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TRACING THE HAZY AIR

Progress Report on National Clean Air Programme (NCAP)

CREA

Centre for Research on Energy and Clean Air

CREA is an independent research organisation focused on revealing
the trends, causes, and health impacts,
as well as the solutions to air pollution.

About CREA

The Centre for Research on Energy and Clean Air is an independent research organisation focused on revealing the trends, causes, and health impacts and the solutions to air pollution.

CREA uses scientific data, research and evidence to support the efforts of governments, companies and campaigning organizations worldwide in their efforts to move towards clean energy and clean air. We believe that effective research and communication are the key to successful policies, investment decisions and advocacy efforts. CREA was founded in December 2019 in Helsinki, Finland and has staff in several Asian and European countries. For more information: energyandcleanair.org

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Tracing the Hazy Air:
Progress Report on National Clean Air Programme (NCAP)

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Authors

Shivansh Ghildiyal and Sunil Dahiya

Reviewer

Nandikesh Sivalingam

Editing

Karthikeyan Hemalatha

Design

Penmi Rungsung

Cover Photo

Penmi Rungsung

Summary

In January 2019, the government of India launched the "National Clean Air Programme (NCAP)"- the country's first-ever plan to reduce air pollution nationally. The programme focuses on reducing the PM2.5 and PM10 levels by 20-30% by 2024. Based on the air quality data under NAMP and WHO data, the cities that violated the NAAQS were put under the non-attainment cities list, covering 132 cities (including eight recently added cities, with more than a million population). NCAP has mainly three segments – mitigation actions, knowledge and database augmentation, and institutional strengthening. According to the programme, various ministries and departments/authorities at the central, state, and municipal levels have to work together and aim to achieve the desired reduction in pollution levels. The progress towards achieving the pollution reduction targets can be measured through air quality modelling and assessment methodologies and by monitoring the defined indicators under the NCAP report released in January 2019.

The current study assessed the progress on implementation of NCAP indicators and highlights that:

- Almost all cities listed under the NCAP have an action plan. However, most have similar action points, suggesting they copied each other.

- Except for the 25 cities of Andhra Pradesh, Maharashtra, Odisha, and Telangana, no other city has defined and specific pollution reduction targets.

- No state has formulated the mandatory state action plan.

Table: Various plans and their status

Plans at various levels	Timeline	Status
City-specific action plans	2019	Completed (except for Trichy and Madurai)
Emergency Response System (GRAP)	2020	Ongoing (under various phases)
State action plans	2020	No information
Regional action plans	2020	No information
Transboundary action plans	2019	No information

Table: Funds distributed under various activities

	Funds		
Activities	2019-20	2020-21	2021-22
MoEF&CC	224.92 crores	150.52 crores	
Pollution Control Schemes	460 crores	470 crores	
15th Finance Commission		4400 crores	
1st Instalment of FC		2200 crores	
2nd Instalment (for 42 cities with million-plus population)			2217 crores

Source: Author's compilation

- Only 15 cities of nine states and union territories - Delhi, Ahmedabad, Bangalore, Angul, Talcher, Ludhiana, Jaipur, Thoothukudi, Trichy, Agra, Ghaziabad, Kanpur, Kolkata, Surat, and Howrah - have completed the source apportionment cities.

- None of the non-attainment cities has completed any kind of carrying capacity study.

- There are 42 and 51 cities, respectively, where the work of the CC (Carrying Capacity) study is under process and is in the MOU/proposal stage.

- Thirty-one cities have no mention of carrying capacity study being carried out.

Table: Various studies under NCAP and their status

Studies	Timeline	Status
Source Apportionment	2020	Completed by only 15 cities, rest in various phases
National Emissions Inventory	2020	Drafted
National Health Profile and Database	2019	No information
Air pollution impact on health and economy	2024	Three Studies (two awarded, one completed)
Joint Studies/Field studies/Pilot scale projects	2019	Joint studies being done for 25 cities, for rest of studies- no information
Carrying Capacity	-	Under various phases

- Emission standards for only six of the 17 highly polluting industries have been amended in the last five or six years. For the rest, it has been more than a decade since emission standards were revised

Table: Activities under air quality monitoring and their status

Activities	Timeline	Status
Augment manual monitoring stations to 1,500	2024	818 present
2-3 average number of CAAQMS (Per City)	2024	309 present
Satellite-based measurements	2024	No information
Alternate technology for real-time monitoring such as low-cost sensors	2024	No information
Setup 100 monitoring stations network in rural areas	2024	26 present
Mobile air quality network	2024	No information
Augment PM2.5 monitoring stations to all cities under NAMP	2024	262 stations in 121 cities present
Plan for setup of 10 city-super network	2019	Under Process
Plan for setting up an air information centre	2019	Under Process

- A web-based portal with a three-tier mechanism for monitoring, assessment, and inspection was to be developed by 2020. However, it has either not been developed or made publicly available.

Based on the analysis, various steps which can be taken to enhance the NCAP further are:

- NCAP needs to be notified under the Environmental Protection Act, 1986 or the Air (Prevention and Control of Pollution) Act, 1981. This will make the programme legally binding to all the authorities.

- NCAP should set interim mid-term targets that go beyond 2024 to achieve WHO's revised guideline levels over the next decade.

- PRANA-NCAP portal by MoEF&CC should be populated with granular information updated at regular intervals on the performance of cities and authorities on indicators as highlighted in the NCAP report. The transparency for the financial support provided under NCAP should also be provided on the portal.

- The PRANA-NCAP portal should provide real-time monitoring of the city-wise progress on the indicators mentioned in the NCAP report to enhance accountability and transparency.

- Meetings of the committees and task forces formulated should be made regular, and their minutes of meetings should be uploaded on the PRANA portal.

- Failure to abide by timelines for conducting various research studies (like Emission inventory and source apportionment studies, Carrying Capacity Studies and health baselines) should be penalised. These research studies are only helpful in setting a baseline if conducted within proper timelines.

- Distributing funds to non-attainment cities/ geography and its utilisation should be made entirely transparent.

- Emission norms for all industries should be updated every five to ten years, keeping cognisance of the future technologies.

- Non-complying industries should be imposed with heavy fines and shut down if they fail to control pollution emissions as per stipulated norms.

Content

Introduction

With 99% of the population living in areas with air quality exceeding the WHO (World Health Organisation) guideline levels for air pollutants[1], air pollution is a global health hazard. South Asia is particularly exposed to high air pollution levels due to rapid industrialisation, urbanisation, population explosion, and rampant fossil fuel consumption over the past decades, with India being crowned as one of the most polluted countries across the globe. According to a recent report by IQAir (2020)[2], India slipped two spots from being the fifth most polluted country in 2019 to the third most polluted country globally in 2020. Twenty-two of the 30 most polluted cities globally are in India, with Delhi taking the top spot.

The impacts of toxic air are not limited to human health and extend to agriculture, the economy, and even the floral and faunal population. For example, a 2021 study by Dalberg et al.[3] estimated that air pollution cost $95 billion, or roughly equivalent to 3% of India's GDP in 2019. The study also revealed that high air pollution levels severely impact labour productivity, with an estimated 1.3 billion days of labour lost due to absenteeism. In addition, the Health Effects Institute[4] estimated that 1.6 million lives were lost due to long-term exposure to air pollution in the same year.

Air pollution is a complex problem to diagnose, with various factors such as meteorology, geographical location, and emissions from different sources playing a significant role. While meteorology and geographical location are beyond human control, emissions from human-made sources contribute the most to high pollution levels. Polluting sectors can be broadly classified as follows:

- Power
- Transport
- Industry
- Residential
- Construction and demolition
- Agriculture

Understanding air pollutants and their impacts on health and the economy have advanced over the past years, along with governments intent to act on those pollution sources to safeguard the health impacts and save economic costs drained by the hazardous air. The Indian government launched various programmes to combat the rising malaise over the past few decades. Various institutions, agencies, and committees were set up to catalyse the fight against air pollution. However, they have proven to be quite insufficient. Table 1 summarises the air pollution regulations development over the past four decades.

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[1] WHO. (2021). Air Pollution. [online]. Available at: https://www.who.int/health-topics/air-pollution#tab=tab_1. [Accessed 20 August, 2021].
[2] IQAir. (2020). World Air Quality Report. [pdf]. Available at: https://www.iqair.com/world-air-quality-report. [Accessed 25 June, 2021].
[3] Dalberg, et al. (2021). Air Pollution and its Impact on Business. [pdf]. Available at: https://www.cleanairfund.org/publication/economic-impacts-india/. [Accessed 11 July, 2021].
[4] Health Effects Institute. (2020). State of Global Air 2020. [pdf]. Available at: https://www.stateofglobalair.org/. [Accessed 13 July, 2021].

Table 1: Timeline of clean air planning in India

Year	Status
1974	Central Pollution Control Board (CPCB) and State Pollution Control Boards (SPCBs) constituted under The Water (Prevention & Control of Pollution) Act
1981	The Air (Prevention & Control of Pollution) Act of 1981 was passed to regulate air pollution in India
1982	CPCB adopted the first National Ambient Air Quality Standards (NAAQS)
1983	The Air (Prevention & Control of Pollution) (Union Territories) Rules were established to apply Air Act 1981 provisions to Union Territories (UTs) of India, including Delhi. Empowered CPCB to notify UTs as air pollution control areas, appoint environmental consultants for UTs
1984	CPCB launches National Ambient Air Quality Monitoring Programme (NAAQM), which was later renamed as National Air Quality Monitoring Programme (NAMP)
1986	Enactment of The Environment (Protection) Act, 1986
1987	Air Act of 1981 amended to include noise pollution and mandated CPCB and SPCBs to meet in grave air pollution events
1991	Mass emission standards for petrol vehicles were released
1993	India signs United Nations Framework Convention on Climate Change
1994	NAAQS revised by CPCB
1997	The National Environment Appellate Authority Act was established to hear appeals regarding the restriction of areas in which any industries, processes, or operations shall be/shall not be carried out subject to certain safeguards under the EPA Act. MoEFCC prepared an action plan for controlling pollution in Delhi.
1998	Environment Pollution (Prevention & Control) Authority (EPCA) was established to address air pollution in the national capital region of Delhi
1999	The Supreme Court adopted Delhi's pollution control program, which became the basis for other cities to adopt similar efforts.
2001	Bharat Stage-II norms for NCR, Mumbai, Kolkata, Chennai
2002	India signs Kyoto Protocol
2003	Supreme court issued directives to prepare clean air plans for cities - Ahmedabad, Kanpur, Sholapur, Lucknow, Bangalore, Chennai, and Hyderabad to reduce RSPM levels Auto Fuel Policy was launched, which provided the roadmap for fuel emission standards till 2010
2008	India launched National Action Plan on Climate Change
2009	CPCB introduced the Comprehensive Environmental Pollution Index as a tool for environmental assessment on industrial clusters. NAAQS were again revised, and PM2.5 was added to the list. National Ambient Air Quality Standards were again revised
2010	National Green Tribunal (NGT) was established for effective and expeditious disposal of cases relating to environmental protection.
2014	National air quality index (AQI) methodology was established

Year	Status
2015	CPCB issued directives under the Air Act, 1981, to implement 42 action points that include control and mitigation measures in the major cities, including Delhi and the National Capital Region (NCR). India sets new emissions standards for air pollution from coal plants for compliance in 2017.
2016	Graded Response Action Plan (GRAP) established to address air pollution emergencies in NCR Delhi India signs Paris Agreement
2018	Draft of the National Clean Air Programmer was circulated.
2019	The National Clean Air Programme was launched with 102 non-attainment cities. Twenty more non-attainment cities were added to the list later on after NGT's intervention.
2020	Launch of National Electric Mobility Mission Plan (NEMMP) Two more cities were added to the list of non-attainment cities
2021	The Commission For Air Quality Management In National Capital Region And Adjoining Areas Act, 2021

Due to discrepancies and unavailability of the data, lack of cooperation between different agencies and institutions, lack of public awareness and ground implementation of meaningful solutions to reduce air pollution, all of these actions undertaken by the government have failed till now in providing breathable air quality to the citizens of the country. Therefore, it becomes imperative for the government to formulate and implement comprehensive policies across sectors that can tackle the emission of pollutants at the source, resulting in improved air quality.

National Clean Air Programme (NCAP)

Having failed in controlling the increasing air pollution levels and its associated health and economic loss to the country, the Ministry of Environment, Forest and Climate Change(MoEF&CC) in 2019 formulated the National Clean Air Programme (NCAP)[5]. The programme was the first to mandate time-bound air pollution reduction targets for cities. The NCAP also looked at the problem of polluted air as an issue that is not just confined to a particular area. It included regions far away from the hotspots, thus necessitating strategies and plans at the national, state and city level to combat it. The plan's main aim is to achieve a 20 to 30% reduction in PM10 and PM2.5 concentrations by 2024, keeping 2017 as the base year. The primary objectives of the plan as highlighted by the MoEF&CC are –

- To strictly implement the mitigation measures for abatement of air pollution
- To increase the air quality monitoring network in the country
- To enhance public awareness and capacity-building measures

These three objectives combined are the pillars of the NCAP. For it to work, Central Pollution Control Board(CPCB), MoEFCC, Ministry of Housing and Urban Affairs(MoHUA), Ministry of Road Transport & Highways (MoRTH), Ministry of Power(MoP), State Pollution Control Boards(SPCB), and other stakeholders are expected to be working together seamlessly.

CPCB initially identified 94 non-attainment cities while circulating the draft NCAP in 2018, later revised to 102 non-attainment cities* (NAC's) in January 2019. These cities were identified based on the air quality data obtained under NAMP from 2011 to 2015 and according to the ambient air quality database of the WHO for the year 2018. These 102 cities exceeded the air pollution limits prescribed by the CPCB. With increasing pressure from citizens, civil society, and researchers, CPCB later revised the list of non-attainment cities to include 20 more cities in August 2019. Two more were added to the list in 2020, taking the total to 124. (Table 2). The list of cities under NCAP focus now stands at 132 cities after the recent addition of 8 more cities in 2021 with a million-plus population.

Table 2 Timeline of how the number of non-attainment cities and other million-plus cities grew under NCAP

Year	Number of Non-attainment Cities
2018	94 (Draft NCAP)
January 2019	102 (Final NCAP)
August 2019	122
October 2020	124
2021	8 cities (with more than one million population) were added to the list of NCAP Cities

[5] Government of India. Ministry of Environment, Forest and Climate Change. (2019). National Clean Air Programme. [pdf]. Available at: http://moef.gov.in/wp-content/uploads/2019/05/NCAP_Report.pdf. [Accessed 26 June, 2021].
*Non-attainment cities (NAC)- Cities are declared non-attainment if over a 5-year period they consistently do not meet the National Ambient Air Quality Standards (NAAQS) for PM 10 (Particulate matter that is 10 microns or less in diameter) or NO2 (Nitrogen Dioxide).

A detailed assessment report by Greenpeace India (2021)[6] for the year 2018 revealed that the NCAP left around 231 cities where air pollution exceeded the prescribed NAAQS. This excludes geographies where air quality was not even monitored. Furthermore, Council on Energy, Environment and Water(CEEW) pointed out that several cities had repetitive action plans for three government agencies -pollution control boards, urban local bodies & transport departments. The study also highlighted the lack of proper information on pollution sources with no clear legal mandates[7].

Another report by LIFE (legal Initiative on Forest and Environment) in July 2021 highlighted that 17 states had no action plan formulated at state levels as prescribed under NCAP; the deadline for the formulation of such plans was 2020[8]. Although there have been various reports and assessments put forward by government agencies, researchers, and CSOs (Civil Society Organisations), a comprehensive assessment of the key indicators at the national level is long due. With the NCAP approaching the halfway mark of three years, this report attempts to put together a status assessment of progress under NCAP.

[6] Chanchal A, Chauhan C. (2020). Airpocalypse IV: Assessment of Air Pollution in Indian Cities & National Ambient Air Quality Monitoring Programme (NAMP). [pdf]. Available at: https://www.greenpeace.org/static/planet4-india-stateless/2020/01/aeef07e3-airpocalypse-iv.pdf. [Accessed 2 August, 2021].
[7] Ganguly T, et al. (2020). CEEW and Urban Emissions. How Robust are Urban India's Clean Air Plans?. [pdf]. Available at: https://www.ceew.in/publications/how-robust-are-urban-india%E2%80%99s-clean-air-plans. [Accessed 25 August, 2021].
[8] The Times of India. (2021). 17 states have no action plan against air pollution, reveals RTI. [online]. Available at:https://timesofindia.indiatimes.com/city/nagpur/17-states-have-no-action-plan-against-air-pollution-reveals-rti/articleshow/84156623.cms. [Accessed 28 August, 2021].

Objective

The current report contains an analysis of the implementation and progress of the National Clean Air Programme (NCAP) towards reducing air pollution levels since its inception in January 2019 by tracking key indicators at the national level. The assessment will help policymakers, CSOs, researchers, and citizens realign the actions and priorities for efficiently utilising resources and energy towards cleaning the air.

Scope and Purpose

With the burgeoning problem of toxic air and its ever-increasing impact on the health and economy, it becomes imperative for a nation to launch measures against it. The NCAP was born out of this realisation and with an aim to reduce air pollution levels by 20-30% by 2024. The present study tracks the progress made under NCAP. The scope of the study is as follows:

- The scope of the study is limited to tracking the indicators at the national level, i.e., coordinated or implemented by national institutions. Therefore, an in-depth analysis of the actions taken by non-attainment cities is not included.

- The study looks at actions taken between January 2019 and November 2021.

Materials and Methodology

The study identifies six broad categories of indicators, as highlighted below. The indicators were expected to be implemented by central agencies and institutions under the NACP report. The indicators were then clubbed into six major categories, as mentioned below:

- Clean air action plans
- Finances
- Studies and network of institutions
- Pollution Abatement Policies across sectors
- Database Network and Augmentation
- Establishment of system/institutions/committees for tracking and monitoring

An excel sheet matrix was created to monitor and access progress on various indicators using secondary sources. Websites of the respective implementation agencies responsible for tracking or implementing a particular indicator were checked for the latest information. This was supplemented by information obtained through RTI applications and from reports presented or questions asked in both the houses of the parliament during the study period. Various reports by research institutions, CSOs, and media reports were also used to fill the information gap in the identified indicators.

Tracking Progress

CLEAN AIR ACTION PLANS

The first step towards solving any problem is acknowledging it before strategising solutions. The first policies to mitigate air pollution came into force way back in 1997, when the Union ministry of environment prepared a clean air action plan for Delhi. Subsequently, in 2003, the Supreme Court issued directives to prepare clean air plans for Ahmedabad, Kanpur, Sholapur, Lucknow, Bangalore, Chennai, and Hyderabad.

Even after the intervention of the Supreme Court and government agencies like the Environment Pollution (Prevention & Control) Authority(EPCA) and SPCBs, little has progressed over the last two decades. Therefore, to overcome the shortcomings in earlier plans and ensure systematic implementation of regulations, the NCAP mandates action plans at all levels, from city to regional to national, with the Central Pollution Control Board being the nodal agency.

During the launch in 2019, the NCAP had 102 non-attainment cities spread across 23 states and union territories. As per the latest by the CPCB, there are 132 cities across 23 states and union territories. Maharashtra has the most NCAP cities (19), followed by Uttar Pradesh, which has 17 cities, while Meghalaya has only one. Some 13 states and Uts have none. The union territories of Chandigarh, Delhi and Jammu & Kashmir are included.

With the exception of the newly listed NACs, Trichy and Madurai from Tamil Nadu, all others have prepared their city-specific action plans towards mitigating air pollution (Table 3). However, all these plans are similar and repetitive to each other. Some common actions listed in all city plans are:

- Reduce the emissions from vehicles and industries
- Reduce dust from construction and demolition activities
- Eradicate open waste burning
- Stringent compliance of the air quality standards by the industries
- Promote clean cooking
- Increase plantation activities
- Raising public awareness
- Strengthening air quality network
- Coordination among different agencies to carry out the activities

Little information and acknowledgment of distinct source contributions led to duplication and copy of action plans by most cities from their counterparts in different geographies. According to a study by Ganguly et al. (2020),[9] nine states and their non-attainment cities have similar action points for most of their cities. With the second-highest number of 16 non-attainment cities, Uttar Pradesh has identical plans with the same set of action points except for Anpara. Only eight states with 48 cities have specific action plans of their own. An analysis of clean air action plans reveals that apart from 25 cities across Andhra Pradesh, Maharashtra, Odisha, and Telangana, no city has set specific, time-bound reduction targets[10].

[9] Ganguly T, et al. (2020). National Clean Air Programme (NCAP) for Indian cities: Review and outlook of clean air action plans. Atmospheric Environment: X.
[10] Central Pollution Control Board. (2021). [pdf] Available at: https://cpcb.nic.in/approved-city-action-plans/. [Accessed 25 August, 2021].

Table 3: City-specific action plans and their reduction targets

States / UTs	Non- Attainment Cities (2021)		
	City-Specific Action Plans Prepared	**City-Specific Action Plans Not Prepared**	**Reduction Targets**
Andhra Pradesh	Guntur, Kurnool, Nellore, Vijayawada, Vishakhapatnam, Anantapur, Chitoor, Eluru, Kadapa, Ongole, Rajahmundry, Srikakulam, Vizianagaram		Up to 30%
Assam	Guwahati, Nagaon, Nalbari, Sibsagar, Silchar		No Targets
Bihar	Patna, Gaya, Muzaffarpur		No Targets
Chandigarh	Chandigarh		No Targets
Chhattisgarh	Bhilai, Korba, Raipur		No Targets
Delhi	Delhi		No Targets
Gujarat	Surat, Ahmedabad, Vadodra		No Targets
Himachal Pradesh	Baddi, Damtal, Kala Amb, Nalagarh, Paonta Sahib, Parwanoo, Sunder Nagar		No Targets
Jammu & Kashmir	Jammu, Srinagar		No Targets
Jharkhand	Dhanbad		No Targets
Karnataka	Bangalore, Davanagere, Gulbarga, Hubli-Dharwad		No Targets
Madhya Pradesh	Bhopal, Dewas, Indore, Sagar, Ujjain, Gwalior		No Targets
Maharashtra	Akola, Amravati, Aurangabad, Badlapur, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Mumbai, Nagpur, Nashik, Navi Mumbai, Pune, Sangli, Solapur, Ulhasnagar, Thane		No Targets except for Amravati and Aurangabad (they have sector-wise reduction targets)
Meghalaya	Byrnihat		No Targets
Nagaland	Dimapur, Kohima		No Targets
Odisha	Angul, Balasore, Bhubaneswar, Cuttack, Rourkela, Talcher, Kalinga Nagar		Up to 40%
Punjab	Dera Bassi, Gobindgarh, Jalandhar, Khanna, Ludhiana, Naya Nangal, Pathankot/Dera Baba, Patiala, Amritsar		No Targets
Rajasthan	Alwar, Jaipur, Jodhpur, Kota, Udaipur		No Targets
Tamil Nadu	Thoothukudi	Trichy, Madurai	No Targets
Telangana	Hyderabad, Nalgonda, Patancheruvu, Sangareddy		Between 20-30%
Uttar Pradesh	Agra, Allahabad, Anpara, Bareilly, Firozabad, Gajraula, Ghaziabad, Jhansi, Kanpur, Khurja, Lucknow, Moradabad, Noida, Raebareli, Varanasi, Gorakhpur		No Targets
Uttarakhand	Kashipur, Rishikesh, Dehradun		No Targets
West Bengal	Kolkata, Asansol, Barrackpore, Durgapur, Haldia, Howrah, Raniganj		No Targets

Source: Author's compilation

In addition to the city-specific clean air action plans, the NCAP has also mandated the launch of emergency response system (ERS) action plans on the lines of Delhi's graded response action plan (GRAP). This ensures health advisories and specific actions in response to severe or emergency air pollution levels are communicated to the relevant stakeholders.

Delhi and the NCR region – India's poster child for air pollution – were the first to prepare a GRAP. Other cities should follow their approach. There are 19 states and union territories where GRAP or emergency response action plans are fully prepared for each of its NAC (Table 4).

- Chhattisgarh and Karnataka are in the process of preparing the GRAP.

- Assam NACs (Guwahati, Nagaon, Nalbari, Sibsagar, Silchar) and Rajasthan's Jaipur, Jodhpur, Kota, and Udaipur cities are still at the proposal stage to prepare the GRAP.

Table 4: City-specific graded response action plans

States / UTs	Non- Attainment Cities (2021)				
	GRAP Prepared	**GRAP being Prepared**	**GRAP Proposal Stage**	**Detailed Action Plan (CAP+GRAP)**	**GRAP Publicly Available**
Andhra Pradesh	Guntur, Kurnool, Nellore, Vijayawada, Vishakhapatnam, Anantapur, Chitoor, Eluru, Kadapa, Ongole, Rajahmundry, Srikakulam, Vizianagaram			Yes	Yes
Assam			Guwahati, Nagaon, Nalbari, Sibsagar, Silchar		
Bihar	Patna, Gaya, Muzaffarpur			Yes	Yes
Chandigarh	Chandigarh			No	No
Chhattisgarh		Bhilai, Korba, Raipur			
Delhi	Delhi			No	Yes
Gujarat	Surat, Ahmedabad, Vadodra			No	No
Himachal Pradesh	Baddi, Damtal, Kala Amb, Nalagarh, Paonta Sahib, Parwanoo, Sunder Nagar			No	Yes
Jammu & Kashmir	Jammu, Srinagar			No	No
Jharkhand	Dhanbad			No	No
Karnataka	Bangalore	Devanagere, Gulburga, Hubli-Dharwad		No	No
Madhya Pradesh	Bhopal, Indore, Gwalior, Dewas, Sagar, Ujjain			No	No

Table 4: City-specific graded response action plans (Contd.)

States / UTs	Non- Attainment Cities (2021)				
	GRAP Prepared	**GRAP being Prepared**	**GRAP Proposal Stage**	**Detailed Action Plan (CAP+GRAP)**	**Publicly Available**
Maharashtra	Akola, Amravati, Aurangabad, Badlapur, Chandrapur, Jalgaon, Jalna, Kolhapur, Latur, Mumbai, Nagpur, Nashik, Navi Mumbai, Pune, Sangli, Solapur, Ulhasnagar, Thane			No	No
Meghalaya	Byrnihat			Yes	Yes
Nagaland	Dimapur, Kohima			Yes	Yes
Odisha	Angul, Balasore, Bhubaneswar, Cuttack, Rourkela, Talcher, Kalinga Nagar			Yes	Yes
Punjab	Dera Bassi, Gobindgarh, Jalandhar, Khanna, Ludhiana, Naya Nangal, Pathankot/Dera Baba, Patiala, Amritsar			Yes	Yes
Rajasthan	Alwar		Jaipur, Jodhpur, Kota, Udaipur	No	No
Tamil Nadu	Thoothukudi, Trichy, Madurai			No (only available for Thoothukudi)	No (only available for Thoothukudi)
Telangana	Hyderabad, Nalgonda, Patancheruvu, Sangareddy			Yes	Yes
Uttar Pradesh	Agra, Allahabad, Anpara, Bareilly, Firozabad, Gajraula, Ghaziabad, Jhansi, Kanpur, Khurja, Lucknow, Moradabad, Noida, Raebareli, Varanasi, Gorakhpur			No (only available for NCR region)	No (only available for NCR region)
Uttarakhand	Kashipur, Rishikesh, Dehradun			No	No
West Bengal	Asansol, Barrackpore, Durgapur, Haldia, Howrah, Raniganj, Kolkata			Yes	Yes

Source: Author's compilation

Policies to mitigate air pollution before NCAP were targeted at the urban centres. However, there is an urgent need to plan at the state, regional, and transboundary levels to approach the matter holistically. To this end, the NCAP mandated states to formulate clean air action plans by 2020. However, not a single state has done so – a recent report by Legal Initiative for Forest and Environment(LIFE)[11] revealed. Except for Maharashtra and Andhra Pradesh, the others interpreted the state action plan as a compilation of city-specific action plans prepared for their non-attainment cities. This is a shocking revelation as it obstructs the NCAP vision to clean the air holistically and across the country. In a recent verdict, the NGT directed the Centre and all state pollution control boards to submit the status of state action plans by October 10, 2021[12] Detailed state-level action plans are still awaited.

The NCAP also acknowledges air pollution to be a regional and transboundary problem. Various regions in the country are suffering from high levels of air pollution because of adjoining areas having high concentrations of polluting industries, vehicles and power plants. The Indo-Gangetic Plains is particularly affected. Large agglomerates like Delhi, Mumbai, Chennai, Agra and Patna have several satellite cities and industries. These adjoining areas near cities were expected to draft a comprehensive regional plan by 2020. However, only one study of "Regional Air Quality Modelling" for the Indo Gangetic Plain is being set up by IIT Delhi and other national institutes in collaboration with the World Bank. This means that no regional plans have been formulated for IGP or any other region (Table 5).

When the MoEFCC was asked regarding the status of the transboundary plan as it was the agency responsible for the creation and implementation of the plan, it transferred the RTI query to CPCB, which responded by saying it does not have any information regarding regional plans being created for other areas.

South Asia is not unknown for its transboundary pollution. This is because air pollution is a severe problem across the region – from Lahore, Pakistan to Dhaka, Bangladesh. The NCAP recognised the "Male Declaration: a transboundary plan for Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia, which expects an action plan from all member states by 2019. However, information from MoEFCC shows no such plans have been drafted yet.

Table 5: Various plans and their status

Plans at various levels	Timeline	Status
City-specific action plans	2019	Completed (except for Trichy and Madurai)
Emergency Response System (GRAP)	2020	Ongoing (under various phases)
State action plans	2020	No information
Regional action plans	2020	No information
Transboundary action plans	2019	No information

Source: Author's compilation

[11] Dutta R., Das K. (2021). NCAP Series: Neither Action Nor Plan. Legal Initiative for Forest and Environment. [pdf]. Available at: https://thelifeindia.org.in/upload/files/State%20Action%20plan.pdf. [Accessed 10 August, 2021].
[12] IANS. (2021). NGT asks CPCB, SPCBs to submit state action plans for air pollution by Oct 10. [online]. Available at: https://www.mangalorean.com/ngt-asks-cpcb-spcbs-to-submit-state-action-plans-for-air-pollution-by-oct-10/. [Accessed 15 September, 2021].

FINANCES

Management of air quality in any geography needs financial support for transition to low pollution fuels, clean energy options, system upgrades, actions on pollution sources while conducting the required research studies, and preparation of management plans. This section will look at the financial allocations made under NCAP by central agencies towards reducing air pollution levels. In the year 2019, MoEF&CC declared that :

- Cities with a population of 1 million or more were sanctioned funds of Rs 10 crore each
- Cities with a population between 500,000 and a million were sanctioned Rs 25 lakh each
- Cities with a population lower than 500,000 were sanctioned Rs 10 lakh each.

These sanctions amounted to Rs 338.9 crore for 102 non-attainment cities in 2019-20. It increased to Rs 381.2 crore the following year when the number of cities increased to 124. However, CREA's assessment of information obtained through RTI and the public domain revealed that only Rs 224.9 crores were allocated to 22 states and UTs for 2019-20. (Figure 1).

- Uttar Pradesh (Rs 48.7 crores), Maharashtra (39.85 crores), Madhya Pradesh (20.60 crores), and Rajasthan (18.12 crores) are the top four states with maximum allocation.

- Tamil Nadu (Rs 6 lakhs), followed by Nagaland, Jammu & Kashmir, and Uttarakhand, with each state getting only Rs 12 lakhs were at the bottom.

A total of Rs 150.52 crores was allocated in the year 2020-21.

- The top four states for the year were Andhra Pradesh (Rs 17.28 crores), Punjab (Rs 15 crores), West Bengal (Rs 13 crores), and Uttar Pradesh (Rs 12.16 crores).

- The bottom four states are Chhattisgarh (Rs 1 crore), Karnataka (Rs 1.52 crore), Madhya Pradesh (Rs 1.52 crore), and Telangana (Rs 2.76 crores).

Jharkhand and Gujarat did not get any funds in 2020-21. During these two financial years, 12 states and UT's saw a reduction in the funds allocated, while 10 saw an increase. Delhi, surprisingly, did not get any funds from MoEF&CC as they were requested to utilise funds collected through different fines and cess levied on polluting activities in the city (Annexure 1).

Table 6: Number of non-attainment cities and their population

Population	No. of non-attainment cities	
	2019-20	**2020-21**
Less than 5 lakhs	49	62
Between 5-10 lakhs	20	25
Above 10 lakhs	33	37
Total	102	124

Source: Author's compilation

Apart from the funds allocated under NCAP, the Government of India made a direct financial allocation in the national budget and aimed to utilise this money to battle the problem of air pollution. The finance minister allocated Rs 460 crores for pollution control schemes in 2019-20. Following the recommendations from the 15th Finance Commission Report for 2021-2026, the finance minister announced a budget of Rs 4400 crores specifically for air pollution, terming it as a "matter of concern". The amount was planned to be released in two equal instalments. The first half was to be transferred unconditionally the non-attainment cities as upfront support, while the rest was subjected to the city's performance in tackling air pollution during the year (Table 7). In November 2020, the Centre released the first instalment of this sanctioned amount. and Rs 2200 crores were given and further in 2021 Rs 2217 crores were allocated to the 15 states having 42 urban agglomerations with million-plus population to improve their air quality[13] starting from April 1.

Table 7: Funds distributed under various activities

Activities	Funds		
	2019-20	**2020-21**	**2021-22**
MoEF&CC	224.92 crores	150.52 crores	
Pollution Control Schemes	460 crores	470 crores	
15th Finance Commission		4400 crores	
1st Instalment of FC		2200 crores	
2nd Instalment (for 42 cities with million-plus population)			2217 crores

Source: Author's compilation

There is a colossal inadequacy and gap in the amount allocated to different states and union territories under NCAP. While big cities (with a population over a million) receive up to Rs 10 crores each, smaller cities receive only Rs 10 lakhs – lesser than what a single monitoring station would cost. Bigger cities also benefit directly from union budgets, whereas 90 smaller NAC's depend only on funds from MoEF&CC.

Apart from direct financial assistance from MoEF&CC and the 15th Finance commission, various other sectors and sources contributing to air pollution levels in different geographies also get separate financial assistance under different programmes and from other ministries utilised to reduce pollution burden. A few of such key sectoral contributions which will help reduce air pollution as well are mentioned below10 -

- Under Swachh Bharat Mission, for management of the solid waste from households and construction and demolition activities and bioremediation of all legacy dump sites, the government has provisioned an amount of Rs 1,41,678 crores to be spent from 2021-2026.

- For crop residue management in the northern states of India, the government has released Rs 1,726.67 crores from 2018-21.

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[13] *Loksabha. (2021). [online]. Available at: http://164.100.24.220/loksabhaquestions/annex/175/AS180.pdf. [Accessed 5 August, 2021].*

- Under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme, Rs 3,204 crores have been allocated till 2021. Atal Mission for Rejuvenation and Urban Transformation (AMRUT) aims to provide basic civic amenities like water supply, sewerage, urban transport, parks to improve the quality of life for all, especially the poor and the disadvantaged.

- Rs 18,000 crore has been allocated to augment public transport infrastructure in the 2021-2022 budget.

- The national/state level of vehicle scrappage policy was recently launched in August 2021 at the national/state level to scrap old polluting vehicles.

- Subsidies are provided on the LPG gas cylinders under Ujjwala Yojan, which will help reduce household air pollution levels and exposure.

STUDIES AND NETWORK OF INSTITUTIONS

The air quality of a region depends on several factors, including its meteorology, topography and the presence of man-made sources of emissions like vehicles and industries. Therefore, a nuanced understanding of these sources is critical to framing and implementing holistic policies. Therefore, studies like source apportionment studies, carrying capacity studies and various others are required. To this end, the NCAP mandates the formation of a network of technical institutions to help the states carry out various studies and form various plans and policies to curb air pollution. Thus, National Knowledge Network (NKN) was formed under the aegis of NCAP, which acts as a technical advisory group for the CPCB and SPCB's.

All the non-attainment cities are required to carry out the source apportionment studies. Source apportionment (SA) studies identify the exact sources of pollution through inventory development, primary monitoring, and various receptor/dispersion modelling types. Such assessments help prioritise actions by giving precise information on the various sources of air pollution. As part of the report, the authors compiled information on the progress of various cities and states in conducting the source apportionment studies. The summary is below:

- Only 15 cities from nine states and UT's - Delhi, Ahmedabad, Bangalore, Angul, Talcher, Ludhiana, Jaipur, Thoothukudi, Trichy, Agra, Ghaziabad, Kanpur, Kolkata, Surat, and Howrah - have completed the source apportionment cities (Annexure -2)

- There are 41 cities of 13 states where the SA study is in the MOU/proposal stage

- The work for the studies is under process in 65 cities

- The status of SA studies is unavailable for three cities - Dimapur, Madurai, and Sangareddy

Table 8: Non-attainment cities and details of their source apportionment studies

Non-attainment cities	Institution	Year (either conducting or completing)	Publicly Available	Mention in Action Plan
Delhi	NEERI and IIT-Kanpur	2018 and 2015	Yes	NEERI – No IIT-Kanpur: Yes
Surat	TERI		No	No
Ahmedabad	GEMI	2019	No	No
Bangalore	TERI and CSTEP	2010 and 2019	TERI: Yes CSTEP: No	No
Angul	OPSCB (Rapid Study)	2020	Yes	No
Talcher				
Ludhiana	Punjab State Council for Science & Technology and TERI	2017-2020	Yes	Yes
Jaipur	IIT-Kanpur	2017-2020	Yes	No
Thoothukudi	Centre for Climate Change and Adaptation Research, Anna University	2019	Yes	No
Trichy				
Agra	IIT Kanpur			No
Ghaziabad	IIT Kanpur		No	No
Kanpur	IIT kanpur	2010 and 2021	Yes – 2010 No – 2021	No
Kolkata	CSIR-NEERI	2019	Yes	No
Howrah	CSIR-NEERI	2019	Yes	No

Along with this, carrying capacity studies and other joint studies are also being conducted by various cities to deepen the understanding of the regions air quality. Carrying capacity studies reveal the ability of a city to accumulate and disperse emission load while maintaining breathable air quality. According to the information accessed by us:

- None of the non-attainment cities has completed any carrying capacity study (Annexure – 2).

- There are 42 and 51 cities, respectively, where the work of the CC study is under process and is in the MOU/proposal stage (Figure 4).
  - There are 25 cities where carrying capacity and source apportionment studies are being done together as part of one joint study.

- Thirty-one cities have no mention of carrying capacity study being carried out.

The NCAP also demands the preparation of a National Emission Inventory is formalised by 2020. However, information on its status is not available in the public domain. According to information collected through RTI from CPCB, draft inventory has been prepared by The Energy and Resources Institute(TERI) and is under revision for incorporating expert comments/ suggestions.

The NCAP also highlighted that a National Health Profile and Database be formulated by 2019. But, again, there is no information available on this any public domain. Moreover, CREA's RTI application to the CPCB failed to elicit any information. (Table 9).

The Centre, through the NCAP report, acknowledges the need for further investigation of air pollution and its impact on health and the economy. However, no concrete steps have been taken. Since the launch of the NCAP only two studies – "Health Impact of Firecrackers Bursting During Diwali in National Capital of Delhi'' awarded to Maulana Azad Medical College (MAMC), "Delhi and Impact of traffic on asthma amongst school children in Delhi" awarded to International Institute of Health Management Research, Delhi have been commissioned. Apart from this only one study - "Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019", was done by ICMR. No other information regarding the studies carried out by any other institutions was available with the CPCB.

Table 9: Various studies under NCAP and their status

Studies	Timeline	Status
Source Apportionment	2020	Completed by only 15 cities, rest in various phases
National Emissions Inventory	2020	Drafted
National Health Profile and Database	2019	No information
Air pollution impact on health and economy	2024	Three studies (two awarded; one completed)
Joint Studies/Field studies/Pilot scale projects	2019	Joint studies being done for 25 cities, for rest of studies- no information
Carrying Capacity	-	Under various phases

Source: Author's compilation

As per information collected from MoEF&CC over the past three years, various studies have been commissioned and conducted (Table 10) in collaboration with international bodies, which can be summarised as follows:

Table 10: Studies with the help of international organisations

S. No.	International Agency	Project	Cities
l	Bloomberg Philanthropies	Developing strategies for control of air pollution in India and its cities	Patna, Surat
2	German Development Cooperation (GIZ)	Study and Expert Funds (SEF) project on 'Support to National Clean Air Programme (NCAP) for combating air pollution.' Development of NCAP portal	Surat CPCB
3	GIZ & Mexican Government	Tripartite Cooperation project on 'Improving Air Quality in India and Mexico.'	Bhubaneswar and Cuttack
4	UNDP	Support to implementation of NCAP	Amritsar and Gurugram
5	World Bank	Technical Assistance to NCAP	Patna, Gaya and Muzaffarnagar
6	Swiss Agency for Development and Cooperation (SDC)	Clean Air Project in India (CAP India)	Pune, Kanpur
7	UNEP	Support to NCAP	Agra
8	AFD	Scoping study on air pollution in India	Varanasi, Surat
9	USA ID	Possible support to implementation oi NCAP	Surat, Kanpur
10	XD Corporation SA, Switzerland	Real-Time Air Pollution forecasting Dynamic Air Quality Control Solution (DACS)	Tamil Nadu

POLLUTION ABATEMENT POLICIES ACROSS SECTORS

Combating air pollution requires policies specific to each sector, like industrial, agricultural, transport, construction/ demolition of buildings and waste treatment. A blanket policy that does not address the nuances of the challenge is bound to fail.

In sync with India's industrialisation, pollution levels across the country saw a sharp rise in the few decades. There are 17 highly polluting industries in India, namely: sugar, cement, distillery, petrochemical, pulp and paper, fertiliser, tannery, pesticides, thermal power station, caustic soda, pharmaceuticals, dye and dye stuff, refinery, copper smelter, iron and steel, zinc smelter and aluminum. The major pollutants released from these industries are suspended particulate matter, SO_2, NO_2, and CO. Even the smaller industries use highly polluting sources of energy such as petrol, diesel, plastic and crude oil. This is excluding energy provided by the electricity authorities. In order to reduce the pollution emission from these industries a regular checking of emission and updating of emission norms is needed with the advent of time as new technologies keep coming up, which helps reduce emission load from the respective sectors. Therefore, it is mandated under the NCAP also to introduce new stringent norms for different industries from time to time. But it is to be noted here that in only six of the 17 highly polluting industries emission standards were amended in the last 6 years. The rest haven't seen a policy amendent in over a decade. (Table 11).

Table 11 Status of highly polluting industries regarding their emission standards

S. No.	Highly Polluting Industries	Revised Standards in the last 5-6 years	Last amended year
l	Distillery including Fermentation Industry	No	1990s
2	Sugar (excluding Khandsari)	Yes	2016
3	Fertilizer	Yes	2017
4	Pulp & Paper (Paper manufacturing with or without pulping)	No	2005
5	Chlor Alkali (Caustic Soda Industry)	No	2008
6	Pharmaceuticals (Basic) (excluding Formulation)	No	2009
7	Dyes and Dye Intermediates	Yes	2016
8	Pesticides (Technical) (excluding Formulation)	No	2011
9	Oil Refinery (Mineral oil or Petro refineries)	No	2008
10	Tanneries	Yes	2020
11	Petrochemicals (Manufacture of and not merely use of raw material)	No	2012
12	Cement	Yes	2016
13	Thermal Power Plants	Yes	2015
14	Iron & Steel (Involving processes from ore/scrap, and Integrated Steel Plants)	No	2012
15	Zinc Smelter	No	2011
16	Copper Smelter	No	2011
17	Aluminum Smelter	No	2006

New stringent norms were issued to the power plants in December 2015, a major contributor to the air pollutants. However, these were wilfully pushed back by MoEF&CC multiple times since 2015 on request from the Central Electricity Authority. The recent amendment pushed the timeline for retrofit by power plants to December 2022 for the power plants within the NCR region, and for other regions, it is being pushed back to the years 2023 and 2025.

Highly polluting industries have been mandated to enforce the stringent norms immediately and continuously monitor them. On being asked about this, the CPCB in an RTI replied said: "It is a matter under state jurisdiction but they monitor these industries using Online Continuous Emission Monitoring (OCEMS). The CPCB inspects these industries from time to time and whosoever is found not complying with the norms faces actions". However, an analysis of 2021 data shows the presence of 4,354 highly polluting industries in India. Of this, 3,708 units are operational and 646 are self-closed. Of the operational units, 3,386 units are complying with the prescribed environmental standards and 322 units are not[14]. While 190 of these were given show cause notices, 88 were ordered to be closed. Only six faced legal action. Action against 38 industries are under process. (Annexure-3).

Various other steps were also taken to reduce the pollution levels, such as shifting of brick kilns to zig-zag technology and retrofitting of the DG sets with emission control devices. These steps, however, have been limited to Delhi-NCR region. The use of CNG and PNG is another step towards reducing pollution. According to the Petroleum and Natural Gas Regulatory Board (2018-19)[15], the 10th round of bidding for the City Gas Distribution network (CGD) in the country is completed, the work for which began on August 26, 2019. The ten rounds bidding covers 70.86% of the country's population and 52.8% of its geographical area.

The transportation sector is a major source of pollution, especially in urban areas. India leapfrogged directly from BS-IV to BS-VI norms in April 2018, mandating all vehicles sold after April 1, 2020 comply the norms.

The NCAP also focuses on green mobility. The Centre launched the National Electric Mobility Mission Programme (NEMMP) in 2020, outlining the roadmap for e-mobility in the country. In addition to this, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicle (FAME) scheme was also launched in two phases. Phase-II has now been extended till 2024. Along with this, NCAP has also started to formulate e-mobility plans at the state and city level. However, policies for the uptake of electric vehicles is lacking in nine state - Assam, Chhattisgarh, Jammu and Kashmir, Nagaland, Arunachal Pradesh, Manipur, Mizoram, Sikkim, and Tripur . The rest have either drafted or launched their e-mobility/e-vehicle plans (Table 13). To support the rapid expansion of the electric vehicle landscape and do away with polluting diesel vehicles, a robust network of EV charging stations is necessay. As of now, the country has only 970 charging stations[16].

[14] *Loksabha. (2021). [online]. Available at: http://164.100.24.220/loksabhaquestions/annex/176/AU880.pdf. [Accessed 10 October, 2021].*
[15] *Ministry of Petroleum and Natural Gas. Petroleum and Natural Gas Regulatory Board. (2019). Annual Report 2019-19. [pdf]. Available at: https://pngrb.gov.in/pdf/annualreports/AR2018-2019.pdf. [Accessed 20 August, 2021].*
[16] *Verma A. (2021). 970 Government Funded Public EV Charging Station Installed in India so far. [online]. Available at: https://www.saurenergy.com/ev-storage/970-public-ev-charging-station-installed-india. [Accessed 27 July, 2021].*

Table 12: E-mobility/e-vehicles plans across various States/UTs

State/UTs	Timeline	E-Mobility/EV Policies or Plans
Andhra Pradesh	States with Non-Attainment Cities	Launched in 2018
Assam		No Policy
Bihar		Drafted in 2019
Chandigarh		Drafted in 2019
Chhattisgarh		No Policy
Delhi		Launched in 2020
Gujarat		Drafted in 2019
Himachal Pradesh		Draft Policy pending for suggestions
Jammu & Kashmir		No Policy
Jharkhand		Partnership in E-Mobility Program with EESL but No Policy
Karnataka		Launched in 2017
Madhya Pradesh		Launched in 2019
Maharashtra		Launched in 2018
Meghalaya		Launched in 2021
Nagaland		No Policy
Orissa		Drafted in 2021
Punjab		Drafted in 2019 and waiting for approval
Rajasthan		Launched in 2021
Tamil Nadu		Launched in 2019
Telangana		Launched in 2020
Uttar Pradesh		Launched in 2019
Uttarakhand		Launched in 2018
West Bengal		Launched in 2021
Haryana		Launched in 2019
Arunachal Pradesh		No Policy
Goa		Drafted in 2021
Kerala		Launched in 2019
Manipur		No Policy
Mizoram		No Policy
Sikkim		No Policy
Tripura		No Policy

Agricultural activities also produce emissions such as ammonia, nitrous oxide, methane, etc. the problem of air pollution because of agricultural activities mainly arises because of the biomass burning during the harvesting season and the production of precursor gases such as ammonia. In India, biomass burning in agricultural farms is very severe during April-May and October-November crop harvesting months. The government has taken several measures to reduce the emission levels from this sector, including the launching of 'Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the State of Punjab, Haryana, Uttar Pradesh & NCT of Delhi' scheme in 2018.

On being asked to provide the details of financial support given to states to clean air because of agricultural activities, the department of agriculture and farmers welfare gave the details only for Punjab, Haryana, Delhi, and Uttar Pradesh, where a total of Rs 2431.84 crores has been spent for crop residue management from 2018 to 2022. (Table 14)

Table 13: State-wise funds released under in-situ management of crop residue management (in crores)

Implementing Agency	2018-19	2019-20	2020-21	2021-22	Total
ICAR	21.29	18.48	8	5	52.77
Department of Agriculture and Farmers Welfare (Haryana)	137.84	192.06	170	193.35	693.25
Delhi Government	0	4.52	0	0	4.52
Department of Agriculture and Farmers Welfare (Punjab)	269.38	273.80	272.50	331.94	1147.62
Joint Director Agriculture (Engineering) for Agriculture (Director) UP	148.60	105.29	120.20	159.59	533.68
Total	**577.11**	**594.15**	**570.70**	**689.88**	**2431.84**

The Centre monitors fire events (crop burning) in coordination with the ISRO for regular availability of remote sensing data. Active Fire Events (AFEs) are also monitored in Haryana and Punjab. All concerned states were also mandated to ban stubble burnings in 2015, 2016, 2018, and 2019. Even with all these measures Delhi and other adjoining areas are still covered in a blanket of smoke during the harvesting season. This reflects the poor implementation of these mandates at the ground level. The NCAP also suggested to formulate a plan to manage the agricultural emission by 2020 by MoEFCC. But the lack of coordination and poor implementation of solutions does not allow for any progress. CREA's RTI application asking for steps to formulate a plan to manage the agricultural emission sent to MoEF&CC. The application was transferred to CPCB, which stated that it has no information regarding this issue.

CPCB had no information regarding any SOP for addressing the issue of disposing of the dust collected from mechanical sweepers and building guidelines or protocols on monitoring and managing indoor air pollution.

DATABASE NETWORK AND AUGMENTATION

In India, the air quality monitoring is coordinated by CPCB. At the same time, various agencies such as SPCBs, Pollution control committees (PCCs), IITM (Indian Institute of Tropical Management), and NEERI (National Environmental Engineering Research Institute), and industries, etc are involved in the primary monitoring. CPCB has formulated ambient air quality standards for 12 primary pollutants[17], but only a handful were being monitored until recently. Mainly four parameters: Sulphur Dioxide (SO2), Oxides of Nitrogen as NO2, Respirable Suspended Particulate Matter (RSPM / PM10), and Fine Particulate Matter (PM2.5) are monitored and reported widely by the responsible agencies with the last one getting more focus over past few years. To ensure the quality of data and the use of the equipment and other devices under NCAP, the MoEFCC recently designated the CSIR-NPL (Council of Scientific and Industrial Research-National Physical Laboratory) as a national agency responsible for carrying out certification for instruments and equipment for monitoring emissions and ambient air. NPL is developing India's own certification facility for air pollution monitoring equipment.

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[17] *Central Pollution Control Board. (2021). [pdf] Available at: https://cpcb.nic.in/uploads/National_Ambient_Air_Quality_Standards.pdf. [Accessed 25 August, 2021].*

The availability of a robust and efficient air quality monitoring network across the geography is an essential step in tackling the air pollution crisis. Keeping in view the importance of air quality monitoring in the fight against air pollution, the NCAP has key indicators for installation of new ambient air quality monitoring stations as well as upgrading the already existing stations to include PM2.5 monitoring and usage of satellite data to strengthen the knowledge on exposure level of population to air pollution. Table 16 summarises the key indicators mentioned under NCAP on strengthening air quality monitoring infrastructure.

While there has been little progress on strengthening the monitoring infrastructureIndia is away from achieving what was mentioned in the NCAP. The following points summarise the progress made towards strengthening the monitoring infrastructure so far:

Manual Monitoring:

- At present, there are 818 manual monitoring stations in India, out of which only 26 stations(3%) are present in rural areas[18].

- Punjab is the only state in India with 24 monitoring stations accounting for 92% of the total rural manual monitoring stations in the country.

- Out of these 818 stations, 464 are present in the non-attainment cities.

- Andhra Pradesh (64), Uttar Pradesh (62) and Maharashtra (61) have the highest number of station in the country. (Table 15).

- The least number of stations are present in Meghalaya, Jharkhand, and Bihar, with 1, 3, and 4 stations each.

Continuous Ambient Air Quality Monitoring Stations(CAAQMS):

- There are 309 CAAQMS present in 26 states and 156 cities, out of which 194 CAAQMS are present in the non-attainment cities[19].

- Among the states/UTs with NAC's, Delhi and Maharashtra have the highest numbers of CAAQMS (40 each) while only a single CAAQMS is present in Jammu & Kashmir, Nagaland, Odisha, and Tamil Nadu.

- Chhattisgarh, Himachal Pradesh, Meghalaya, and Uttarakhand do not have a single CAAQMS.

[18] *Central Pollution Control Board. (2021). [online]. Available at: https://cpcb.nic.in/uploads/Stations_NAMP.pdf. [Accessed 26 July, 2021].*
[19] *Central Pollution Control Board. (2021). [pdf]. Available at: https://app.cpcbccr.com/ccr/#/caaqm-dashboard/caaqm-landing. [Accessed 20 August, 2021].*

The number of manual stations monitoring PM2.5 in the whole country as of 2020 is 262, of which 131 are in the non-attainment cities[20]. Only 95 new PM2.5 monitoring stations were introduced between 2019-2020, when the number of PM2.5 monitoring stations was just 167 in 80 cities. Though the number cities and stations have increased, equiping every NAMP station with PM2.5 is an ardous task. The NCAP aims to install around 1,500 manual monitoring stations and 150 CAAQMS with an average of 2-3 stations in each city by 2024. It has been almost three years since the launch of NCAP, and only 73 new manual stations have been added to the list[21].

Table 14: Number of manual monitoring stations and CAAQMS in non-attainment cities

States/UTs	Total Manual Monitoring	Total CAAQMS	Manual Monitoring Stations in NAC's	CAAQMS in NAC's
Andhra Pradesh	72	5	64	3
Assam	23	2	12	2
Bihar	8	16	4	11
Chandigarh	5	2	5	2
Chhattisgarh	13	0	9	0
Delhi	10	40	10	40
Gujarat	24	15	17	8
Himachal Pradesh	25	0	14	0
Jammu & Kashmir	7	1	6	1
Jharkhand	10	1	3	0
Karnataka	30	31	15	13
Madhya Pradesh	41	16	23	7
Maharashtra	80	41	61	40
Meghalaya	10	1	1	0
Nagaland	9	1	9	1
Odisha	38	2	23	1
Punjab	47	8	22	6
Rajasthan	39	10	30	7
Tamil Nadu	31	11	11	1
Telangana	25	6	16	6
Uttar Pradesh	82	43	62	32
Uttarakhand	8	0	5	0
West Bengal	82	14	42	13
Total	**719**	**266**	**464**	**194**

[20] Central Pollution Control Board. (2021). [pdf]. Available at:
https://cpcb.nic.in/displaypdf.php?id=bWFudWFsLW1vbml0b3JpbmcvTG9jYXRpb25fZGF0YV8yMDIwLnBkZg==. [Accessed 25 August, 2021].
[21] Upadhyay A. (2019). Air Pollution Crisis: Does India Have Enough Air Quality Monitoring Stations?. [online]. Available at:
https://swachhindia.ndtv.com/air-quality-monitoring-india-importance-challenges-practices-31871/. [Accessed 10 August, 2021].

According to a 2020 Centre for Science and Environment report,[22] more than 70% of the manual air quality monitoring stations in India are not meeting the necessary requirement of collecting data for at least 104 days. The National Green Tribunal, in its order in November 2019, observed a requirement of more than 800 CAAQMS and 1,250 manual monitoring stations across the country in addition to the already existing ones. The panel also added a penalty of Rs 5 lakh for every month of non-compliance by pollution control boards[23]. Despite these measure, India is still far away from building up a comprehensive monitoring network to assess the pollution levels across the country.

Besides this, the NCAP has also instructed to deploy alternate technology to monitor the real-time pollution levels in the city with low-cost sensors (at an average of 10 sensors per city), formation of mobile air quality monitoring network with at least one mobile monitoring station each city, but till now no information regarding these is present with CPCB. On being asked if any plans for a city super network and air information centre is being developed, the CPCB in an RTI said that it is "under process" and no further information as to what stage it is in was provided. No plans or policy is even formulated for monitoring the pollution levels through satellite data. The rural areas of the country are also poorly equipped with any kind of monitoring facilities. The NCAP has also mandated the installation of monitoring stations in the rural areas but so far nothing has been done regarding this as no detailed information on this was present with the CPCB.

Table 15: Activities under air quality monitoring and their status

Activities	Timeline	Status
Augment manual monitoring stations to 1500	2024	818 present
2-3 average number of CAAQMS	2024	309 present
Satellite-based measurements	2024	No information
Alternate technology for real-time monitoring such as low-cost sensors	2024	No information
Setup 100 monitoring stations network in rural areas	2024	26 present
Mobile air quality network	2024	No information
Augment PM2.5 monitoring stations to all cities under NAMP	2024	262 stations in 121 cities present
Plan for setup of 10 city-super network	2019	Under Process
Plan for setting up an air information centre	2019	Under Process

[22] *Roychowdhary A., Somvanshi A. (2020). Breathing Space. Centre for Science and Environment. [pdf]. Available at:*
https://www.cseindia.org/breathing-space-9923. [Accessed 20 August, 2021].
[23] *The Hindu. (2019). Install AQI monitoring stations across India: NGT. [online]. Available at:*
https://www.thehindu.com/news/cities/Delhi/install-aqi-monitoring-stations-across-india-ngt/article30031656.ece. [Accessed 10 August, 2021].

Establishment of system/institutions/committees for tracking and monitoring

Effective tracking and monitoring through proper channels and organisational networks are as important as other factors while reducing air pollution. It enables accountability and responsibility. The NCAP has been mandated to create various committees at the national, state, and city-level for various purposes such as monitoring and forecasting groups, technical expert committees, project implementation units, etc. According to the latest information accessed through RTI applications, CREA found:

- MoEFCC has constituted the national steering, monitoring, and implementation committees, which have met 3, 4, and 7 times respectively from January 01, 2021, till November 2021.

- Apart from this technical expert committee and project appraisal committee have conducted three meetings each.

- The taskforce for implementing GRAP consisted of members from state pollution control boards and committees- Delhi, Haryana, Uttar Pradesh, Rajasthan, IMD, a Health Expert, and Central Pollution Control Board initiating action. The Task Force had conducted 68 meetings till 2020 and initiated appropriate actions.

- A High-Level Task Force (HLTF) was constituted to manage air pollution in Delhi and NCR in November 2017, in which Chief Secretaries of Haryana, Delhi, and Punjab participated. The HLTF closely monitors the implementation of measures related to air pollution management in Delhi and NCR.

Observing the bleak situation in the country, the National Green Tribunal (NGT) directed the constitution of an eight-member national task force to oversee air quality monitoring of 124 non-attainment cities (NACs) in the country[24]. Apart from this, various portals and cells were also to be constituted. A web-based portal of a three-tier mechanism for monitoring, assessment, and inspection was to be developed by 2020, for which again CPCB has no information. No information regarding the technology assessment cell was available. Public grievance portals regarding pollution problems have been developed by most of the states having non-attainment cities, with the exception of Chandigarh, for which it is under trial. Environment cell was to be formulated for each state for tracking the progress and other activities. So far, only ten states - Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Maharashtra, Odisha, Nagaland, Punjab, Tamil Nadu, Uttar Pradesh, and West Bengal - have created it (Table 17). No information about the other 13 states and union territories is available[25].

[24] The Indian Express. (2021). NGT directs setting up national task force for air pollution monitoring in 124 cities. [online]. Available at: https://indianexpress.com/article/india/ngt-directs-setting-up-national-task-force-for-air-pollution-monitoring-in-124-cities-7275202/. [Accessed 21 August 2021].
[25] National Green Tribunal. (2021). Compliance Report by CPCB. [online]. Available at: https://greentribunal.gov.in/sites/default/files/news_updates/Compliance%20Report%20by%20CPCB%20in%20O.A.%20No.%20681%20of%202018%20 0(News%20Item%20Published%20in%20The%20Times%20of%20India%20Authored%20by%20Shri%20Vishwa%20Mohan%20Titled%20NCAP%20with %20multiple%20timelines%20to%20clear%20air%20in%20102%20cities%20....).pdf. [Accessed 20 July, 2021].

Table 16: States and their status regarding grievance portals and environment monitoring cell

States/UTs	Public Grievance Redressal Portal (PGRP)	Status
Andhra Pradesh	Developed Sameer like app ("Spandana" and "Paryavaran")	No Information available
Assam	Working for public complaints on PCBA's website	No Information available
Bihar	Developed and available on the website	No Information available
Chandigarh	Under trial run	No Information available
Chhattisgarh	Developed	Constituted
Delhi	Developed (Sameer app)	No Information available
Gujarat	Developed (VATAVARAN)	No Information available
Himachal Pradesh	Developed (HPSPCB), Also, "CM Sewa Sankalp", "eSamadhan", and "e-suggestions" app available	Constituted
Jammu & Kashmir	Developed (JKAir)	No Information available
Jharkhand	Helpline already working	No Information available
Karnataka	Developed ICCC (Integrated control and command centre)	No Information available
Madhya Pradesh	Developed (EnvAlert)	Constituted
Maharashtra	Developed (MPCB's E-catalyst)	Constituted
Meghalaya	Developed (MegSPCB Environment)	No Information available
Nagaland	Development of PGRP is under process. Helpline already working.	Constituted
Odisha	Developed "PAVAN (Paryavaran Abang Vayu Asudhata Niyatran)"	Constituted
Punjab	Developed ("PunjabVatavaran"), Developed call center and a toll-free number and Whatsapp number.	Constituted
Rajasthan	Developed ("CM Sampark")	No Information available
Tamil Nadu	Development under process. TNPCB has an online complaint redressal system on the TNPCB website for public complaints apart from CM cell and Amma call centre.	Constituted
Telangana	Developed (TSAIR)	No Information available
Uttar Pradesh	Developed (Swaccha Vayu)	Constituted
Uttarakhand	Developed (NCAP Uttarakhand)	No Information available
West Bengal	Developed (Paribesh app)	Constituted

Conclusion

Air Pollution is an issue that impacts the community health and the country's economy. Almost the entire population of India is breathing in air with pollution levels above WHO guidelines. Therefore, it is imperative to find sustainable solutions to reduce the burden and to leave behind a cleaner and a safer planet. The solutions need to include all the aspects, including health, the economy, technological advancements, and the feasibility to implement the suggested solutions.

Air pollution is a complex problem arising out of complex sources. The solutions are equally complex and challenging. The National Clean Air Program launched in 2091 India's first ever framwork to reduce air pollution in a time-bound manner. The plan proposes to reduce the PM2.5 and PM10 levels in the country by 20-30% by the year 2024, keeping 2017 as the base year. A total of 132 cities have been identified under the NCAP. But looking at the parameters mentioned under the NCAP, it is not wrong to point out that it is another consolidated piece of work of different plans and policies which were launched prior to 2019. Though some of the points mentioned under the NCAP are encouraging, it lacks a comprehensive approach to tackle the problem of air pollution. For example, the NCAP acknowledges air pollution is not limited to urban areas. Yet, it has included only cities under its umbrella. The funds are highly inadequate and discriminatory as well. There is no framework regarding the coordination between different government agencies or institutions. The NCAP also lacks a framework for accountability in case of non-compliance with the plan.

With all the government's resources, whether it is financial, academic, or any other resource relating to air pollution control, it should start acting on a war scale. Stringent actions should be implemented across sectors to reduce emission loads without any kind of relaxation given to polluters by diluting the standards or delaying the timeline for compliance, as done for coal-based power plants multiple times over the past six years. This framework of NCAP can act as a driving force in order to create a healthy, clean, and green environment around us. If not taken seriously, it is just another piece of an official document that never achieved its goal.

Way Forward

The analysis of NCAP has disclosed that while it has made progress on certain indicators. However, the majority of indicators are still far from being achieved and have gone beyond deadlines stipulated under NCAP. Given the release of the plan at the national level and explicitly mentioning the reduction targets of 20-30% by 2024, it can be interpreted as just another document of a compilation of various ongoing and previous initiatives undertaken. Based on the analysis, various steps which can be taken to enhance the NCAP further and its implementation are–

- NCAP needs to be notified under the Environmental Protection Act, 1986/Air (Prevention and Control of Pollution) Act, 1981, to be legally binding to all the authorities.

- NCAP should set interim mid-term targets beyond 2024 and aim to achieve the WHO revised guideline levels over the next decade.

- PRANA- NCAP portal by MoEF&CC should be populated with granular information updated at regular intervals on the performance of cities and authorities on indicators as highlighted in the NCAP report. The transparency for the financial support provided under NCAP should also be provided on the portal.

- The PRANA-NCAP portal should provide real-time monitoring of the city-wise progress on the indicators mentioned in the NCAP report to enhance accountability and transparency.

- Meetings of the committees and task forces should be made regular, and their minutes be uploaded on the PRANA portal.

- Failure to abide by timelines for conducting various research studies (Emission inventory and source apportionment studies, carrying capacity studies and health baselines, etc.) should be discouraged and penalised if goes beyond a reasonable extension, as these research studies are only helpful in setting a baseline if conducted within proper timelines.

- While distributing the funds to non-attainment cities/geographies, complete transparency should be maintained.

- Emission norms for all the industries should be updated every 5-10 years keeping in cognisance of the new technologies coming up.

- Non-complying industries should be imposed with heavy fines and shut down if they fail to control pollution emissions as stipulated through emission norms.

Limitations

- The present study focuses only on the indicators monitored and implemented by central and state agencies and does not analyse plans in detail at the city level.

- Unavailability of data at the public domain.

- The relevant ministries and departments dodged some questions by providing vague answers or simply transferred RTI applications to other departments, which resulted in limited information availability.

- The discrepancy among the data was found while compiling the data available on the public portals and through RTI's which might have led to the author's bias in reporting the current status for a few indicators.

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Appendix

Annexure 1: Details of Grants received under NCAP during the Financial Year 2019-20 & 2020-21(In Crore)

State/UTs	S.No.	City	Population (in lakhs)	FY : 2019-20			FY : 2020-21			Total Cumulative Fund Released
				1st Inst	2nd Inst	Total	3rd Inst	4th Inst	Total	
Andhra Pradesh	1	Srikakulam	Less 5			6.36	2.00		17.28	23.64
	2	Chitoor	Less 5				2.00			
	3	Ongole	Less 5				2.00			
	4	Vizianagaram	Less 5				2.00			
	5	Eluru	Less 5				2.00			
	6	Rajamundry	Less 5				2.00			
	7	Anantapur	Less 5				2.00			
	8	Kadapa	Less 5				1.00			
	9	Vijayawada	Above 10	6.00						
	10	Guntur	Between 5-10	0.12				0.76		
	11	Kurnool	Less 5	0.06				0.76		
	12	Nellore	Less 5	0.06				0.76		
	13	Vishakapatnam	Above 10	0.12						
Chandigarh	14	Chandigarh	Above 10	6.00	2.28	8.28	5.00		5.00	13.28
Chhattisgarh	15	Raipur	Above 10	6.00		12.06		1.00		13.06
	16	Bhilai	Between 5-10	6.00						
	17	Korba	Less 5	0.06			1.00			
Delhi	18	Delhi	Above 10			0.00			0.00	0.00
Gujarat	19	Surat	Above 10	6.00		12.00				12.00
	20	Ahmedabad	Above 10	6.00						
	21	Vadodara	Above 10							
Himachal Pradesh	22	Baddi	Less 5	0.06		0.24	3.00		10.00	10.24
	23	Nalagarh	Less 5	0.06						
	24	Paonta Sahib	Less 5	0.06			1.00			
	25	Sunder Nagar	Less 5	0.06			1.00			
	26	Damtal	Less 5				1.00			
	27	Parwanoo	Less 5				1.00			
	28	Kala Amb	Less 5				3.00			
Jammu & Kashmir	29	Jammu	Between 5-10	0.12		0.12	3.00		8.00	8.12
	30	Srinagar	Above 10				5.00			
Jharkhand	31	Dhanbad	Above 10	6.00		6.00			0.00	6.00
Karnataka	32	Bangalore	Above 10	6.00		6.30			1.52	7.82
	33	Gulburga	Between 5-10	0.12				0.38		
	34	Hubli-Dharwad	Between 5-10	0.12				0.38		
	35	Devanagere	Less 5	0.06				0.76		
Madhya Pradesh	36	Bhopal	Above 10	6.00	4.00	20.60			1.52	22.12
	37	Gwalior	Above 10	6.00	4.00					
	38	Indore	Above 10	0.12	0.08					
	39	Ujjain	Between 5-10	0.12	0.08			0.38		
	40	Sagar	Less 5	0.06	0.04			0.76		
	41	Dewas	Less 5	0.06	0.04			0.38		
Maharashtra	42	Mumbai	Above 10	6.00	3.50	39.85			11.40	51.25
	43	Nagpur	Above 10	6.00	3.45					
	44	Navi Mumbai	Above 10	6.00	3.45					
	45	Pune	Above 10	6.00	3.45					
	46	Amravati	Between 5-10	0.12	0.08			1.14		
	47	Aurangabad	Above 10	0.12	0.08					
	48	Nashik	Above 10	0.12	0.08					
	49	Kolhapur	Between 5-10	0.12	0.08			0.76		
	50	Sangli	Between 5-10	0.12	0.08			0.76		
	51	Solapur	Between 5-10	0.12	0.08			0.38		
	52	Ulhasnagar	Between 5-10	0.12	0.08			1.90		
	53	Akola	Less 5	0.06	0.04			1.14		
	54	Badlapur	Less 5	0.06	0.04			1.90		
	55	Chandrapur	Less 5	0.06	0.04			1.14		
	56	Jalgaon	Less 5	0.06	0.04			0.76		

State/UTs	S.No.	City	Population (in lakhs)	FY : 2019-20			FY : 2020-21			Total Cumulative Fund Released
				1st Inst	2nd Inst	Total	3rd Inst	4th Inst	Total	
Maharashtra	57	Jalna	Less 5	0.06	0.04			1.14		
	58	Latur	Less 5	0.06	0.04			0.38		
	59	Thane	Above 10							
Odisha	60	Kalinga Nagar	Less 5			6.18	3.00		6.04	12.22
	61	Cuttack	Between 5-10	6.00						
	62	Bhubaneswar	Between 5-10							
	63	Balasore	Less 5	0.06				0.76		
	64	Rourkela	Less 5	0.06				1.14		
	65	Talcher	Less 5	0.06				1.14		
	66	Angul	Less 5							
Punjab	67	Ludhiana	Above 10	6.00		12.48			15	27.52
	68	Amritsar	Above 10	6.00						
	69	Jalandhar	Between 5-10	0.12			4.00			
	70	Khanna	Less 5	0.06				1.90		
	71	Gobindgarh	Less 5	0.06			3.00			
	72	Naya Nangal	Less 5	0.06			1.00			
	73	Pathankot/Dera Baba	Less 5	0.06				0.76		
	74	Patiala	Less 5	0.06			4.00			
	75	Dera Bassi	Less 5	0.06				0.38		
Rajasthan	76	Jaipur	Above 10	6.00		18.12			3.80	21.92
	77	Jodhpur	Above 10	6.00						
	78	Kota	Above 10	6.00						
	79	Alwar	Less 5	0.06				1.90		
	80	Udaipur	Less 5	0.06				1.90		
Tamil Nadu	81	Tuticorn/Thoothukudi	Less 5	0.06		0.06	3.00		3.00	3.06
	82	Trichy	Between 5-10							
	83	Madurai	Above 10							
Telangana	84	Hyderabad	Above 10	6.00	4.80	11.00			2.76	13.76
	85	Nalgonda	Less 5	0.06	0.04			0.38		
	86	Patancheru	Less 5	0.06	0.04			0.38		
	87	Sangareddy	Less 5				2.00			
Uttar Pradesh	88	Agra	Above 10	6.00	3.45	48.47			12.16	60.63
	89	Allahabad	Above 10	6.00	3.45					
	90	Kanpur	Above 10	6.00	3.45					
	91	Lucknow	Above 10	6.00	3.45					
	92	Varanasi	Above 10	6.00	3.47					
	93	Moradabad	Between 5-10	0.12	0.08			1.90		
	94	Bareily	Between 5-10	0.12	0.08			1.90		
	95	Firozabad	Between 5-10	0.12	0.08			1.90		
	96	Jhansi	Between 5-10	0.12	0.08			1.14		
	97	Khurja	Less 5	0.06	0.04			1.90		
	98	Anpara	Less 5	0.06	0.04			1.14		
	99	Gajraula	Less 5	0.06	0.04			1.14		
	100	Raebareli	Less 5	0.06	0.04			1.14		
	101	Noida	Between 5-10							
	102	Ghaziabad	Above 10							
	103	Gorakhpur	Between 5-10							
Uttarakhand	104	Kashipur	Less 5	0.06		0.12	3.00		11.00	11.12
	105	Rishikesh	Less 5	0.06			5.00			
	106	Dehradun	Between 5-10				3.00			

State/UTs	S.No.	City	Population (in lakhs)	FY : 2019-20			FY : 2020-21			Total Cumulative Fund Released
				1st Inst	2nd Inst	Total	3rd Inst	4th Inst	Total	
West Bengal	107	Kolkata	Above 10	6.00		6.00			13.00	19.00
	108	Howrah	Above 10							
	109	Haldia	Less 5				5.00			
	110	Durgapur	Between 5-10				3.00			
	111	Barrack pore	Less 5				3.00			
	112	Asansol	Between 5-10				2.00			
	113	Raniganj	Less 5							
Bihar	114	Patna	Above 10	6.00	4.00	10.20			7.00	17.20
	115	Gaya	Less 5	0.06	0.04		2.00			
	116	Muzaffarpur	Less 5	0.06	0.04		5.00			
Assam	117	Guwahati	Between 5-10	0.12		0.36	5.00		12.00	12.36
	118	Nagaon	Less 5	0.06			2.00			
	119	Nalbari	Less 5	0.06			2.00			
	120	Sibsagar	Less 5	0.06			2.00			
	121	Silchar	Less 5	0.06			1.00			
Nagaland	122	Dimapur	Less 5	0.06		0.12	3.00		6.00	6.12
	123	Kohima	Less 5	0.06			3.00			
Meghalaya	124	Byrnihat	Less 5				3.00		3.00	3.00
Total				**173.04**	**51.88**	**224.92**	**111.00**	**39.52**	**150.52**	**375.44**

Annexure 2: Non-Attainment Cities and Various Studies Carried out by them and their Status

State/UTs	S.No.	Non-Attainment Cities	Joint Studies	CC Studies	SA Studies
Andhra Pradesh	1	Guntur			SA/EI is in MOU/proposal stage
	2	Kurnool			SA/EI is in MOU/proposal stage
	3	Nellore			SA/EI is in MOU/proposal stage
	4	Vijayawada		CC work under process	SA/EI work under process
	5	Vishakhapatnam	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	6	Anantapur			SA/EI is in MOU/proposal stage
	7	Chitoor			SA/EI is in MOU/proposal stage
	8	Eluru			SA/EI is in MOU/proposal stage
	9	Kadapa			SA/EI is in MOU/proposal stage
	10	Ongole			SA/EI is in MOU/proposal stage
	11	Rajahmundry	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	12	Srikakulam			SA/EI is in MOU/proposal stage
	13	Vizianagaram			SA/EI is in MOU/proposal stage
Assam	14	Guwahati	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	15	Nagaon			SA/EI is in MOU/proposal stage
	16	Nalbari			SA/EI is in MOU/proposal stage
	17	Sibsagar			SA/EI is in MOU/proposal stage
	18	Silchar			SA/EI is in MOU/proposal stage
Bihar	19	Patna	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI work under process
	20	Gaya			SA/EI work under process
	21	Muzaffarpur			SA/EI work under process
Chandigarh	22	Chandigarh	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Chhattisgarh	23	Bhilai		CC is in MOU/proposal stage	SA/EI work under process
	24	Korba		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	25	Raipur		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Delhi	26	Delhi		CC work under process	SA/EI completed
Gujarat	27	Surat		CC is in MOU/proposal stage	SA/EI completed
	28	Ahmedabad		CC is in MOU/proposal stage	SA/EI completed
	29	Vadodara	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Himachal Pradesh	31	Baddi	Joint SA and CC study	CC work under process	SA/EI work under process
	32	Damtal		CC work under process	SA/EI work under process
	33	Kala Amb		CC work under process	SA/EI work under process
	34	Nalagarh		CC work under process	SA/EI work under process
	35	Paonta Sahib		CC work under process	SA/EI work under process
	36	Parwanoo		CC work under process	SA/EI work under process
	37	Sunder Nagar		CC work under process	SA/EI work under process
Jammu & Kashmir	38	Jammu		CC work under process	SA/EI work under process
	39	Srinagar		CC work under process	SA/EI work under process
Jharkhand	40	Dhanbad	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI work under process
Karnataka	43	Bangalore			SA/EI completed
	44	Devanagere		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	45	Gulburga			SA/EI is in MOU/proposal stage
	46	Hubli-Dharwad	Joint SA and CC study		SA/EI is in MOU/proposal stage
Madhya Pradesh	47	Bhopal			SA/EI work under process
	48	Dewas			SA/EI is in MOU/proposal stage
	49	Indore	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	50	Sagar			SA/EI is in MOU/proposal stage
	51	Ujjain			SA/EI is in MOU/proposal stage
	52	Gwalior			SA/EI work under process
Maharashtra	54	Akola		CC is in MOU/proposal stage	SA/EI work under process
	55	Amravati		CC is in MOU/proposal stage	SA/EI work under process
	56	Aurangabad		CC is in MOU/proposal stage	SA/EI work under process

State/UTs	S.No.	Non-Attainment Cities	Joint Studies	CC Studies	SA Studies
Maharashtra	57	Badlapur		CC is in MOU/proposal stage	SA/EI work under process
	58	Chandrapur		CC is in MOU/proposal stage	SA/EI work under process
	59	Jalgaon		CC is in MOU/proposal stage	SA/EI work under process
	60	Jalna		CC is in MOU/proposal stage	SA/EI work under process
	61	Kolhapur		CC is in MOU/proposal stage	SA/EI work under process
	62	Latur		CC is in MOU/proposal stage	SA/EI work under process
	63	Mumbai	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI work under process
	64	Nagpur		CC work under process	SA/EI work under process
	65	Nashik		CC is in MOU/proposal stage	SA/EI work under process
	66	Navi Mumbai		CC work under process	SA/EI work under process
	67	Pune	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI work under process
	68	Sangli		CC is in MOU/proposal stage	SA/EI work under process
	69	Solapur		CC is in MOU/proposal stage	SA/EI work under process
	70	Ulhasnagar		CC is in MOU/proposal stage	SA/EI work under process
	71	Thane		CC is in MOU/proposal stage	SA/EI work under process
Meghalaya	73	Byrnihat	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Nagaland	74	Dimapur			Status not available
	75	Kohima	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Odisha	76	Angul		CC is in MOU/proposal stage	SA/EI completed
	77	Balasore	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	78	Bhubaneswar	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI work under process
	79	Cuttack		CC is in MOU/proposal stage	SA/EI work under process
	80	Rourkela		CC is in MOU/proposal stage	SA/EI work under process
	81	Talcher		CC is in MOU/proposal stage	SA/EI completed
	82	Kalinga Nagar		CC is in MOU/proposal stage	SA/EI work under process
Punjab	83	Dera Bassi		CC work under process	SA/EI work under process
	84	Gobindgarh		CC work under process	SA/EI work under process
	85	Jalandhar		CC work under process	SA/EI work under process
	86	Khanna		CC work under process	SA/EI work under process
	87	Ludhiana		CC work under process	SA/EI completed
	88	Naya Nangal		CC work under process	SA/EI work under process
	89	Pathankot/Dera Baba		CC work under process	SA/EI work under process
	90	Patiala		CC work under process	SA/EI work under process
	91	Amritsar		CC work under process	SA/EI work under process
Rajasthan	92	Alwar		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	93	Jaipur		CC is in MOU/proposal stage	SA/EI completed
	94	Jodhpur		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	95	Kota	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	96	Udaipur		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
Tamil Nadu	97	Thoothukudi	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI completed
	98	Trichy			SA/EI completed
	99	Madurai			Status not available
Telangana	101	Hyderabad		CC work under process	SA/EI work under process
	102	Nalgonda	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	103	Patancheruvu		CC work under process	SA/EI work under process
	104	Sangareddy			Status not available
Uttar Pradesh	105	Agra		CC work under process	SA/EI completed
	106	Allahabad		CC work under process	SA/EI work under process
	107	Anpara		CC work under process	SA/EI work under process
	108	Bareily	Joint SA and CC study	CC work under process	SA/EI work under process
	109	Firozabad		CC work under process	SA/EI work under process
	110	Gajraula		CC work under process	SA/EI work under process
	111	Ghaziabad		CC work under process	SA/EI completed
	112	Jhansi		CC work under process	SA/EI work under process
	113	Kanpur		CC work under process	SA/EI completed
	114	Khurja		CC work under process	SA/EI work under process
	115	Lucknow		CC work under process	SA/EI work under process
	116	Moradabad	Joint SA and CC study	CC work under process	SA/EI work under process
	117	Noida	Joint SA and CC study	CC work under process	SA/EI work under process
	118	Raebareli		CC work under process	SA/EI work under process
	119	Varanasi		CC work under process	SA/EI work under process
	120	Gorakhpur			SA/EI is in MOU/proposal stage

State/UTs	S.No.	Non-Attainment Cities	Joint Studies	CC Studies	SA Studies
Uttarakhand	122	Kashipur			SA/EI work under process
	123	Rishikesh			SA/EI is in MOU/proposal stage
	124	Dehradun	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
West Bengal	125	Kolkata	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI completed
	126	Asansol		CC work under process	SA/EI work under process
	127	Barrackpore		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	128	Durgapur		CC work under process	SA/EI work under process
	129	Haldia		CC is in MOU/proposal stage	SA/EI is in MOU/proposal stage
	130	Howrah	Joint SA and CC study	CC is in MOU/proposal stage	SA/EI completed
	131	Raniganj		CC work under process	SA/EI work under process

Annexure 3: State-wise list of number of industries and their status (2021)

S. No.	States /Union Territories	Total No. of Industries	No. of industries closed by their own	No. of operational industries	No. of complying industries	No. of non-complying industries	No. of Show cause notices issued	No. of Closure directions issued	No. of Legal action filled	Action under process
1	Andaman & Nicobar	0	0	0	0	0	0	0	0	0
2	Andhra Pradesh	282	23	259	243	16	1	0	1	14
3	Arunachal Pradesh	5	0	5	5	0	0	0	0	0
4	Assam	51	11	40	36	4	2	2	0	0
5	Bihar	43	26	17	17	0	0	0	0	0
6	Chandigarh	0	0	0	0	0	0	0	0	0
7	Chhattisgarh	163	20	143	137	6	5	1	0	0
8	Daman & Diu	4	0	4	4	0	0	0	0	0
9	Delhi	0	0	0	0	0	0	0	0	0
10	Goa	4	0	4	4	0	0	0	0	0
11	Gujarat	517	76	441	344	97	72	24	0	1
12	Haryana	174	8	166	161	5	0	1	0	4
13	Himachal Pradesh	21	2	19	19	0	0	0	0	0
14	Jammu & Kashmir	55	0	55	52	3	3	0	0	0
15	Jharkhand	81	2	79	54	25	13	1	0	11
16	Karnataka	246	47	199	184	15	2	12	0	1
17	Kerala	25	5	20	20	0	0	0	0	0
18	Lakshadweep	0	0	0	0	0	0	0	0	0
19	Madhya Pradesh	96	5	91	88	3	1	0	1	1
20	Maharashtra	506	32	474	434	40	29	11	0	0
21	Manipur	0	0	0	0	0	0	0	0	0
22	Meghalaya	23	1	22	21	1	1	0	0	0
23	Mizoram	0	0	0	0	0	0	0	0	0
24	Nagaland	0	0	0	0	0	0	0	0	0
25	Odisha	186	43	143	126	17	14	3	0	0
26	Puducherry	7	3	4	4	0	0	0	0	0
27	Punjab	98	22	76	71	5	5	0	0	0
28	Rajasthan	161	12	149	129	20	17	2	0	1
29	Sikkim	1	0	1	0	1	0	1	0	0
30	Tamil Nadu	239	41	198	194	4	0	1	0	3
31	Telangana	329	37	292	274	18	0	14	4	0
32	Tripura	5	0	5	4	1	0	1	0	0
33	Uttar Pradesh	855	196	659	646	13	6	5	0	2
34	Uttarakhand	46	0	46	42	4	4	0	0	0
35	West Bengal	131	34	97	73	24	15	9	0	0
	Total	**4354**	**646**	**3708**	**3386**	**322**	**190**	**88**	**6**	**38**