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THE NATIONAL CLEAN AIR PROGRAMME: IMPLEMENTATION

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Introduction

The Government of India started the National Clean Air Programme (NCAP) in 2019 as a critical national endeavour to fight the country's chronic air pollution crisis. NCAP aims to lower particulate matter (PM) concentrations by 20-30% by 2024 (later amended to 40% by 2026) compared to 2017 levels in 131 non-attainment cities through city-specific action plans, improved monitoring, and multi-sectoral interventions. This article presents a complete review of the NCAP concept, implementation tactics, accomplishments, and issues as of early 2026. Drawing on current studies, it cites results such as a 26.84% reduction in PM levels across the country from 2019 to 2024, with PM10 concentrations falling in over 100 cities.

However, long-standing challenges such as underutilisation of funding, data discrepancies, and enforcement gaps have hampered complete implementation. The programme's impact on public health includes fewer deaths from air pollution-related disorders, however external factors such as weather changes have influenced observed benefits (*Air Quality Improvements in India Partially Due to Weather - University of Reading*, n.d.). To achieve long-term air quality gains, recommendations emphasise strengthening legal bindings, improving data infrastructure, and integrating regional airshed management. This analysis highlights NCAP's potential as a model for environmental governance in developing countries, while also advocating for adaptable reforms to solve India's persistent air quality issues.(Ganguly et al., 2020)

With air quality indicators often above permissible thresholds in both urban and rural areas, India has one of the worst air pollution crises in the world. Approximately 1.67 million deaths in 2019 were attributed to air pollution, making up 17.8% of all deaths in the nation. Particulate matter (PM2.5 and PM10), nitrogen dioxide (NO2), and ozone are examples of major pollutants that come from a variety of sources, such as automobile emissions, industrial processes, construction dust, burning biomass, and burning agricultural stubble. With PM2.5 levels frequently exceeding the World Health Organization's (WHO) recommendations by several

times, cities like Delhi, Mumbai, and Kolkata routinely rank among the most polluted in the world.(*How Is India Trying to Address Air Pollution?*, n.d.)

The Ministry of Environment, Forests, and Climate Change (MoEFCC) launched NCAP on January 10, 2019, as a result of international pressure and mounting public health concerns. NCAP, India's premier clean air program, expands on earlier initiatives such as the National Ambient Air Quality Standards (NAAQS) created in 2009 and the Air (Prevention and Control of Pollution) Act of 1981. NCAP takes a comprehensive, national strategy, stressing cooperative governance among federal, state, and local entities, in contrast to dispersed state-level initiatives.

By 2021, NCAP has grown from its initial objective of 102 non-attainment cities—those that failed to satisfy NAAQS for five years in a row—to 131 cities. The fundamental tenets of the program are on preventing, controlling, and reducing air pollution through strict mitigation strategies, public involvement, and technology integration. It is consistent with India's obligations under the Paris Agreement and the Sustainable Development Goals (SDGs), especially SDG 13 (Climate Action) and SDG 11 (Sustainable Cities). Implementation entails the creation of city-specific clean air action plans (CAAPs), which include targeted interventions and use source apportionment studies to identify pollution sources. Infrastructure such as pollution control technology and air quality monitoring stations are supported by funding mechanisms, such as allocations from the 15th Finance Commission (about $1.7 billion in 2020). In light of the post-COVID recovery and economic expansion, NCAP has changed by 2026, updating aims to a 40% PM reduction or NAAQS compliance.

The implementation trajectory of NCAP is examined in this study, and its achievements are weighed against ongoing difficulties. It highlights the program's contribution to cleaner air while flagging needs for improvement, based on empirical data from 2025–2026 reports.

Objectives and Framework

With a revised target of up to 40% by 2026 or meeting NAAQS (60 µg/m³ for PM10 yearly), NCAP's main goal is to significantly reduce important air pollutants, particularly PM10 and PM2.5, from 2017 baseline levels by 20–30% by 2024. Three pillars support this goal: strengthening public awareness and capacity building, strengthening air quality management systems, and strictly enforcing mitigating measures.(*Goals Set under NCAP*, n.d.)

Committees at the federal, state, and local levels are involved in the multi-tiered framework for coordination, oversight, and assessment. Through the PRANA site, which monitors action plan implementation, financial utilisation, and trends in air quality, the Central Pollution Control Board (CPCB) monitors developments at the national level. Urban local bodies (ULBs) and State Pollution Control Boards (SPCBs) carry out city-specific plans that incorporate waste management, transit, industry, and urban greening.(Sabha, n.d.) Important elements include the creation of CAAPs according to local contexts and source apportionment studies to measure pollution contributions (e.g., vehicular emissions at 20–40% in many cities). Plans, for example, place a strong emphasis on electrifying public transit, including subsidies for e-rickshaws and e-buses through programs like FAME-II. The Continuous Ambient Air Quality Monitoring Stations (CAAQMS) network is being expanded in order to provide real-time data in all non-attainment cities.(*National Clean Air Programme (NCAP) for Indian Cities*, 2020)

In terms of funding, NCAP makes use of central grants, with ₹7,600 crore allotted by 2024, in addition to convergence with initiatives like the Smart Cities Mission and Swachh Bharat Mission. Performance-based incentives were implemented by the 15th Finance Commission, which linked funding to improvements in air quality in cities with more than a million residents. Additionally, the framework encourages international cooperation and technology transfer, such as collaborations with the Climate and Clean Air Coalition (CCAC) to reduce short-lived climate pollutants. Community involvement in pollution control is ensured through citizen science projects and public awareness campaigns.(*Clean Air, Choked Finance*, n.d.)

All things considered, NCAP's goals are broad, emphasising both short-term mitigation and long-term sustainability; yet, their achievement hinges on efficient ground-level implementation.

Implementation Strategies

CAAPs are the cornerstone of decentralised yet coordinated solutions used in NCAP implementation. By 2022, 102 cities had submitted plans; by 2024, that number had risen to 131. These plans identified priority measures in seven sectors: transportation, industry, power, waste, construction, biomass, and dust.

Promoting electric cars (EVs), replacing outdated automobiles, and enhancing public transportation are examples of transportation initiatives. For instance, Delhi's strategy is for a 25% EV penetration rate by 2024, backed by infrastructure for charging them. Cleaner fuels,

such as PNG, and more stringent emission standards are required by industrial interventions, with internet monitoring tools to ensure compliance. Urban greening entails afforestation campaigns under the National Mission for Green India, while waste management concentrates on removing open burning through automated collection and biogas facilities. Green buffers, paved roads, and construction site rules are examples of dust management strategies.(*National_Clean_Air_Programme09122019.Pdf*, n.d.)

The PRANA platform, which offers dashboards for real-time tracking, facilitates monitoring and evaluation. Adaptive planning is informed by source apportionment studies, which will be finished in more than 80 cities by 2025. As seen in the Indo-Gangetic Plain, the program recognises transboundary pollution and incorporates airshed management. Beginning in 2025, funding distribution will be performance-linked, and cities will be assessed based on five key areas: capacity building, public grievance redressal, source apportionment, monitoring network, and emissions inventory. Enhancing capacity is supported by international assistance, such as that provided by the World Bank. Incomplete micro-action plans in certain cities and bureaucratic delays are implementation challenges. However, tactics like the Compendium of Viable Technologies encourage cutting-edge methods like biomass briquetting and mechanised sweepers.

Progress and Achievements

NCAP has made significant strides as of January 2026. Between 2019 and 2024, PM levels decreased by 26.84% nationwide, with NCAP cities seeing a 24% decrease. In comparison to baselines from 2017–18, PM10 levels in over 103 cities decreased in 2024–2025. Of the 97 cities assessed, 41 achieved the initial 20–30% PM10 reduction goal in 2025, while 61 showed improvements. Through focused initiatives, cities like Varanasi and Agra saw decreases of more than 30%. Better data-driven judgements were made possible by the monitoring network's expansion to more than 1,500 sites. Cleaner technologies have lowered industrial emissions, and incentives for machines have reduced stubble burning. Studies show that reduced PM exposure results in fewer deaths, demonstrating the clear advantages to public health.

Using forecasting models, NCAP cities in Uttar Pradesh saw notable PM10 reductions. By early 2025, Kolkata recorded a 21.5% decrease. All things considered, NCAP has promoted intersectoral cooperation and established a standard for environmental policy. Only 4% of cities

with persistent pollution are covered, indicating coverage gaps. However, progress varies.

Challenges and Limitations

Despite successes, NCAP still has a lot of obstacles to overcome. Due to bureaucratic red tape, funding utilisation is sub 40% in some states, with an average of 60%. Financial limitations have severely hampered efforts by 2025, leaving gaps in clean air finance. Enforcement is weakened in the absence of legally obligatory targets. There are still data inconsistencies, and 28 NCAP cities do not have CAAQMS, which results in inaccurate evaluations. Local variations are ignored by uniform targets, and incentives are diminished by the spillover effects of weak SPCBs. Incomplete source allocation and post-funding sustainability issues are examples of implementation gaps. Some gains were caused by meteorological causes, not just NCAP. With only 4% of cities covered by NCAP, chronic pollution in 44% of cities suggests structural problems. NCAP is "deeply flawed," according to political criticisms, which demand changes. Expanded coverage and binding mechanisms are needed to address this.

Impact on Air Quality and Public Health

NCAP has improved air quality, resulting in PM10 reductions in more than 100 cities. Pollution reductions in Kota, Rajasthan, have been associated with fewer health difficulties. Nationally, it has the potential to increase life expectancy by 1.4-3 years in contaminated areas. Public health benefits include lower rates of respiratory and cardiovascular disease, as well as lower mortality rates due to PM exposure. However, increases in NO2 and external factors attenuate attributions. Broader consequences include environmental co-benefits such as climate mitigation. However, rural-urban inequities remain, needing inclusive methods.

Since its commencement in 2019, the National Clean Air Programme (NCAP) has made undeniable progress in India's long-standing struggle against air pollution. As of January 2026, recent evaluations highlight both concrete accomplishments and ongoing shortcomings, providing a nuanced picture of a program that has catalysed air quality gains while contending with systemic constraints. PM10 concentrations have decreased in 77 out of 100 monitored non-attainment cities, with 51 meeting the initial 20-30% reduction target compared to the 2017-18 baseline and 23 meeting the ambitious revised goal of 40% reduction or compliance with National Ambient Air Quality Standards (NAAQS) of 60 µg/m³ for PM10.

This progress has been aided by the expansion of the monitoring infrastructure, which now includes over 1,600 stations (including 565 Continuous Ambient Air Quality Monitoring Stations and 1,035 manual ones) in 584 cities, representing a 462% increase in PM10 stations and a 344% increase in PM2.5 stations since 2017. Financially, the initiative has mobilised ₹13,415 crore through NCAP allocations and the 15th Finance Commission, with a commendable 74% utilisation rate, facilitating interventions in areas including transport electrification, waste management, and city greening.(Institute, 2025)

These developments have resulted in significant public health and environmental benefits. Since 2019, declining trends in PM10 and PM2.5 levels at more than half of the monitoring stations indicate lower exposure risks, potentially preventing thousands of premature deaths from respiratory and cardiovascular diseases. Cities such as Varanasi and Agra, for example, have achieved reductions of more than 30% through targeted efforts such as stubble burning alternatives and industrial retrofits, illustrating the effectiveness of localised clean air action plans. Furthermore, NCAP's integration with broader initiatives, such as Bharat Stage-VI emission norms and the Pradhan Mantri Ujjwala Yojana for clean cooking fuels, has increased co-benefits such as greenhouse gas mitigation, which is consistent with India's commitments under the Paris Agreement and the Sustainable Development Goals. The program's performance-based payment mechanism, which was implemented in 2025, has encouraged better implementation, with over 100 communities reporting PM10 reductions in 2024-25 compared to baselines.

However, the programme's obstacles remain serious, necessitating immediate revisions to assure long-term viability. A critical limitation is the program's incomplete coverage: while NCAP targets 130 non-attainment and million-plus cities, recent analyses show that 44% of India's 4,041 assessed cities (approximately 1,787) face chronic pollution, but only 4% (around 67-130, depending on metrics) are included, leaving 96% of persistently polluted areas unaffected. Despite reductions in 77 cities, 23 monitored cities saw PM10 increases, and 68 of those with declines still exceeded NAAQS, particularly in high-burden areas such as the Indo-Gangetic Plain (60 out of 61 cities exceeded PM10 standards) and the National Capital Region (all 14 cities exceeded). PM2.5 exceedances are as severe, affecting 103 out of 231 cities with relevant data. States like Bihar, Rajasthan, and Uttar Pradesh exhibit extensive violations.

While funding utilisation has improved, there are still inefficiencies: 68% of expenditures go

towards road dust mitigation, often through short-term measures like mechanical sweepers, while critical areas such as industrial emissions (under 1%), domestic fuel transitions (under 1%), and public outreach (under 1%) receive little attention. Source apportionment studies, which are required for evidence-based planning, have only been completed in 90 cities, postponing targeted interventions in the remaining 40. Monitoring gaps exist, with 28 NCAP cities lacking CAAQMS, as well as continuous data quality difficulties caused by poor station maintenance and noncompliance with siting criteria. Furthermore, attributions of NCAP benefits are complicated by external factors such as weather changes, seasonal influences, and concurrent national policies, demanding more robust, station-level analyses that isolate program impacts using rolling averages. Enforcement remains inadequate in the absence of legally obligatory targets, resulting in bureaucratic delays, underutilisation in some states, and inconsistent inter-sectoral collaboration.

To address these constraints and accelerate NCAP towards its 2025-26 targets of 40% PM reduction or NAAQS compliance, recent assessments have produced a set of focused suggestions. First, prioritise PM2.5 and its precursor gases (e.g., NOx, SO2, and NH3) over the existing PM10-centric focus, as PM2.5 poses larger health hazards and necessitates extensive precursor monitoring. Second, amend and enlarge the list of non-attainment cities to include the 1,787 chronically contaminated locations, providing greater geographical parity and incorporating rural hotspots impacted by biomass burning and agricultural leftovers. Third, enforce pollution load reductions by tighter, time-bound regulations for industry, cars, and power plants, backed up by legal mandates and penalties to encourage compliance. Fourth, allocate funding proportionally based on source apportionment data, shifting resources away from dust control and towards underfunded areas such as renewable energy transitions and capacity building for State Pollution Control Boards.

Adopt a regional airshed management approach to address transboundary pollution, particularly in clusters such as the Indo-Gangetic Plain, using coordinated multi-state frameworks and real-time forecasting models. Improve data infrastructure by meeting the unmet objective of 1,500 manual stations, increasing maintenance, and incorporating sophisticated technologies such as satellite monitoring and AI-driven analytics to better identify trends. Increase public participation through increased awareness campaigns, citizen science activities, and grievance redressal systems, so encouraging community ownership and behavioural changes. Finally, boost total funding envelopes, possibly through green bonds or

international collaborations, to close the predicted gaps in clean air financing.

Looking ahead, with adaptable tactics and reforms, NCAP has the potential to become a strong model for environmental governance in developing countries. As India approaches the 2025-26 deadline, the program's success depends on moving from aspirational goals to enforceable actions, possibly through an NCAP 2.0 framework that includes lessons learnt over the previous seven years. India can achieve long-term clean air by resolving coverage gaps, optimising resource allocation, and emphasising airshed-level initiatives, reducing the health burden that currently kills millions of people and stifles economic growth. Ultimately, NCAP's legacy will be characterised not by percentage reductions, but by its ability to provide breathable air to all citizens, emphasising the importance of sustained political will, scientific rigour, and community participation.

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