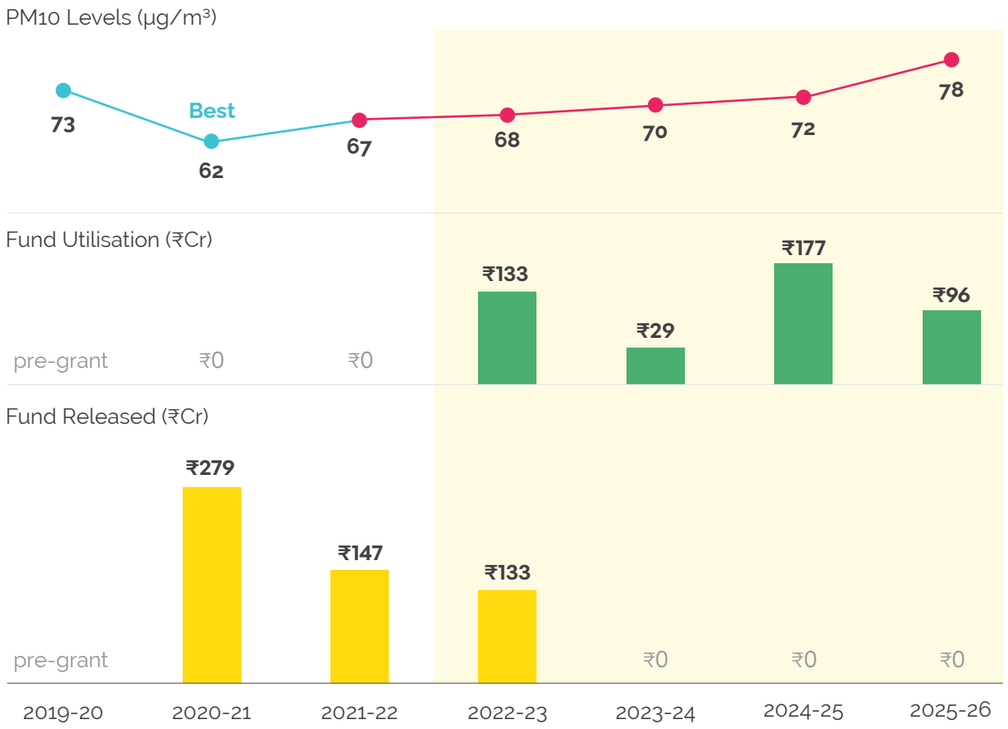

INR 29.3 crore in FY 2023–24, INR 176.8 crore in FY 2024–25 and INR 95.6 crore in FY 2025-26.[18] Over this period, PM10 concentrations increased consistently, rising to 67 µg/m³ in 2021-22, 68 µg/m³ in 2022-23, 70 µg/m³ in 2023-24, 72 µg/m³ in 2024-25 and 78 µg/m³ in 2025-26. This underscores the central finding that spending on air quality does not equate to better air quality outcomes. Further, the fund release and utilisation pattern reinforces this disconnect, as only INR 535 crore[19] of the INR 881 crore allocated was released (61 per cent) and just INR 434 crore[20] (i.e. 49.3 per cent of allocation and 81.1 per cent of funds released).

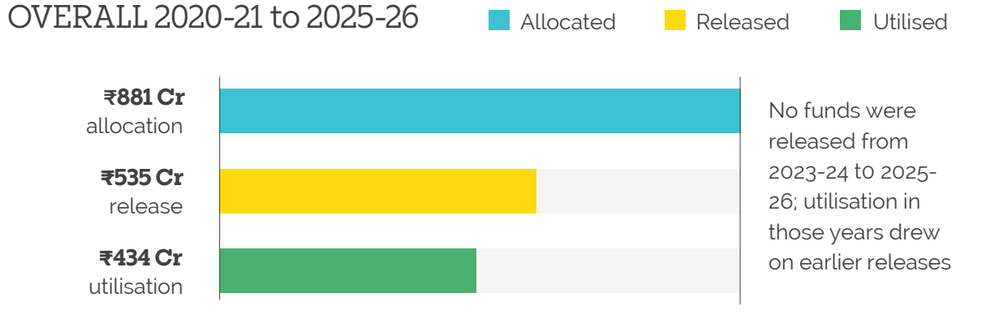
This finding directly challenges the implicit assumption of the current funding architecture: that more spending equals better outcomes. The evidence suggests the challenge is not primarily in funding, but in how funds are governed, utilised, and evaluated.

This is validated by evidence from air quality trends and insights from city-level data and discussions on implementation of actions under NCAP, which point to a central contradiction in the current approach to financing air quality in India. While the NCAP and the Fifteenth Finance Commission introduced performance-linked grants with the explicit intent of incentivising cleaner air outcomes, the observed results indicate that although air quality improvements were a key indicator in disbursing the allocated amount, the emphasis of actions taken was



**Figure 5** Bengaluru: Air Quality Outcomes versus Fund Allocation, Release, and Utilisation

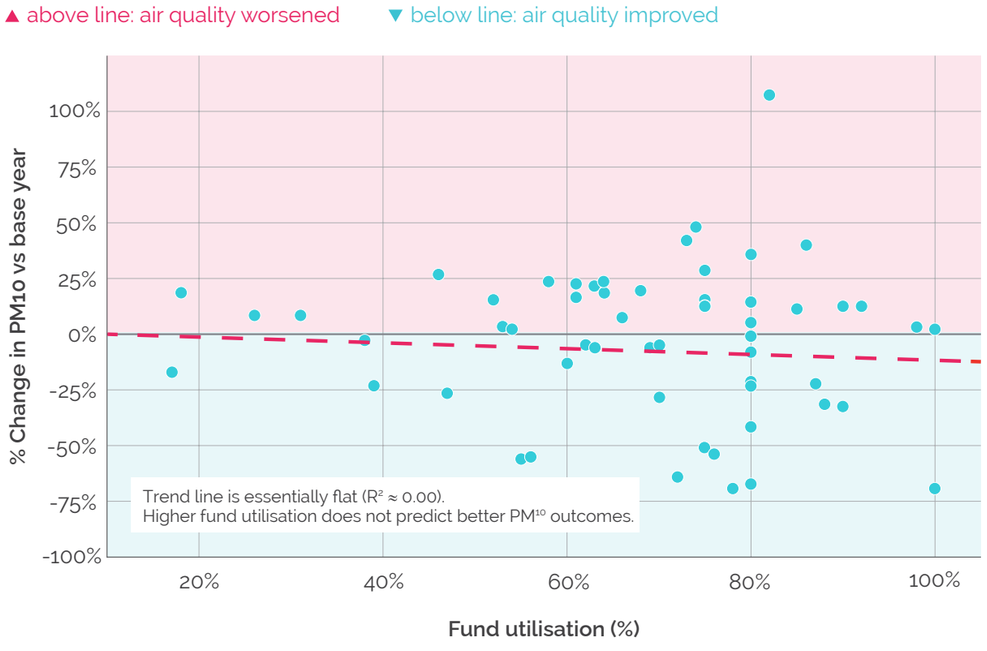



primarily driven by utilisation of funds, without sufficient prioritisation of their impact on air quality improvement or absolute emission load reduction. Across the cities analysed, improvements in air quality were uneven and limited, even where substantial funds were released and spent. This suggests that the challenge lies less in the availability of resources and more in how performance is defined, incentivised, and translated into action.

The quantitative analysis indicated that there is **no statistically significant correlation between fund utilisation and air quality outcomes.** Cities that utilised over 80 per cent of released funds did not uniformly attain improved air quality results compared to cities with lower utilisation rates. This paradox exists because how the money is spent is much more important than how much is spent or how quickly it is spent.

**Figure 6 Correlation between fund use and PM10 performance of NCAP cities[21]**




## 3.3 Funds were utilised on ineffective emission reduction interventions. Delayed fund releases further exacerbated the problem

Field data from cities visited[22] reveals a consistent and troubling pattern in expenditure allocation. For example, in one of the field cities,[23] which recorded the lowest overall fund utilisation rate of approximately 40 per cent,[24] as much as 80 per cent[25] of the Fifteenth Finance Commission air quality grants was spent on mitigation measures for road and construction dust through road paving works, use of mechanical sweeping machines, water sprinklers, and smog guns.

In several instances, this pattern extends into an anomaly, with regular municipal service delivery appearing to be funded from Fifteenth Finance Commission grants meant for air pollution control. One visited city spent INR 323 crore, almost 67 per cent of its total Fifteenth Finance Commission funds over the entire grant period, on the transport and collection of municipal solid waste alone. Another city spent nearly 80 per cent of the XV FC funds on acquiring electric buses on wet-lease models.

However, there has been a delay in acquiring these buses and only few have been procured as of July 2025.

**Municipal solid waste management accounted for**

**34–50%**

**of total expenditure.**





This covers routine waterworks, sewer line expansion, and the procurement of vehicles and equipment for solid waste management departments, across the cities that shared their data.

A further area of concern is the significant share of funds directed towards activities that do not directly reduce emissions at source, including anti-smog guns, fog cannons, smoke towers, and water fountains. These interventions are largely reactive in nature and aimed at temporarily relieving the symptoms, rather than addressing their root cause. Under NCAP, cities were also expected to leverage convergence with other central government schemes, including AMRUT 2.0, SBM, and Nagar Van Yojana. Cities have spent substantially more from convergence funds than from the XV FC grant itself; however, reporting on their utilisation remains opaque and patchy, at times resulting in non-air-pollution-related spending being recorded as NCAP convergence.

Funds are being utilised on a narrow set of activities, such as the purchase of additional sweeping machines, and are often allocated repeatedly year after year. While several of these interventions may be in the right direction, they are unlikely to deliver sustained long-term improvement unless their impact on desired outcomes is measured.

Moreover, cities have reported delays in fund release in one or more financial years. Five of the nine cities visited shared that fund releases were temporarily withheld during periods when elected municipal councils were not in place. In several cities, funds for multiple years were released together (which two years also varied between cities), or release timelines were extended due to procedural checks or performance assessments. Where delays occurred, cities noted that projects were either initiated later than planned or were implemented within compressed time windows that coincided with monsoon or procurement constraints. Cities continued to follow the procedural requirements while adapting project execution to when funds were made available.

Allocations are known to cities in advance, but the annual release figure is typically unavailable by the time a city prepares its municipal budget for the coming financial year. Releases have been delayed, bunched across several years, paused for administrative reasons and, in some cases, withheld due to lack of municipal elections. Utilisation-certificate submissions have also lagged, and many cities receive their grants late in the financial year.

The NCAP and the Fifteenth Finance Commission frameworks represent India's principal mechanisms for financing air quality improvement. However, despite substantial allocations under these frameworks, most cities have failed to improve air quality. Evidence indicates that higher levels of expenditure have not translated into better outcomes, with no statistically significant relationship observed between the scale of spending and air quality outcomes. This suggests that the central challenge lies not in the availability of resources, but in how performance is defined, incentivised, and translated into action. In addition, a substantial share of funds is being channelled towards interventions with limited effectiveness in reducing absolute emissions, while delays in fund releases further constrain timely implementation. Taken together, these findings indicate that, despite the scale of funding, measurable progress in improving air quality has remained limited.

# Why Has Air Quality Not Improved Despite the Funding?




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04



The Ministry of Earth Sciences (MoES) and Ministry of Health and Family Welfare (MoHFW), despite being identified as implementing agencies under NCAP, are absent from coordination mechanisms.

Numbers alone do not explain why performance-based grants failed to deliver cleaner air. With only 10 of 69 cities meeting their PM10 targets and air quality worsening in 31 cities, an obvious question arises: if funds were released and largely utilised, **why did air quality not improve?**

This section draws on field visits to select million-plus cities and urban agglomerations, namely Patna, Varanasi, Bengaluru, Mumbai (including Navi Mumbai and Thane), Pune, Chennai, and Vadodara, to understand the patterns behind the data.

## 4.1 Air pollution mitigation is inherently cross-sectoral, requiring coordination among multiple ministries other than just environment departments and pollution control boards.

Responsibility for the sectors that affect air quality such as transport, construction, industry, waste, energy and power is divided across departments and parastatals. NCAP identifies seven ministries as part of the central coordination mechanism, but implementation reveals significant gaps. In practice, only ULGs, state environment departments, and Central Pollution Control Board (CPCB) are meaningfully involved in air quality management. The Ministry of Earth Sciences (MoES) and Ministry of Health and Family Welfare (MoHFW), despite being identified as implementing agencies under NCAP, are absent from coordination mechanisms. Planning and coordination at the intersectoral level remains inadequate. Air quality governance is particularly weak at the coordination level. Vertical integration from central ministries through state departments to ULGs lacks formalised mechanisms,

Planning and coordination at the intersectoral level remains inadequate. Air quality governance is particularly weak at the coordination level. Vertical integration from central ministries through state departments to ULGs lacks formalised mechanisms, including clear meeting schedules, decision-making protocols, and escalation procedures.

**Horizontal coordination among departments at each level remains ad-hoc, with no mandatory agreements specifying deliverables, timelines, or consequences for non-performance.**



City-level monitoring and implementation committees exist and meet, but largely to share information rather than to take joint decisions. Moreover, city action plans lack statutory backing, further diluting accountability and enforcement leverage. The absence of ministry-specific emission reduction targets means that ministries that control major emission sources, including transport, agriculture, power, and housing, operate without accountability for air quality outcomes. As a result, when pollution levels rise, the environment department bears sole responsibility despite having limited authority over the sectors driving emissions. This creates a governance structure where everyone shares the blame, but nobody has the mandate or capacity to drive coordinated action.

## 4.2 Air quality in cities is affected by sources beyond ULG boundaries[26] and meteorological factors

The current system is limited by fundamental attribution errors. ULGs are assessed on outcome indicators like PM10 reduction and good air quality days despite having limited control over many emission sources (industries, vehicular fleet composition, agricultural burning) and no control over meteorological conditions.

Air quality in cities is affected by sources both within and beyond ULG boundaries, such as, vehicular emissions, dust pollution, construction and demolition waste, industrial emissions, municipal solid waste burning, agricultural waste burning, and household emissions. Additionally, meteorological factors such as wind speed, dust storms, and rainfall influence air quality but lie outside the control of any entity. **Accountability for emissions from different sources is fragmented** across multiple agencies, including transport departments, pollution control boards, urban development authorities, and agriculture departments. No single entity has comprehensive authority or responsibility for managing urban air quality.

This creates perverse incentives, i.e., cities are penalised for pollution originating beyond their jurisdictions or from weather patterns, while entities with actual control over emission sources face no accountability for their contributions to poor air quality.

> Accountability for emissions from different sources is fragmented across multiple agencies, including transport departments, pollution control boards, urban development authorities, and agriculture departments.



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## 4.3 The evidence base is too weak to guide or evaluate actions

The first step towards taking action for air quality improvement is to understand the source and status; however, the scientific studies meant to provide this understanding remain largely incomplete. These studies, mandated under NCAP, were intended to enable targeted pollution mitigation through evidence-based planning. For instance, source apportionment studies mandated under NCAP, which are entirely outsourced to empanelled academic and research institutions, have been completed in only 79 of 130 cities (45 peer-reviewed and 34 completed), with 51 still in progress. Carrying capacity studies, though proposed, have not yet been initiated for any city.

The deeper problem is the absence of a working evidence base, i.e., the lack of dynamic emission inventories, which creates a critical knowledge gap. Most cities cannot update baseline inventories with quarterly activity data, making it impossible to determine whether an intervention is actually reducing the emission load.

Without such tracking, there is no clear logic chain from source analysis to intervention design to measurable outcome; as a result, actions remain disconnected from evidence, and performance assessment becomes speculative rather than data-driven.

Weaknesses in monitoring and data systems compound this gap. Although the monitoring network has expanded, it has been used primarily for compliance and reporting rather than aiding city-level actions. Monitoring networks are unevenly distributed, often reflecting older rather than current municipal boundaries. While data availability has improved, data is rarely used to continually modify interventions or prioritise high-impact sources. Instead, monitoring outputs largely feed into performance assessments, reinforcing a compliance-oriented approach rather than evidence-based actions.

## 4.4 Institutional and governance constraints play out distinctively contributing to how the funds were utilised

Air quality management is not yet embedded as a specialised function within most ULGs. Responsibilities are frequently delegated as an additional charge to officials whose primary focus lies elsewhere, reducing strategic focus and continuity. In urban agglomerations, differential support to the main municipal corporation further weakened coordination across constituent municipal corporations/ non-attainment cities and cantonment boards, despite air pollution mitigation requiring actions at level of shared airshed.

The NCAP consultant model was designed to address certain technical and coordination gaps, but the consultants were never given the authority to close this gap. It did not translate into institutional ownership, and they held no decision-making power. They were frequently assigned unrelated responsibilities such as solid waste management in many cities and faced recurring contract and remuneration delays. A model built to anchor air quality actions and drive inter-departmental coordination instead functions as a reporting layer that is present but structurally unable to align planning, spending, implementation and outcome.

The fragmentation in governance further exacerbated these challenges. Air quality improvements rely on coordinated efforts across transportation, construction, industry, waste management, energy and power systems. However, implementation has continued to remain siloed across departments and parastatals. Even with monitoring and

implementation committees functional at city level, they were frequently limited to information sharing rather than joint decision-making. Misalignment between infrastructure development timelines and pollution control actions caused repeated construction activity and dust generation that undid the very mitigation measures funds had already been spent on.

Underlying all of this was the absence of statutory backing for city action plans (CAAP) and without legal backbone behind them, CAAP couldn't ensure compliance or attach consequences to poor performance thereby further diluting accountability and limited enforcement leverage, and spending decisions away from the actions the plan prioritised.

## 4.5 Cities have optimised for predictable spending rather than targeted interventions to address pollution sources, impact areas, and emission reduction at source

City-level actions towards air quality management were largely shaped by existing administrative priorities and focused on visible, short-term measures to reduce local pollution exposure in the form of stopgap measures. This was evident in patterns of fund utilisation, which prioritised initiatives that were familiar, visible, and under direct municipal control, such as road paving, mechanised sweeping, water sprinkling, and equipment procurement.

Expenditure trends further reinforce this pattern:

**67%**

**(₹5,098 crore) of total expenditure across all non-attainment cities of INR 7,594.28 crore between 2019 and September 2024 was directed towards road dust mitigation measures such as road paving, widening, pothole repair, water sprinkling and mechanical sweepers.[27]**

**14%**

**(INR 1,041 crore) was spent towards mitigating vehicular pollution, 11 per cent (INR 871 crore) to solid waste management and biomass burning, while under 1 per cent each was spent on public outreach, industrial pollution control, and domestic fuel interventions.[28]**

Although these actions may have provided immediate short-term reductions in particulate exposure at certain locations, they do not address the underlying drivers of air pollution and were often not targeted towards the major sources or impact areas contributing most significantly to poor air quality in the city. The concentration of expenditure on a narrow set of interventions, combined with the repetition of similar activities across years and cities, suggests that cities prioritised predictable spending over adaptive and place-based approaches. Field visits to cities revealed that air quality grants were largely utilised to supplement core municipal functions, thereby blurring the line between air pollution management and routine urban service delivery.

The adoption of uniform performance targets further constrained city-level action. Measures implemented to reduce particulate matter pollution were largely consistent across cities, despite significant differences in geography, bio-climatic conditions, baseline pollution levels, or exposure to regional emission sources. In many of the cities visited, these targets were perceived as top-down requirements whose achievement was only partially within municipal control. Seasonal meteorological conditions, long-range pollution transport, and existing municipal infrastructure frequently influenced outcomes, weakening the causal relationship between interventions



and measured performance. Under such conditions, cities had limited incentive to pursue complex, cross-sectoral measures whose outcomes might not be immediately visible in annual monitoring data which subsequently influenced the release of funds.

## 4.6 Adequate and timely fund flow is essential to implement air quality improvement measures within and beyond ULG jurisdictions

The current system is constrained by delayed fund releases, delayed submission of utilisation certificates, and rigid performance-linked funding mechanisms. Although cities were informed of their fund allocation in advance, the annual release figure was often unavailable by the time a city began preparing its municipal budget for the following financial year. In many cases, cities received their grants only towards the end of the year, leaving insufficient time to plan, tender and implement.

Delays in fund release, bunching of funds across years, administrative pauses, and delayed releases owing to postponed municipal elections affected implementation. These uncertainties resulted in cities prioritising short-term interventions that could be implemented immediately once funds were released, as opposed to longer-term solutions that required sustained investment, phased implementation or continuous coordination.



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**The current financing architecture contains three critical flaws.**

### 01 Timing Dysfunction

Late fund disbursement forces cities to prioritise high-expenditure visible projects over systematic emission reduction actions, creating rushed procurement and suboptimal outcomes.

### 02 Jurisdictional Mismatch

Cities are funded to control pollution but lack resources to influence emission sources in surrounding industrial clusters, brick kilns, and peri-urban areas that significantly impact their air quality.

### 03 Performance Paradox

The current outcome-based assessment penalises cities for factors beyond their control while failing to reward cities that build institutional foundations, establish coordination mechanisms, or implement processes that will yield results over longer timeframes.

Cities that achieve targets may see funding withdrawn precisely when they need sustained support to maintain gains, while cities struggling with governance capacity may not receive the upfront institutional investments they need to succeed.

For instance, Patna under the Fifteenth Finance Commission's Million-Plus Challenge fund, like other million-plus cities, received the entire allocated amount in the FY 2020-21, but subsequent releases were contingent on annual performance assessments. As a result, no funds were released in FY 2021-22 and FY 2022-23, creating uncertainty regarding the continuity of planned interventions and recurring expenditure. While this was consistent with the performance linked design of the fund, it also meant that cities could not reliably anticipate the resources that would ultimately be available for implementation.

**In FY 2023-24, Patna recorded a**

**9.8%**

**improvement in PM10 concentrations compared to the previous year.**

Although this fell short of the 15 per cent performance benchmark, the city was eligible for a partial release of funds. However, the corresponding release, which was expected in FY 2024-25, was disbursed only in FY 2025-26, when approximately INR 30 crore was released. This illustrates how delays in fund disbursement can affect cities even when improvements in air quality are achieved.

Mumbai illustrates a different dimension of this challenge. Despite achieving a nearly 19 per cent reduction in PM10 concentrations between FY 2022-23 and FY 2023-24, the city received only about INR 56 crore against an allocation of INR 269 crore in FY 2023-24, approximately 21 per cent of the allocated amount. Bengaluru and Mumbai demonstrate how administrative conditions could further affect fund flows, with both cities receiving no releases from FY 2023-24 onwards owing to delays in municipal elections. Together, these examples show how performance-linked disbursement, delayed releases, and compliance-related conditions created uncertainty in both the timing and quantum of available funds. Such unpredictability constrains a city's ability to plan and sustain long-term air quality interventions.

## 4.7 ULGs receive air quality grants but often lack clear frameworks for prioritisation, implementation, and performance monitoring.

Cities have undertaken various interventions to tackle air pollution, such as municipal solid waste management, mechanised road sweepers, pavement management, dust suppressants, water sprinkling, e-buses, PNG for crematoriums, and Miyawaki forests. However, the Air Quality Monitoring Committee meeting held in May 2025 noted that cities need to shift from broad sectoral actions to bridging critical gaps through targeted interventions.

Two fundamental disconnects plague implementation.

**The evidence-action gap.**

Cities take ad-hoc steps to utilise grants rather than prioritising interventions based on emission inventories and source apportionment studies. A city where vehicular emissions contribute 40 per cent of pollution may still disproportionately spend 60 per cent of its budget on dust suppression, a relatively minor contributor to overall pollution, simply because mechanised sweepers are easier to procure.

**The infrastructure-operations gap**

Cities invest in equipment and systems but lack budgets for operations and maintenance. Mechanised sweepers sit idle for want of spare parts, monitoring stations remain non-functional because of calibration delays, and water sprinklers and mechanical sweepers operate without protocols. Additionally, the absence of public dashboards and transparent tracking systems means that neither citizens nor higher authorities can assess whether planned actions are being implemented or whether they are producing intended results.

## 4.8 Most ULGs lack adequate human resource capacity for air quality management.

In most ULGs, air quality management is handled as an additional charge by officials whose primary responsibilities lie elsewhere, rather than through a dedicated, specialised function. Most ULGs lack dedicated environment departments, and where they do exist, staff expertise in air quality management is severely limited. CPCB-appointed NCAP consultants at ULGs support coordination and reporting but often get assigned additional responsibilities such as solid waste management. They also hold no decision-making authority and face contract and remuneration delays, resulting in air quality work being deprioritised.

The current provision of City Air Quality Monitoring Cells exists in structure but not in substance. These cells lack permanent technical staff, operate without dedicated budgets, and have no authority to coordinate across departments. In urban agglomerations, support has been concentrated on the main municipal corporation, with the constituent corporations, other non-attainment cities and cantonment boards with less. Air quality management requires specialised expertise in environmental engineering, emissions modelling, GIS mapping, and data systems, knowledge that cannot be rebuilt with each administrative transfer. The absence of permanent technical cadres means that institutional memory evaporates, planning cycles restart with each personnel change, and sophisticated interventions remain perpetually beyond reach. Cities are expected to manage complex technical challenges with generalist administrators who may be transferred within months of developing relevant expertise.

## Performance-Based Funding Works Only When Targets, Capacity, and Governance Align

One thread runs through every finding. Since utilisation is an important criterion for fund release, it has become an incentive that leads cities to take the easier route of focusing on utilisation and expenditure rather than outcomes.

By intent, the grant was designed to reward cleaner air performance, with achievement against targets serving as the basis for fund release.  However, cities ended up prioritising expenditure and utilisation, and interventions that were administratively safe, auditable, and under direct municipal control. This countered the strategic and planned actions required for improving air quality. Emission sources beyond municipal jurisdiction, including regional industry, power generation, and peri-urban activities, remained largely outside the scope of action, despite their significant influence on urban air quality. As a result, local efforts were often insufficient to shift measured outcomes at the city scale.

The key lesson is not that performance-based funding is ineffective, but that its effectiveness depends critically on how performance is defined, how incentives align with the capacities of the ULG, and how governance structures enable or constrain actions.



The learnings from NCAP and the Fifteenth Finance Commission highlight that performance-linked funding, without differentiated targets, institutional strengthening, and governance reforms, has limited ability in achieving sustained improvements in air quality. The key lesson is not that performance-based funding is ineffective, but that its effectiveness depends critically on how performance is defined, how incentives align with the capacities of the ULG, and how governance structures enable or constrain actions. Without addressing these structural elements, future funding cycles risk perpetuating current utilisation patterns rather than providing cleaner air to breathe for those living in the cities.




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# What Can We Learn from the Cities Across the World?



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05

Beijing's transformation from one of the world's most polluted cities to one that has achieved 42 per cent improvement in air quality between 2013 and 2021 is perhaps the most dramatic urban air quality success story of the past two decades.

This section reviews a set of global case studies on urban air quality management. It includes four cities that have demonstrated visible progress in reducing pollution through sustained policies and implementation, such as Beijing, Mexico City, Paris, and London. To understand the factors that hinder effective action, it also includes Accra, Ghana's capital city where air quality progress has been limited.

By examining both successful and less successful experiences, this section highlights the range of strategies, institutional arrangements, and practical challenges that have shaped air quality outcomes for different cities. Together, these cases help illustrate what supports long-term improvement and what creates persistent barriers.

## 5.1 Beijing: Political Will, Accountability, and Scale

Beijing's transformation from one of the world's most polluted cities to one that has achieved 42.3 per cent improvement in air quality between 2013 and 2021[29] is perhaps the most dramatic urban air quality success story of the past two decades.

**PM2.5 concentrations fell from**

**89.5 µg/m³**

**in 2013 to**

**32 µg/m³**

**by 2024.[30]**



The number of heavily polluted days fell from 58 in 2013 to just 2 in 2024, a 96.6 per cent reduction.[31] Beijing's success rested on three pillars that are directly relevant to the Indian context.

China's 'Target Responsibility System' embedded pollution control targets into the performance contracts of local officials at the provincial, municipal, and county levels.[32] Air pollution reduction carried 'veto power', meaning that local officials who failed to meet them were denied promotion regardless of other achievements. Accountability was therefore tied directly to career consequences, creating institutional incentives fundamentally different from India's current system.

Strengthening regional coordination also played an important role in this transformation. The 2013 Air Pollution Prevention and Control Action Plan established unified emission standards, coordinated enforcement, and joint pollution response protocols across the Beijing-Tianjin-Hebei (BTH) region.[33] Collective coal reduction targets led to negative growth in coal use across the region between 2013 and 2017.

The scale of investment played a very crucial role in this transformation story. The 2013 action plan was backed by a USD 270 billion budget[34] and drove structural economic changes. More than 2,000 heavy industries were closed or relocated, 300,000 coal-fired heating stoves were replaced, and 6,584 electric buses were deployed. Beijing's coal consumption fell from 21.8 million tonnes in 2012 to under 600,000 tonnes by 2024. Beijing's approach cannot be mechanically replicated in India, but two lessons translate directly: accountability must carry real consequences, and airshed-level regional coordination is essential for cities surrounded by high-emission industrial and agricultural areas.

## 5.2 Mexico City: Sustained Multi-Decadal Commitment and Institutional Evolution

Mexico City was labelled the world's most polluted city by the United Nations in 1992. Over the next three decades, sustained policy efforts reduced PM10 concentrations by 60 per cent (from 110 µg/m³ to below 45 µg/m³) and PM2.5 concentrations to below 25 µg/m³ by 2015.[35] The city's experience illustrates the importance of sustained institutional commitment across political cycles.

A key lesson is the evolution of governance institutions. The Metropolitan Environmental Commission (CAM), established in 1992, evolved into the Megalopolis Environmental Commission (CAMe) in 2013, expanding its jurisdiction to 224 municipalities across six states. CAMe's governance structure, comprising high-level political leadership (state governors and ministers),[36] an Executive Commissioner, and a Scientific Advisory Committee provides a model for the kind of cross-jurisdictional authority that Indian metropolitan regions currently lack.[37]



The ProAire (Programa de Gestión para Mejorar la Calidad del Aire) series of air quality management programmes — Mexico's official framework of state and regional policies designed to monitor, manage, and reduce air pollution — now in its fifth iteration covering 2017-2030 demonstrates that air quality planning must be long-term, evidence-based, and progressively strengthened. Each programme has built on the last, incorporating new monitoring data and adjusting strategies based on performance.[38]

Mexico City also offers a cautionary lesson: some policies deliver unintended outcomes. The Hoy No Circula driving restriction programme initially prompted many households to purchase additional older, higher-emitting vehicles to circumvent restrictions, ultimately worsening rather than improving emission profiles.[39] Evidence-based design and evaluation are essential to avoid such consequences.

## 5.3 Accra: The Limits of Policy Without Institutional Capacity

Accra offers the most instructive cautionary example — a city that has pursued air quality interventions for two decades without achieving meaningful improvement. In 2019, Ghana's average PM2.5 concentration was 11 times the WHO guideline level, with approximately 3,000 premature deaths attributed to air pollution annually.[40]

Accra's shortcomings are not because of a lack of intent or flawed policy design. The city has environmental legislation, an Environmental Protection Agency, international partnerships, and successive policy frameworks. What it lacks is the institutional infrastructure to translate policy into enforcement - adequate monitoring coverage, regulatory capacity to act against non-compliant vehicles and industries, political authority to implement Bus Rapid Transit (BRT) at scale, and the funding to sustain interventions over time.

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Accra's specific shortcomings mirror the challenges identified in India. Monitoring remains limited to a few locations, 70 per cent of commuters still rely on high-emitting tro-tros[41] with minimal regulation, the proposed BRT has not materialised at scale, and solid fuel use remains widespread despite clean cookstove programmes.[42]

Accra's experience reinforces the central lesson from all five case studies: institutional frameworks and policy declarations, without adequate funding, enforcement capacity, infrastructure investment, and unified coordination - a single framework aligning transport, industrial, and fuel policies etc. rather than parallel, sector-specific efforts - are insufficient to achieve meaningful improvements in air quality.

## 5.4 Paris: Targeted Interventions and Modal Shift

Paris's air quality improvement between 2014 and 2024, with nitrogen dioxide concentrations falling 45 per cent[43] and PM2.5 declining by 55 per cent since 2005, demonstrates what is achievable through targeted, politically committed intervention focused on the dominant emission source.[44]

Transportation accounted for approximately 45 per cent of nitrogen oxide emissions in Paris,[45] making it the primary focus of intervention. The Crit'Air vehicle classification system, which assigns colour-coded emission ratings to vehicles and restricts higher-polluting vehicles from certain areas and during pollution episodes,[46] was combined with:

- Removal of 50,000 parking spaces to reduce car dependency and create space for cycling infrastructure.
- Planned installation of 1,400 km of cycle lanes by 2020, with the Vélib' bike-sharing programme, which provided free or low-cost access to bicycles.
- Progressive phase-out of diesel vehicles, which contributed approximately 40 per cent of fine particulate matter emissions.

Paris's experience underscores the importance of concentrating interventions on the primary sources of emissions rather than spreading resources thinly across multiple sectors. It also demonstrates that transport modal shift requires both restrictions on high-emission modes and accessible, affordable alternatives.

## 5.5 London: Legal Frameworks, Sustained Investment, and Enforcement

London's air quality trajectory illustrates the power of clear regulatory mandates, consistent funding, and progressively tightened regulations. Between 2016 and 2024, $NO_2$ concentrations fell 65 per cent in central London, 53 per cent in inner London, and 45 per cent in outer London.[47] The number of monitoring sites exceeding the legal $NO_2$ limits declined from 56 in 2016 to just five by 2023.[48]

Critical interventions included the Ultra Low Emission Zone (ULEZ), expanded in stages from central London in 2019 to cover all of Greater London by 2023;[49] the Mayor's GBP 27 million Air Quality Fund, supplemented by GBP 271 million for vehicle transition since 2019; and the Breathe London programme, which deployed 400 air quality sensors to support evidence-based policy decisions.[50]



London's key lessons are the value of progressive, multi-stage implementation (each expansion of ULEZ was accompanied by financial support for affected residents and businesses), the importance of transparent public data to build community engagement and trust, and the need for sustained financial commitment to support behavioural change and fleet transitions.

## Applying Global Lessons to India's Air Quality Challenge

Together, these five cities tell an interconnected story. Beijing, Mexico City, Paris, and London achieved success through various policy mixes. Yet they all shared the same underlying principles: accountability with real consequences, coordination that extended beyond municipal boundaries to the larger airshed, sustained financial commitment across political cycles, and interventions targeted at each city's dominant emission sources rather than spread thinly across all of them.

Each also viewed clean air as a long-term institutional effort, built up over a decade or more, rather than a short-term effort.

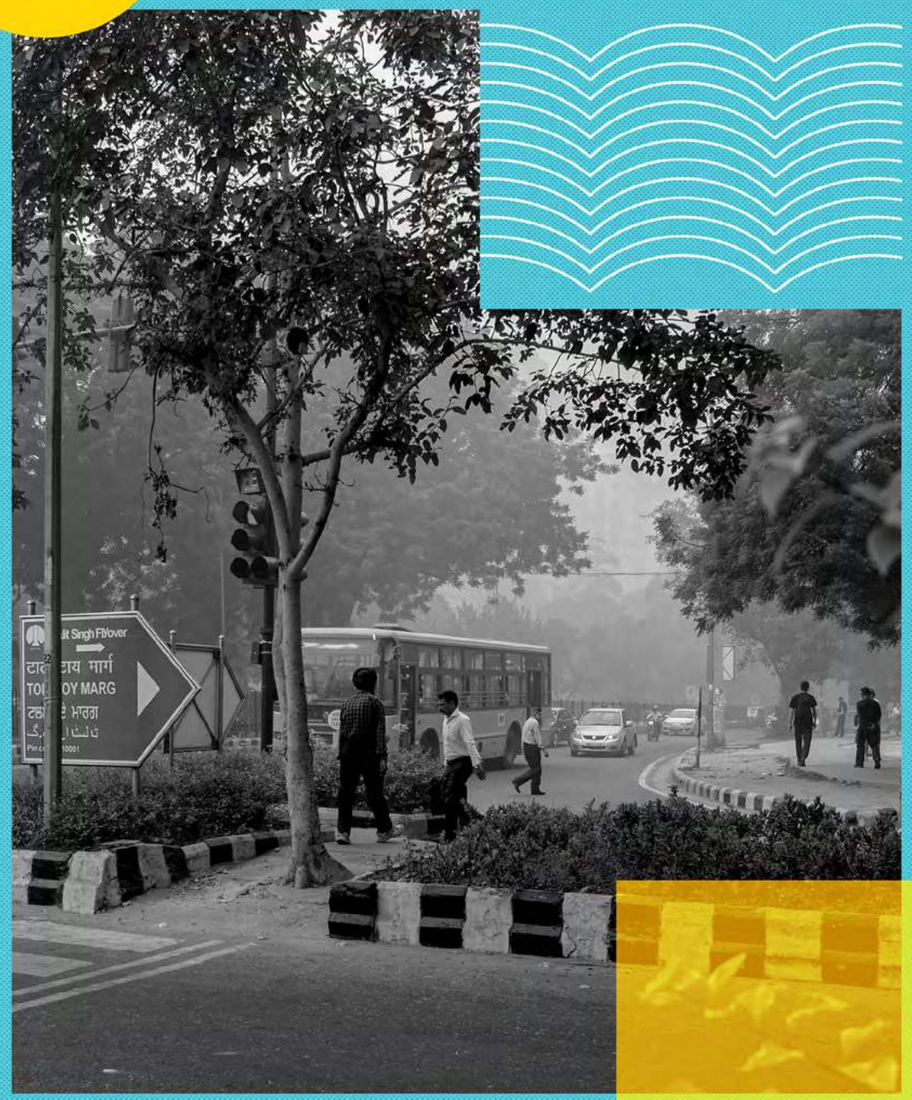
On the other hand, India's air quality management mirrors Accra: intent and policy design exist, but actions have not turned into outcomes. The lesson for India is to establish the operating system that these cities shared, rather than copying any specific model. The next section details how this can be accomplished.

Each viewed clean air as a long-term institutional effort, built up over a decade or more, rather than a short-term effort.



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# Pathways and Recommendations to Clean Air in Indian Cities



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06

It lists six elements that are critical to creating clean air pathways: source-based accountability, evidence-based decision-making, institutional permanence,

Section V showed that cleaner air has been constrained less by the scale of funding than by how it is governed, planned and utilised. This section turns that diagnosis into action in two steps. The first lays out the pathways and the operational framework and the second translates the framework into recommendations.

## A Pathways to Clean Air for Indian Cities

This section builds on the gaps in accountability, data, capacity, finance, and coordination identified in the previous sections. Moving from diagnosis to action, it lists six elements that are critical to creating clean air pathways: source-based accountability, evidence-based decision-making, institutional permanence, coordination across the agencies involved, transparent performance tracking and building a robust performance measurement framework. Financing that matches the scale and sources of the problem underpins these six key elements. Without adequate and predictable funding, none of these elements can be sustained.

### 01 Source-based accountability

Responsibility for each emission source must be assigned to specific institutions with the legal mandate and technical capacity to address it. Vehicular emissions fall under transport/urban mobility departments, industrial emissions under pollution control boards, construction dust under urban development authorities, and agricultural burning under agriculture departments. Performance assessment should align with jurisdictional responsibility, recognising that ULGs cannot be held solely accountable for pollution from sources beyond their boundaries or for meteorological factors outside any entity's control.

### 02 Evidence-based decision-making

All interventions should be grounded in emission inventories that quantify the contribution of targeted sources. ULGs should maintain dynamic activity and emissions tracking systems, updated quarterly, to link actions taken with changes in emission loads. Annual Clean Air Action Plans should demonstrate a clear chain of logic from source analysis to intervention design to expected emission reductions. Third-party validation of these plans should be mandatory before the release of funds.

## 03 Institutional permanence

Air quality management requires specialised expertise that cannot be rebuilt with every personnel transfer. Clean Air Cells should be staffed by permanent technical personnel on long-term contracts, insulated from routine administrative transfers. These cells should include environmental engineers, data managers, GIS specialists, and urban planners, with mandatory capacity building programmes and professional development pathways to retain talent.

## 04 Multi-Level Coordination

Vertical integration from central ministries through state departments to ULGs must be formalised through coordination mechanisms with clear meeting schedules, decision-making protocols, and escalation procedures. Horizontal coordination across departments at each level requires mandatory MoUs specifying deliverables, timelines, and consequences for non-performance. State-level coordination committees should meet quarterly to review progress, resolve inter-departmental conflicts, and ensure alignment between city and state action plans.

## 05 Transparent Performance Tracking

All ULGs should maintain public dashboards displaying real-time air quality data, activity and emission load tracking, source-wise emission contributions, planned interventions, budget allocation and utilisation, and progress against targets. Quarterly reports should be published on ULG websites, including inter-departmental meeting minutes, departmental performance against MoU commitments, and analysis of why targets were met or missed. The PRANA portal should evolve from a reporting tool to an integrated performance management system with automated data flows from CAAQM stations, financial management systems, and departmental reporting mechanisms.

## 06 Performance Measurement Framework

A composite performance framework should balance outcome indicators with input, process, and output measures. Outcome indicators (PM2.5 and PM10 concentrations, and the number of good air quality days) should carry reduced weight, recognising the influence of external factors. Process indicators (emission inventory updates, CAAQM uptime, inter-agency meetings, and public consultations) should reward systematic governance. Output indicators (sectoral emission reductions, implementation rates of planned actions, and departmental compliance with MoUs) should measure direct institutional performance. Input indicators (budget allocation, technical staffing, and training programmes) should ensure foundational capacity is in place.

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# B Recommendations

The preceding subsection described the operational framework needed to close the gaps in evidence, institutions, finance, and coordination. This section translates that framework into action, grouping recommendations by the institutions responsible: (1) the Central and State Finance Commissions, (2) the MoEFCC and pollution control boards, and (3) state governments and urban local governments.

## 01 Recommendation to CFC and SFCs - Financial Institutions

The Central Finance Commission and various State Finance Commissions have a pivotal role in creating a sustainable financial architecture for air quality management. The current funding model has fundamental design flaws that undermine effective action. The following recommendations propose a comprehensive restructuring.

Recommendations 1.1 to 1.5 were formally submitted to the Sixteenth Finance Commission. Recommendation 1.6, which pertains to State Finance Commissions, is included here to inform future engagement with select State Finance Commissions.

### Recommendation 1.1: Create a Dedicated Sector-Specific Air Quality Grant

The sixteenth Finance Commission should create a separate performance-based grant category for **'Air Pollution',** distinct from the existing Million-Plus Challenge Fund (MCF). This grant should be designed as a **sector-specific performance grant,** consistent with other finance commission grants to states. Under this model:

- The **overall responsibility** for planning, monitoring, and delivering outcomes should rest with state governments, which can coordinate among relevant stakeholders across jurisdictions.
- Monitoring and performance assessment should apply only to those interventions that fall **within the mandate of the respective entities,** with flexibility for states to determine internal coordination and accountability mechanisms.

**Key features of this sector-specific air pollution funding may include:**

1. **Expansion of eligibility beyond population thresholds:** Extend eligibility beyond million-plus ULGs to include other ULGs with poor air quality, prioritising regions based on monitoring data and population growth. Cities with fewer than 5 years of monitoring data should also be eligible to ensure that newly identified pollution hotspots are not excluded.

2. **Coverage of emissions outside city limits:** Allocate funds to target pollution sources outside municipal boundaries, such as industrial clusters, brick kilns, and construction sites. State governments should coordinate interventions across peri-urban and wider airshed regions to address pollution affecting city air quality.

3. **Direct funding for periphery and agglomeration areas:** Provide funding directly to eligible ULGs instead of routing it through larger metropolitan entities. This eliminates administrative bottlenecks and ensures smaller ULGs are not dependent on larger bodies for funding or approvals.

4. **Avoid conflating air pollution work with developmental and service delivery work:** Interventions for air pollution must leverage specialised knowledge from broader urban development programmes, allowing for targeted technological interventions instead of being diluted within routine municipal service delivery.

## Recommendation 1.2: Establish a Sub-Grant for Institutional Capacity

The sixteenth Finance Commission should establish specific sub-grants under the air quality grant framework to address the lack of fundamental capacity that has hampered effective air quality management.

Challenges in air quality management often stem from insufficient institutional capacity at the ULG and state levels rather than a lack of intent. A specific percentage of the air quality grants should be dedicated to capacity building and institutional strengthening at the state level and across other responsible agencies to achieve the targets set in 2020-21 during early implementation.

**Key components of this sub-grant include:**

1. **Technical expertise development:** Recruitment of full-time technical experts including environmental engineers, data managers, and urban planners dedicated exclusively to air quality management.

2. **Establishment of Clean Air Cells:** These cells will serve as the institutional backbone for proactive clean air governance within ULGs. These cells must consist of permanent technical personnel, representatives of key line departments, and independent experts, and should facilitate multi-departmental coordination through:
   - Regular training programmes on air quality planning, monitoring, and data systems management
   - Public grievance redressal systems
   - Establishment and maintenance of CAAQM stations
   - Use of emission inventories and source apportionment data for planning, action, and reporting on emission-load reduction indicators.

3. **Self-sustainability of Clean Air Cells:** Annual self-sustainability indicators and milestones should be linked to sub-grant allocation to build financial and institutional sustainability, for example:
   - Creation and retention of trained staff
   - Timely preparation and third-party validation of annual Clean Air Action Plans
   - Integration of air quality into urban planning documents such as master plans and transport strategies
   - Inclusion of public health co-benefits into pollution management planning
   - Rethinking the framework for demonstrated convergence between SBM, AMRUT, STPs, and NCAP funds.




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4. **Data infrastructure development:** Support transparent implementation, public reporting, and real-time monitoring systems.

This would address the governance vacuum and encourage ULGs to invest in administrative continuity, staff capacity, and planning systems that endure beyond individual tenures.

## Recommendation 1.3: Continue Support for Target-Achieving ULGs

ULGs that have successfully achieved their air quality targets (under the new composite framework) should continue to receive performance-linked funds. Achieving clean air is not a one-time accomplishment but requires sustained effort to maintain progress and prevent reversal. Cities that reach targets often face continued pressure from population growth, economic development, and regional pollution sources. Discontinuing support for successful cities creates perverse incentives and risks undoing hard-won gains. The goal should be to level the playing field, ensuring smaller ULGs with genuine intent and plans are not handicapped by a lack of upfront funding, while maintaining momentum in cities that have demonstrated success.

## Recommendation 1.4: Address Delayed Grant Disbursement Through Process Reforms

Grants to several ULGs are disbursed towards the end of the financial year, leaving insufficient time for ULGs to plan work, issue tenders, and complete implementation. Late receipt of funds forces ULGs to prioritise large expenditures to maximise utilisation rates rather than undertake systematic actions to reduce emissions. This creates a rushed and inefficient approach that favours visible projects over effective interventions.

Disbursement to ULGs should be completed within two months of the start of the financial year. This will require process reforms, including pre-approval of state and ULG action plans before the financial year begins, streamlined central approval processes, and conditional advance releases based on the previous year's performance. These measures would provide ULGs with sufficient time to plan and execute systematic pollution reduction actions.

## Recommendation 1.5: Develop Additional Performance Parameters and Indicators

The sixteenth Finance Commission should revamp the current performance-linked grant framework for air quality by moving beyond outcome-only indicators, such as PM10 reduction and increases in good air quality days. The commission should encourage the nodal ministry to develop a composite performance framework that evaluates cities using a mix of input, process, and output indicators, aligned with their contextual constraints

**Proposed Framework:**

1. **Sectoral and departmental performance indicators:** Allocate a portion of urban air quality grants to specific departmental contributions through mandatory MoUs between ULGs and key line departments at the city and state levels. These MoUs should specify:
   - Clear responsibilities and deliverables linked to emission load reduction
   - Specific actions under City Clean Air Action Plans (CAAP) and State Action Plans (SAP)
   - Performance targets informed by emission inventories and source apportionment studies
   - Direct fiscal penalties for departments that fail to fulfil obligations.

2. **Institutional capacity indicators:** Cities that have built functional coordination mechanisms, strong monitoring infrastructure and have appointed dedicated technical expertise should be incentivised within the framework.
   - Functional inter-agency coordination mechanisms between ULGs, state

departments, and regulatory bodies such as the Clean Air Cells.
- Installation and maintenance of Continuous Ambient Air Quality Monitoring (CAAQM) stations with a minimum uptime of 85 per cent.
- Active use of emission inventories and emission source analysis for action planning and resource allocation
- Development of trained technical personnel, supported by regular capacity building programmes.

3. **Process indicators:** Transparency on budget utilisation through financial tracking.
   - Establish and maintain **transparency on budget utilisation** through financial tracking systems that monitor fund allocation across air quality interventions, department-wise expenditure against MoUs, and quarterly cost variance analysis
   - **Establish integrated reporting** through regular data updates on the PRANA portal, linking performance measurement to systematic reporting of indicators as per action plans and MoUs to ensure accuracy and regularity.
   - **Enable transparency and accountability** with the quarterly publication of performance data on ULG websites, including inter-departmental meeting minutes, departmental performance against MoU targets, budget utilisation reports, and air quality trend analysis with action taken

4. **Output indicators:** It is crucial to measure the results of intervention that cities are undertaking.
   - Restore focus on directly measuring PM2.5 and PM10 concentrations, while increasing the number of days within permissible air quality limits — with priority on PM2.5, given its greater health risks.
   - Define sectoral emission reduction targets aligned with city-specific emission source analysis.

By rewarding structural and systemic progress, this framework will ensure that ULGs investing in strong institutional foundations and addressing governance bottlenecks remain incentivised even where pollution concentration reductions take longer to materialise. It will shift the focus from optics to operational depth and ensure that performance-linked grants drive meaningful change rather than cosmetic improvements.

### Recommendation 1.6: Leveraging State Finance Commissions

The transboundary nature of air pollution requires a shift in focus towards airshed-based governance. This would also address the coordination issues inherent in the current system and provide opportunity for more accountability at the state or regional level. State Finance Commissions (SFCs) are currently an underutilised lever to this end.

Despite their constitutional mandate and contextual knowledge, SFCs remain removed from the financial architecture for improvement of air quality. Their involvement could enable regionally coordinated, incentive-based financing, especially for smaller cities and rural areas that fall outside the current NCAP framework but contribute significantly to regional air pollution.

Given NCAP's city-centric design, it lacks mechanisms for airshed-level planning or funding. This limits the programme's ability to address pollution sources that lie outside municipal boundaries. SFCs can help strengthen mechanisms that enable regional/multi-state coordination (e.g. bodies that coordinate aggregation and leveraging of capital across states or earmark funds for multi-state efforts that affect development). Further, SFC grants should support the operational and maintenance costs of air quality infrastructure, bridging gaps in ULG capacity for ongoing system management.



## 02 Recommendations to MoEFCC and PCBs - Domain Institutions

The Ministry of Environment, Forest and Climate Change, along with the Central Pollution Control Board and State Pollution Control Boards, must strengthen their technical, regulatory, and coordination roles to enable effective air quality management across India.

### Recommendation 2.1: Complete and Utilise Scientific Studies

- **Complete source apportionment studies for all 130 non-attainment cities.** Currently, 79 cities have completed these studies (45 peer-reviewed and 34 completed), while 51 remain in progress. The remaining cities must prioritise completion within the next 12 months. These studies form the scientific foundation for targeted interventions and should not be delayed further.

- **Build dynamic emission inventories.** Develop a standardised template for emission inventories that cities can update quarterly using activity data. Provide technical support and capacity building to ULGs to maintain these inventories. Make emission inventories publicly accessible through the PRANA portal, with visualisation tools that link emission sources to proposed actions.

- **Conduct carrying capacity studies for cities.** Although proposed under NCAP, these studies have not been initiated. Carrying capacity assessments are essential for understanding the maximum pollution load cities can handle while maintaining acceptable air quality. These studies should inform urban planning, industrial site selection decisions, and regional coordination strategies.

### Recommendation 2.2: Strengthen Central Coordination Mechanisms

- **Include MoES and MoHFW in the central coordination mechanism.** The Ministry of Earth Sciences and Ministry of Health and Family Welfare were identified as implementing agencies under NCAP. However, they remain absent from coordination mechanisms, underplaying their significance. MoES should provide forecasting capabilities and early warning systems, while MoHFW should track health impacts through district hospital data on respiratory illnesses and other pollution-related health outcomes.

- **Establish a robust inter-ministerial coordination system.** Create formal coordination protocols with clear meeting schedules (at least quarterly), defined decision-making authority, escalation procedures for inter-ministerial conflicts, and public minutes documenting decisions and action items. Each ministry should have specific activity and emission reduction targets cascading from national to the state to city levels.

- **Define ministry-specific emission reduction targets.** Assign measurable, time-bound, and publicly reported targets to individual ministries. Transport ministries should commit to vehicular emission reductions, agriculture ministries to crop residue management, power ministries to thermal power plant emission controls, and housing ministries to construction dust management.

### Recommendation 2.3: Improve CAAQM Network Management

- **Ensure minimum 85 per cent uptime for all CAAQM stations.** Current uptime falls below acceptable standards, creating data gaps that undermine performance assessment and public trust. Central Pollution Control Board (CPCB) should establish service-level agreements with station operators, implement

real-time monitoring of station status, and enforce penalties for prolonged downtime.

- **Expand monitoring coverage.** Increase the density of monitoring stations in large cities and establish stations in smaller cities showing signs of deteriorating air quality. Prioritise PM2.5 monitoring given its greater health impacts. Integrate low-cost sensor networks with reference-grade stations to provide higher spatial resolution while maintaining data quality standards.

- **Enhance data accessibility and visualisation.** Make real-time air quality data freely available through APIs and develop user-friendly visualisation tools that display trends, forecasts, and health advisories. Provide historical data for research and policy analysis.

### Recommendation 2.4: Strengthen PCB/PCC[51] Regulatory Capacity

- **Build technical capacity for industrial emissions monitoring.** PCBs require specialised equipment and trained personnel for continuous emissions monitoring, stack testing, and compliance verification. Invest in modern monitoring equipment, training programmes for PCB staff, and standardised protocols for emissions testing and reporting.

- **Improve enforcement mechanisms.** Develop clear escalation procedures for non-compliance, ranging from notices to production closures. Implement automated monitoring systems for high-polluting industries with real-time data transmission to PCBs. Establish fast-track adjudication for environmental violations to reduce the time between detection and penalty.

- **Clarify jurisdictional boundaries.** Address instances where certain waste types fall into regulatory gaps between ULGs and PCBs. Develop clear protocols for waste categorisation and responsibility assignment. Establish joint inspection mechanisms for activities requiring coordination between multiple regulatory bodies.

### Recommendation 2.5: Standardise Operating Procedures

- **Develop comprehensive SOPs for ULG actions.** Current implementation reveals significant gaps. For example, one of the visited cities had no clear protocols for disposing of collected road dust or guidelines on water use for sprinklers. MoEFCC should develop standardised operating procedures covering road dust management and disposal, water sprinkling schedules and volumes, mechanised sweeping, construction dust control, and municipal solid waste burning.

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- **Create technical guidelines for interventions.** Provide evidence-based guidance on the effectiveness of different interventions under various conditions. Include cost-effectiveness analyses to help ULGs make informed choices. Develop sector-specific guidance for transport, construction, waste management, and industrial areas.

### Recommendation 2.6: Sharpen Priorities Based on Monitoring Committee Recommendations

Following the recommendations from Air Quality Monitoring Committee held in May 2025, cities should shift from broad sectoral actions to bridging critical gaps. Priority actions should include end-to-end road paving rather than piecemeal approaches, targeted dust management at pollution hotspots, strategic traffic management and parking reforms, development of green corridors and urban forests in priority areas, stricter control and monitoring of crematorium emissions, and mass awareness campaigns on air pollution through schools, colleges, and MY Bharat volunteers.

MoEFCC should provide clear evidence to support the proposed directions and develop guidance to support this transition, including revised funding priorities, technical specifications for priority interventions, performance metrics aligned with these actions, and timelines for implementation.

### Recommendation 2.7: Enable Citizen and Community Action

- **Develop a national framework for awareness programmes.** MoEFCC should develop standardised guidelines and toolkits for ULGs to design awareness campaigns distinct from general environmental education. It should also develop evidence-based communication materials highlighting the link between specific behaviours (vehicle maintenance, avoiding waste burning, and reporting construction dust) and measurable air quality outcomes. Create model curricula for schools and colleges that can be adapted by State Governments and ULGs based on local pollution profiles.

- **Create citizen science programmes**. CPCB should create technical standards and protocols for incorporating community-generated monitoring data into official monitoring systems. It should establish a national platform for low-cost sensor data collection and validation, provide technical recommendations for mobile applications that allow users to report violations, and create training modules and certification programmes on air quality monitoring for community organisation that ULGs can adopt locally.

# 03 Recommendations to State Governments and ULGs – Urban Governance

State governments and Urban Local Governments are at the frontline of air quality management. Their capacity to translate policy into action will determine whether clean air remains an aspiration or becomes a reality.

## Recommendation 3.1 (Urban Local Governments): Establish and Empower Clean Air Cells

- **Create dedicated institutional structures.** Transform the current provision of City Air Quality Monitoring Cells into robust Project Implementation Units with representatives from all concerned line departments and parastatals working exclusively on air quality. These cells should not function as add-ons to existing environmental departments but as dedicated units with their own staff, budget, and authority.

- **Staff with permanent technical personnel.** Recruit environmental engineers, data managers, GIS specialists, and urban planners on specialised contracts insulated from routine administrative transfers. Provide competitive salaries and professional development opportunities to attract and retain qualified professionals. Each city should have a minimum of 5-7 dedicated technical staff.

- **Assign clear mandates and authority.** Clean Air Cells should have the authority to coordinate across departments, access financial resources, commission studies and consultancies, and report directly to city leadership. They should lead the preparation and monitoring of City Clean Air Action Plans, manage emission inventories and source apportionment data, coordinate with state agencies and PCBs, engage with citizens and stakeholder groups, and track progress against targets.

## Recommendation 3.2 (Urban Local Governments): Prioritise Data-Based Action

- **Base all actions on emission inventories and source apportionment.** Cities should move away from ad-hoc steps to utilise available grants and instead develop action plans directly derived from their pollution profiles. Budget allocation and spending should be linked to emission source profiles. If vehicular emissions account for 40 per cent of PM2.5, allocate at least 40 per cent of interventions and budget to transport sector solutions. If construction dust is the dominant source, prioritise road paving, construction site regulation, and mechanised sweeping.

- **Maintain dynamic emission inventories.** Update emission inventories quarterly with current activity data. Track emission reductions from implemented interventions. Make this data publicly available through city dashboards.

- **Conduct annual action plan reviews.** Each year's Clean Air Action Plan should analyse the previous year's performance, identify why targets were met or missed, adjust strategies based on lessons learned, and set realistic targets for the coming year. These reviews can include third-party experts and made public.

## Recommendation 3.3 (State Government): Formalise Inter-Departmental Coordination

- **Execute mandatory MoUs with line departments.** States should facilitate ULGs in signing formal MoUs with transport, public works, solid waste management, town planning, and other relevant departments. These MoUs should specify each department's emission reduction responsibilities, concrete actions with timelines, budget commitments, reporting requirements, and consequences for non-performance.



- **Establish coordination committees.** Create standing committees with representatives from all relevant departments that meet monthly. The Clean Air Cell should serve as the secretariat, preparing agendas, tracking action items, and documenting decisions. Committee meetings should review progress on MoU commitments, resolve inter-departmental conflicts, and align on upcoming initiatives.

- **Implement accountability mechanisms.** Link departmental budget allocations to air quality performance. Conduct annual performance reviews of each department's contribution to air quality goals. Make departmental performance data public. Establish fiscal penalties for departments that consistently fail to meet their commitments.

## Recommendation 3.4 (Urban Local Governments): Address Operational and Maintenance Gaps

- **Include O&M costs in budget planning.** Many cities have invested in infrastructure such as mechanised sweepers, air quality monitoring stations, and electric buses but lack operational budgets. Infrastructure without maintenance quickly becomes non-functional, wasting the initial investment. Cities should allocate at least 30 per cent of air quality budgets to operations and maintenance.

- **Develop comprehensive O&M plans.** For each piece of infrastructure, prepare detailed maintenance schedules, spare parts inventories, trained operator requirements, and performance monitoring protocols. Contract with reliable service providers for specialised equipment. Build in-house maintenance capacity for routine operations.

## Recommendation 3.5 (Urban Local Governments): Implement Transparent Performance Tracking

- **Create public dashboards.** Each ULG should maintain a comprehensive dashboard showing real-time air quality data from all monitoring stations, emission source contributions updated quarterly, planned interventions with timelines and budgets, actual spending and implementation status, and performance against annual targets. These dashboards should be prominently featured on city websites and updated at least monthly.

- **Publish quarterly performance reports.** Detailed reports should include air quality trends and analysis, actions implemented with associated costs and emission reductions, departmental performance against MoUs, challenges encountered and mitigation measures, and revised strategies based on performance. These reports should be presented to city councils and made available to the public.




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- **Integrate with the PRANA portal.** Ensure regular data uploads to the national PRANA portal covering financial data, action plan status, monitoring station data, and emission inventory updates. Use PRANA not just as a compliance reporting platform but also as a performance management tool.

### Recommendation 3.6 (State Government): Leadership and Coordination

- **Ensure timely fund transfers to ULGs.** State governments should transfer air quality grants to ULGs within two days, as mentioned in existing guidelines, of receiving funds from the central government. Delayed transfers undermine planning and force rushed spending. States should establish systems for automatic fund release upon receipt to eliminate bureaucratic delays.

- **Coordinate actions beyond city limits.** State governments must address pollution sources in industrial clusters, brick kilns, and peri-urban areas that affect city air quality. Establish airshed management frameworks recognising that air pollution crosses administrative boundaries. Coordinate between multiple ULGs and districts within the same airshed.

- **Build state-level technical capacity.** Establish state-level Clean Air Cells with the technical expertise to support ULGs. Provide training programmes for city officials and technical staff. Commission state-wide studies on cross-cutting issues. Facilitate peer learning between cities through regular workshops and knowledge exchange platforms.

- **Harmonise state policies with air quality goals.** Review industrial siting policies to prevent new pollution sources near cities. Align urban planning regulations with air quality objectives. Ensure transport policies promote public transit and non-motorised transport. Integrate air quality considerations into state-level infrastructure planning.

### Recommendation 3.7 (Urban Local Governments): Strengthen Community Engagement

- **Develop targeted and localised awareness campaigns.** Move beyond generic environmental messaging to specific behavioural changes with measurable air quality impacts. This can be done using the national guidelines and toolkits created by MoEFCC to design and execute city-specific awareness campaigns that address local pollution sources and target behaviours. Focus on vehicle maintenance and responsible driving, avoiding burning of leaves and waste, reporting construction dust, and participation in clean air initiatives. Use schools and colleges to reach diverse audiences with messaging tailored to the city's emission profile.

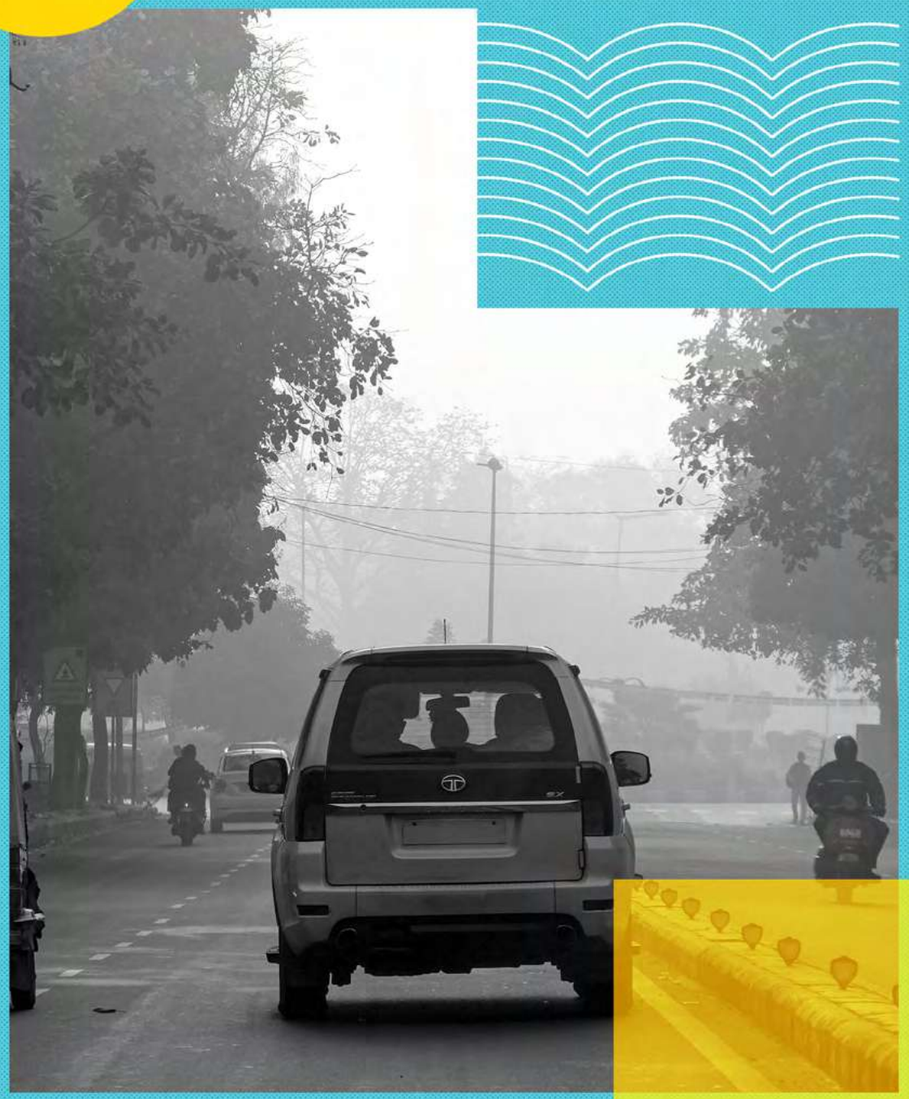
- **Create feedback and enforcement mechanisms.** Establish city-specific helplines and deploy mobile applications integrated with a centralised platform for reporting violations such as construction dust, waste burning, and traffic pollution. Ensure rapid response to complaints through coordinated enforcement by the relevant departments. Provide complainants with updates on the actions taken

- **Build partnerships with civil society.** Engage NGOs, resident welfare associations, and community groups in monitoring and advocacy. Support citizen science initiatives with technical guidance and by integrating community-generated data. Recognise and celebrate community contributions to clean air through awards and public acknowledgment.




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# Conclusion



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The main takeaway is not that performance-linked funding is ineffective, but that its effectiveness depends on design and operation: how performance is defined, how incentives align with the institutional capacities of ULGs, and how governance is strengthened to enable rather than constrain action.

**Six years, Over**

**₹20,000 Cr**

**Yet most Indian cities have not met their air pollution reduction targets under NCAP.**



The evidence in this report points to a single, clarifying insight: air pollution management in Indian cities is constrained less by limitations in data, technology, or funding than by fragmented governance, weak accountability, and misaligned incentives. The key finding of this report is the clear lack of correlation between how much a city spent and how much its air quality improved.

The binding constraint is not the quantum of funding but how it is governed and translated into action. Effective air quality governance requires clarity on three fundamental questions: who is responsible, for what actions, and how will performance be measured? Today, responsibility is diffused, with multiple agencies holding overlapping mandates and no clear demarcation of roles or consequences for inaction. Cities are judged on outcomes they cannot fully control, while the agencies that govern major emission sources are often not held accountable.

The main takeaway is not that performance-linked funding is ineffective, but that its effectiveness depends on design and operation: how performance is defined, how incentives align with the institutional capacities of ULGs, and how governance is strengthened to enable rather than constrain action.
Without differentiated targets, institutional strengthening, and governance reform, future funding cycles risk reproducing the current pattern: money spent, air quality unchanged.

These findings reinforce a city-systems approach to urban air quality, one that treats clean air as a matter of institutions, accountability, and capacity, not funding alone. Ultimately, clean air is not just a technical target. It is a child walking to school, with no memory of clean air. It is a pregnant woman travelling for her doctor's appointment, breathing for two. It is the traffic police personnel standing for hours at a traffic signal, and the auto driver driving through heavy traffic, construction corridors and dust-laden roads. It is a daily wage labourer working on a construction site, and an elderly person with chronic illness, whose condition worsens with every polluted day. It is all of them, breathing the same polluted air, all day, every day.

07

## Annexure 1 130 NCAP Cities

| State / Union Territory | XV-FC Cities | NCAP Cities |
|---|---|---|
| Andhra Pradesh | Vijayawada, Visakhapatnam | Guntur, Kurnool, Nellore, Anantapur, Chittoor, Eluru, Kadapa, Ongole, Rajahmundry, Srikakulam, Vizianagaram |
| Assam | | Guwahati, Nagaon, Nalbari, Sibsagar, Silchar |
| Bihar | Patna | Gaya, Muzaffarpur |
| Chandigarh | | Chandigarh |
| Chhattisgarh | Bhilai, Raipur | Korba |
| Delhi | | Delhi |
| Gujarat | Surat, Ahmedabad, Vadodara, Rajkot | |
| Haryana | Faridabad | |
| Himachal Pradesh | | Baddi, Damtal, Kala Amb, Nalagarh, Paonta Sahib, Parwanoo, Sundar Nagar |
| Jammu & Kashmir | | Jammu, Srinagar |
| Jharkhand | Dhanbad, Jamshedpur, Ranchi | |
| Karnataka | Bengaluru | Davanagere, Gulbarga, Hubli Dharwad |
| Madhya Pradesh | Bhopal, Indore, Gwalior, Jabalpur | Dewas, Sagar, Ujjain |
| Maharashtra | Aurangabad, Badlapur, Mumbai, Nagpur, Nashik, Navi Mumbai, Pune, Ulhasnagar, Thane, Vasai Virar | Akola, Amravati, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Sangli, Solapur |
| Meghalaya | | Byrnihat |
| Nagaland | | Dimapur, Kohima |
| Odisha | | Angul, Balasore, Bhubaneswar, Cuttack, Rourkela, Talcher, Kalinga Nagar |
| Punjab | Ludhiana, Amritsar | Dera Bassi, Gobindgarh, Jalandhar, Khanna, Naya Nangal, Pathankot/ Dera Baba, Patiala |
| Rajasthan | Jaipur, Jodhpur, Kota | Alwar, Udaipur |
| Tamil Nadu | Tiruchirappalli (Trichy), Madurai, Chennai | Thoothukudi |
| Telangana | Hyderabad | Nalgonda, Sangareddy |
| Uttar Pradesh | Agra, Allahabad (Prayagraj), Ghaziabad, Kanpur, Lucknow, Varanasi, Meerut | Anpara, Bareilly, Firozabad, Gajraula, Jhansi, Khurja, Moradabad, Noida, Raebareli, Gorakhpur |
| Uttarakhand | | Kashipur, Rishikesh, Dehradun |
| West Bengal | Kolkata, Asansol, Barrackpore, Howrah | Durgapur, Haldia |

# Endnotes

[1] Tracing the Hazy Air 2026: Progress Report on National Clean Air Programme (NCAP). Centre for Research on Energy and Clean Air (CREA)

[2] https://www.iqair.com/in-en/world-most-polluted-cities

[3] The World Health Organization (WHO) has established guidelines on ambient (outdoor) air pollution levels, which are widely used as reference tools by policymakers across the world to set standards and goals for air quality management. The WHO air quality guideline (AQG) states that annual average concentrations of PM2.5 should not exceed 5 µg/m3.

[4] India's National Ambient Air Quality Standards (NAAQS) set the legal limits for fine particulate matter (PM2.5) at 40 micrograms per cubic meter (µ g/$m^3$) for annual average exposure.

[5] Tracing the Hazy Air 2026: Progress Report on National Clean Air Programme (NCAP). Centre for Research on Energy and Clean Air (CREA)

[6] Non-attainment cities, as defined by the Central Pollution Control Board (CPCB), are those that consistently fail to meet National Ambient Air Quality Standards (NAAQS). In accordance with this definition, the CPCB has identified 131 cities (including both non-attainment cities and million-plus cities) across 24 States/Union Territories (UTs).

[7] NCAP stands for National Clean Air Programme.

[8] Sharma, S., Kumar, A., Datta, A., Mohan, I., Das, S., Mahtta, R., Lakshmi, C. S., Pal, S., Malik, J., (2016). Air pollutant emissions scenario for India. ISBN 978-81-7993-639-9

[9] Unveiling the elemental composition, sources and health impacts of PM10 over the central Indo-Gangetic plain (IGP) of India, Physics and Chemistry of the Earth, Parts A/B/C, Volume 136, 2024, 103752, ISSN 1474-7065, https://doi.org/10.1016/j.pce.2024.103752.

[10] NCAP, launched by the Ministry of Environment, Forest and Climate Change, is a time-bound, multi-stakeholder programme spanning more than 100 cities. It aims to reduce PM10 levels by up to 40% or reach the national ambient air quality standard of 60 µg/$m^3$, by 2025–26 relative to 2019–20 levels.

[11] As per the data presented in the 15th monitoring committee meeting on implementation of NCAP held on 15th September 2025. https://prana.cpcb.gov.in/ncapDashboard/download_public_portal_file/Monitoring_Committee_Meeting-29th_August_2025_1758609505105813.pdf

[12] cities with continuously available data were included to enable reliable annual comparisons. The detailed data validation criteria are set out in Janaagraha, Air Quality in Indian Cities. https://www.janaagraha.org/wp-content/uploads/2026/06/Air-Quality-in-Indian-Cities.pdf

[13] PM10 data assessed taking into consideration the 2024-25 reduction targets against the baseline year of 2019-20. Both million-plus cities (XV FC MCF) and non-million-plus cities (MoEFCC CoP scheme) show broadly similar patterns.

[14] Million Plus Cities

[15] Non-attainment cities that are not million plus

[16] The 50 per cent utilisation is as per the data recorded in May/June 2025 when the field visits were being conducted. For instance, at the time, Varanasi had less than 50 per cent fund utilisation with respect to the funds that were released to the city, but Varanasi showed target improvements in terms of PM10 reduction.

[17] The data was recorded in September 2025, and at the time full year fund release and utilisation data was not available for FY 2025–26 therefore the calculation was done until FY 2024–25.

[18] This is as per the data recorded and available on PRANA portal in July 2026. As per the data updated on the PRANA portal in 2025, the fund utilisation in FY 2022-23 was INR 116 crore, followed by INR 46 crore in FY 2023-24 and INR 151 crore in FY 2024-25.

[19] The amount released is INR 541 if we consider INR 6 crores that was released in 2019-20 prior to XVI FC grant under NCAP.

[20] The fund utilisation of INR 434 crore is as per July 2026. However, the number was INR 313 crore (i.e. 36 per cent of allocation and 58.5 per cent of the funds released) as recorded in May/June 2025.

[21] This representation is as per data available in December 2025.

[22] During the period May to September 2025, field visits to 9 cities were conducted. These cities include Varanasi, Patna, Bengaluru, Mumbai, Thane, Navi Mumbai, Pune, Chennai and Vadodara.

[23] These cities recorded the lowest overall utilisation rate of 40%

[24] This percentage was calculated based on data available on PRANA portal during the period in which field visits were conducted ie May to September 2025.

[25] It should be noted that activity-wise spending data was made available for only 4 of the 9 cities visited, and the figures cited reflect those cities alone.

[26] Here ULG refers to the municipal boundary of the non-attainment cities (million-plus and others) and in certain cities the ULG cluster i.e. Urban Agglomeration (Greater Mumbai UA for example includes Mumbai, Thane, Navi Mumbai, Ulhasnagar and Badlapur)

[27] Minutes of 4th meeting of National Apex Committee under National Clean Air Programme (NCAP) (7 September 2024)

https://prana.cpcb.gov.in/ncapDashboard/download_public_portal_file/Minutes_of_4th_Apex_Committee_meeting_ (2)_1727686782964684.pdf

[28] Minutes of 4th meeting of National Apex Committee under National Clean Air Programme (NCAP) (7 September 2024)

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