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Engaging Communities in Air Quality Action:

A Focus on Monitoring, Education, and Advocacy

Developed by

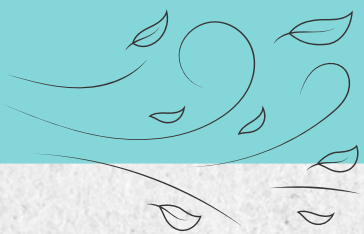
All India Institute of Local Self Government (AIILSG), Mumbai *under the* **Maharashtra WASH-ES Coalition** *with support from* **UNICEF Maharashtra**

About the Handbook

This handbook has been developed by the All India Institute of Local Self Government (AIILSG) Mumbai, with support from UMICORE Autocat India Pvt. Ltd. in partnership with UNICEF Maharashtra , as part of the ***Localizing Plastic Action through Communities (L-PAC)*** initiative. It is published in collaboration with the Majhi Vasundhara Abhiyan, the flagship program of the Department of Environment and Climate Change, Government of Maharashtra, which strengthens climate action across urban and rural communities.

Designed as a community resource, the handbook provides accessible knowledge on air pollution science, India's monitoring infrastructure, the policy and regulatory landscape, and practical pathways for citizen participation in local air quality management. It highlights how systematic community engagement through initiatives such as L-PAC, can reinforce municipal solid waste systems while delivering measurable air quality benefits.

By integrating waste management with air quality monitoring, this handbook encourages residents, educators, professionals, and community organizations to engage constructively with local governance frameworks. It complements government efforts under the National Clean Air Programme (NCAP) and related initiatives, supporting capacity-building and enabling informed, collective action for cleaner air.



Content

Section One

Overview of Air Pollution

Did you know?

We breathe *25000* times a day and inhale about *11000* litres of air!

> ***That is more than the amount of food or water we consume in a day!***

The State of Air in India

Air pollution accounted for nearly 20% of all deaths in India in 2023. Outdoor particulate matter (PM2.5) ranked as the leading risk factor for deaths, and household air pollution (HAP) ranked second.

75%

of the population of India lives in areas where PM levels are above the least stringent WHO Interim Target for healthy air

68%

of the population lives in areas where PM2.5 levels do not meet the national annual standard

31%

of outdoor PM comes from fossil-fuel combustion (i.e., coal, oil and gas)

21%

of deaths due to air pollution are in children under 5

Sources

https://www.downtoearth.org.in/air/half-of-monitored-indian-cities-breached-air-quality-standards-in-january-2026-crea

What is Air Pollution?

Air pollution refers to the presence of toxic chemicals or compounds in the Earth's atmosphere at concentrations that are harmful to human health, ecosystems, and the climate.

Major Causes of Urban Air Pollution

1 Transportation

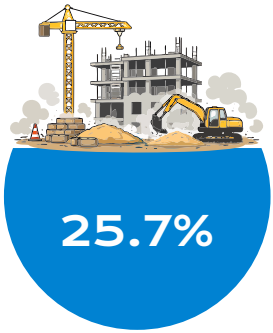
Industrial Emissions 2

3 Garbage Burning

Construction Activities 4

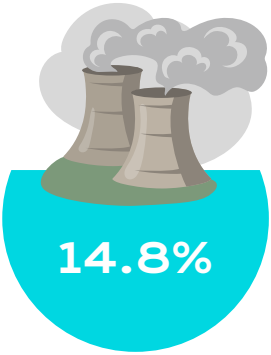
5 Power Generation

Top 5 Sources of Outdoor Air Pollution in India

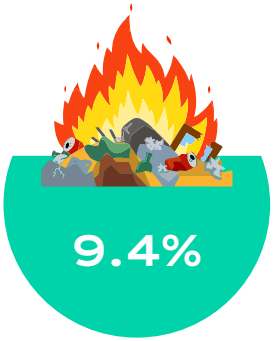


Residential Construction

Industrial Emissions



Power Generation

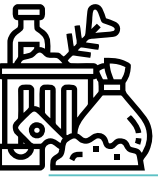


Anthropogenic Dust

Agriculture

Sources

https://www.stateofglobalair.org/resources/countryprofiles



How is solid waste contributing to air pollution?

Plastic pollution is not only a solid waste management challenge, it is also a significant contributor to air pollution. In urban India, the mismanagement of plastic waste leads to two major pathways of air quality degradation -

Methane Emission from Landfills

India's municipal solid waste sector emitted approximately 754 gigagrams of methane in 2016, largely from open dumpsites where plastic and organic waste are co-disposed. (Source: Down to Earth, 2023)

Open Burning of Plastic Waste

Studies across Indian dumping sites report $PM_{2.5}$ concentrations as high as 250.3 µg/m³, far exceeding safe limits and contributing to severe respiratory risks. (Source: Springer, 2025)

> ***Many urban neighborhoods, especially in low-income zones, are located near informal waste disposal sites or burning hotspots. Youth living in these areas face direct exposure to toxic air, making clean air advocacy not just a climate issue but a public health imperative.***

Health Effects of Adverse Air Pollution

Today's Symptoms

- Respiratory Distress
- Fatigue & Poor Concentration
- Eye, Nose & Throat Irritation
- Physical Inactivity

Tomorrow's Risks

- Stunted lung growth
- Neurodevelopmental Delays
- Respiratory Disorders
- Cardiovascular Disorders

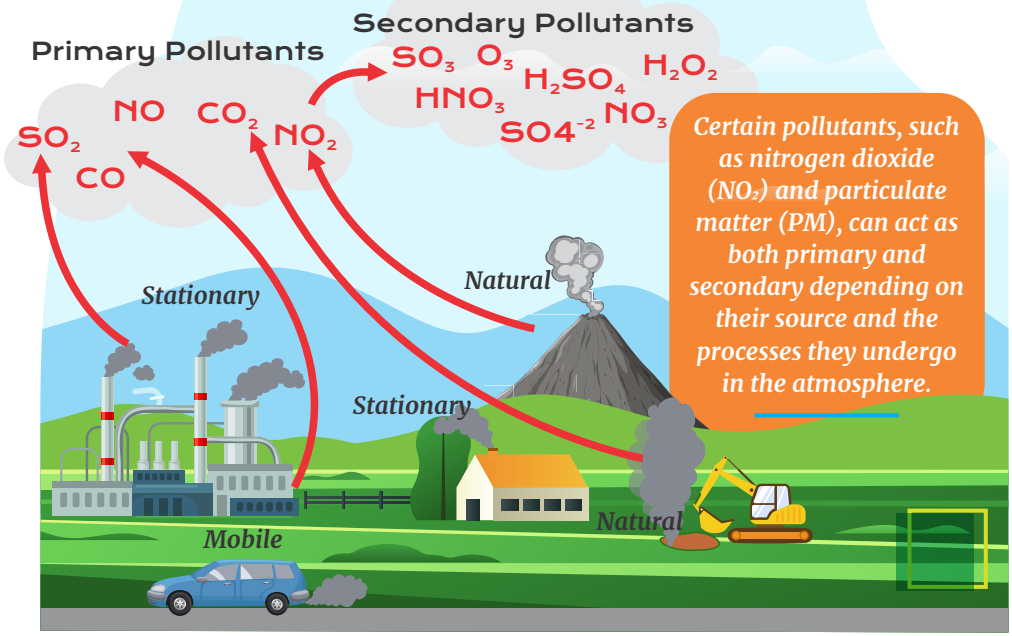
Section Two

What are the most common Air Pollutants?

Introduction

Air pollutants are generally classified into two broad categories based on how they originate.

- **Primary pollutants** are substances released directly into the atmosphere from identifiable sources such as vehicles, factories, and households. Common examples include carbon monoxide (CO), carbon dioxide (CO_2), methane (CH_4), volatile organic compounds (VOCs), ammonia (NH_3), sulfur dioxide (SO_2), and nitric oxide (NO).
- **Secondary pollutants** are not emitted directly but are formed in the atmosphere through chemical reactions involving primary pollutants. Typical examples include ozone (O_3), nitric acid (HNO_3), sulfate (SO_4^{2-}), and sulfuric acid (H_2SO_4).

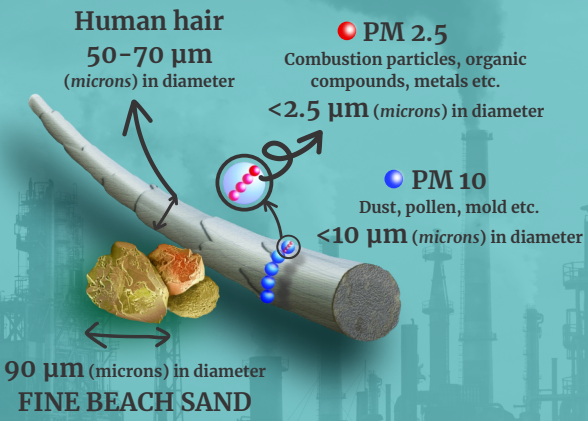


Sources

1. https://www.epa.gov/expobox/exposure-assessment-tools-media-air
2. https://www.neaspec.org/sites/default/files/Air_Pollution_Handbook.pdf

Sources of Major Types of Air Pollutants

What is the most *deadly category* of air pollutants?



The Most Harmful Pollutants — Particulate Matter (PM2.5 & PM10)

What is Particulate Matter (PM)?

- *Particulate Matter (PM) refers to a mix of tiny solid particles and liquid droplets suspended in the air.*
- *These particles vary in size, shape, and composition, ranging from dust and soot to metals and organic compounds. While some are emitted directly from sources such as construction sites, roads, smokestacks, and fires, most are formed in the atmosphere through chemical reactions of pollutants such as sulfur dioxide and nitrogen oxides released by power plants, industries, and automobiles.*

PM is classified by size:

- *PM10: Particles ≤10 micrometers (about 1/7th the width of a human hair).*
- *PM2.5: Particles ≤2.5 micrometers—so small they can penetrate deep into the lungs and even enter the bloodstream*

Why PM2.5 & PM10 Are So Dangerous?

- *PM2.5* is considered the ***most harmful air pollutant to human health.***
- These particles bypass the body's natural defenses and:
  - Reach the ***alveoli*** (tiny air sacs in the lungs).
  - Trigger ***inflammation, oxidative stress,*** and ***tissue damage.***
  - Enter the ***bloodstream***, affecting the heart, brain, and other organs

Sources

https://www.neaspec.org/sites/default/files/Air_Pollution_Handbook.pdf

Section Three

What is the regulatory and assessment framework governing air quality management in India?

Air Quality Framework in India - *Monitoring Programs & Tools*

National-Level Monitoring Programs

1. National Air Monitoring Programme (NAMP)

- **Led by:** Central Pollution Control Board (CPCB)
- **Coverage:** 800+ stations across 344 cities/towns in 28 states and 6 UTs
- **Pollutants Monitored:** SO_2, NO_2, PM_{10}, $PM_{2.5}$
- *Purpose: Long-term ambient air quality data collection for policy and planning*

2. National Ambient Air Quality Standards (NAAQS)

- **Established:** 2009 by CPCB under the Air Act, 1981
- **Includes:** 12 pollutants including lead, ozone, CO, benzene, and ammonia
- *Function: Sets permissible limits for pollutants to safeguard public health*

Real-Time Monitoring Tools

1. Sameer (National Air Quality Index)

- **Developed by**: Central Pollution Control Board (CPCB)
- *Features: Hourly AQI updates; simple number–colour communication; public feedback with photo uploads; tracks SO_2, NO_2, PM_{10}, $PM_{2.5}$, CO, and O_3*

2. Continuous Ambient Air Quality Monitoring Stations (CAAQMS)

- **Technology:** Reference-grade analyzers (for regulatory compliance) and sensor-based systems (for localized, high-density monitoring)
- **Used by:** CPCB, SPCBs, and private entities
- *Application: Industrial zones, urban centers, and sensitive areas*

Air Quality Framework in India - *Regulatory Bodies*

National Level

Ministry of Environment, Forests & Climate Change (MoEFCC)

Central ministry *responsible for environmental policy and air quality regulation*

Central Pollution Control Board (CPCB)

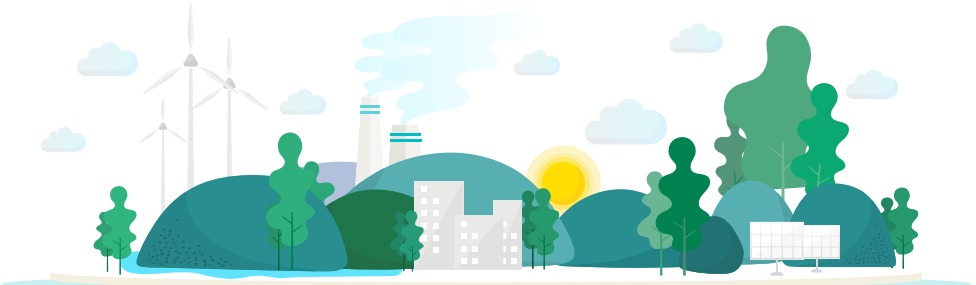
National body *that sets air quality standards and coordinates monitoring across India*

State Level

Maharashtra Pollution Control Board (MPCB)

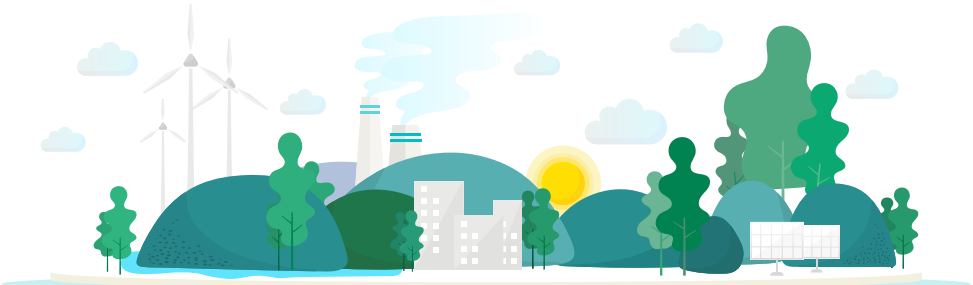
State pollution *board for Maharashtra overseeing monitoring and enforcement*

Air Quality Framework in India - Examples of Policy Framework



Policy / Program	Description	Why It Matters for Youth
National Clean Air Programme (NCAP)	A flagship initiative targeting pollution reduction in 131 cities with clear targets and funding support.	Empowers youth to participate in city -level air quality planning and hold authorities accountable
Majhi Vasundhara Abhiyan	Flagship initiative to implement climate action across Maharashtra through active participation of local bodies.	Youth can engage with local bodies for public awareness activities and other relevant initiatives to advance climate action

Air Quality Framework in India - Examples of Action Plans



Policy / Program	Description	Why It Matters for Youth
Clean Air Action Plans (CAPs)	City-specific strategic plans addressing pollution sources such as vehicles, industry, and waste.	Youth can engage in reviewing, contributing to, or monitoring these plans to ensure effective local action.
Construction and Demolition Waste Management Rules	Regulations aimed at reducing dust and particulate emissions from construction activities.	Youth can monitor compliance and advocate for safer construction practices to reduce local pollution.

About Majhi Vasundhara Abhiyan

Majhi Vasundhara Abhiyan (MVA) *is Maharashtra's state-level, integrated urban–rural climate campaign. Launched in 2020, it advances measurable local climate action across three core themes: carbon sequestration, greenhouse-gas emission reduction, and promotion of sustainable lifestyles within the Panchamahabhuta (earth, water, air, energy, sky) framework.*

The Abhiyan operates at scale through an annual toolkit and scoring system that engages all local bodies across Maharashtra.

The ecologically coherent and socially relevant framing enables local bodies across Maharashtra to prioritize afforestation and urban greening for sequestration; clean energy, low-emission transport and improved waste management for emission reduction; and behaviour-change and livelihood linkages for sustainable lifestyles, thereby linking environmental outcomes to public health and local development metrics.

Sources

MAJHI VASUNDHARA-ABHIYAN (2026) Majhi Vasundhara. Available at: https://majhivasundhara.in/en

Majhi Vasundhara Abhiyan (MVA) *E-Pledge*

#EPLEDGE

Be the change. Take your *E-Pledge* today and join the movement for cleaner, greener living.

majhivasundhara.in/en/majhi-vasundhara-pledge

- *Inspires citizens to take daily sustainable actions that make a real difference*
- *Encourages small lifestyle changes which, when practiced collectively, transform the environment*
- *Promotes conscious, collaborative efforts for climate action across communities*
- *Invites citizens to share their journey and progress on the @majhivasundhara Facebook page and @majhivasundharaabhiyan_mah on Instagram*
- *Take an e-pledge as an individual or group, for example, committing to reduce single-use plastics, conserve water, or plant trees, to help small actions add up to big change.*

The Vayu component empowers communities to breathe cleaner by driving local action for better air quality

The Majhi Vasundhara Abhiyan toolkit outlines specific community climate actions for local bodies to implement under the Vayu vertical, aimed at reducing localized air pollution and earning recognition within the Abhiyan

Banning of fire crackers

Promotion of EV vehicles

Creation of cycling track

Construction & Demolition (C&D) Waste Management

Disaster Risk Reduction & Climate Action Planning

Reduction of Noise Pollution

Section Four

What monitoring and reporting mechanisms are instrumental for communicating air quality in India?

Air Quality Monitoring vs. Air Quality Index (AQI)

Air Quality Monitoring

*Scientific process of measuring pollutants in the atmosphere to assess environmental health and compliance with standards. It is the **source** to inform elements in the air we breathe!*

Key Features:

- Measured through a combination of ground-based stations (CAAQMS) and manual (NAMP) stations.
- Pollutants measured include PM10, PM2.5, SO2, NO, NO2, NOX, NH3, CO, O3, BTX, NH3, Pb
- Data collected at regular intervals
- Used by CPCB, SPCBs, and municipal bodies to inform policy and planning

Air Quality Index

*Simplified numerical scale that translates complex pollutant data into a single value to communicate health risks to the public. It is the **signal** that tells us how that air affects our health!*

Key Features:

- Calculated using pollutant concentrations from monitoring stations
- Expressed as a number from ***0 (Good)*** *to* ***500+ (Hazardous)***
- Updated hourly or daily depending on the monitoring system

What does AQI mean?

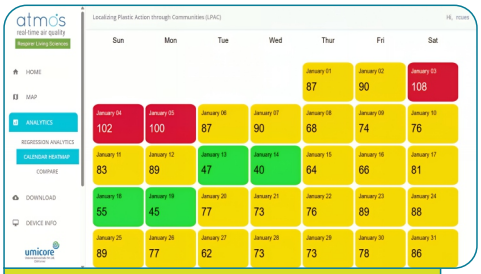
Healthy	0-50	Enjoy outdoor activities
Moderate	51-100	Sensitive groups may feel mild effects
Unhealthy for sensitive groups	101-150	Breathing discomfort for vulnerable groups
Unhealthy	151-200	Avoid outdoor exertion
Very Unhealthy	201-300	Serious health risks
Hazardous	301-500	Emergency conditions

The more days with poor air quality, the more young people and children are forced indoors; missing out on fresh air, play, and healthy growth.

How is AQI measured by local bodies in India?

- Selection of Location
- Deploy AQM devices - Installation & Calibration
- Regular collection of Air Samples
- Continuous Real-time Monitoring
- Validation of Data
- Conversion into AQI
- Data Assessment and Real-time Updates
- Policy Advocacy

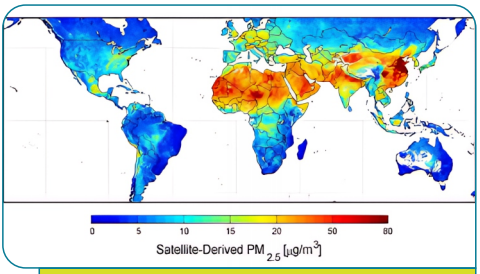
Citizens can use real-time sensors and mobile applications to measure AQI for indicative reference, but such values are not regulatory-grade



Mobile Apps & Online Dashboards

Low-Cost Portable Sensors

Low-Cost Fixed Sensors



Satellite & Remote Sensing Data

Fixed Monitoring Stations (Public Access)

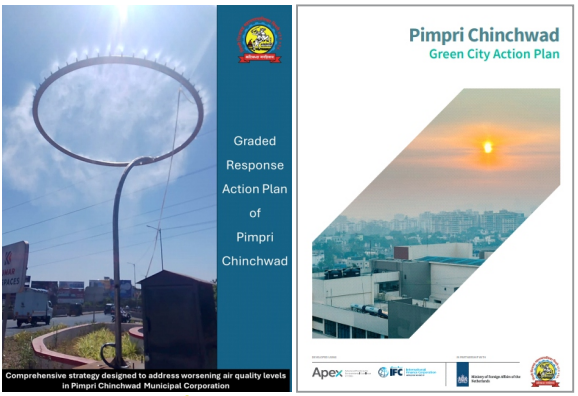
Visual & Experiential Indicators

Cities across Maharashtra commonly combine real-time automated monitoring with manual sampling to build a robust picture of urban air quality

Monitoring Protocols

- ***Real-time monitoring*** *record key pollutants such as* $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, *and* O_3 *at regular intervals produce hourly Air Quality Index (AQI) values and detect pollution episodes.*
- ***Manual sampling and laboratory analysis*** *is used to validate automated sensors, measure speciated pollutants, and fill gaps where continuous monitors are not available.*
- ***Policy integration:*** *Municipal authorities pair monitoring with policy instruments such as the* ***Graded Response Action Plan (GRAP)*** *to trigger short-term actions during high pollution episodes and with some cities developing* ***Green City Action Plans*** *to guide longer-term emission-reduction measures.*
- ***Data use*** *from automated and manual methods inform public advisories, traffic and construction controls, and targeted emission-reduction programs.*

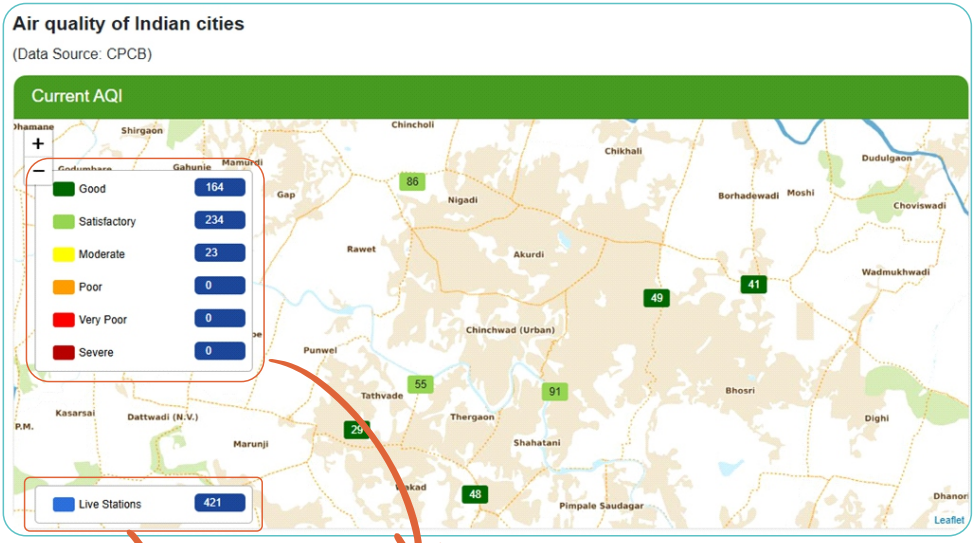
Continuous Ambient Air Quality Monitoring System



Examples of Policy Instruments for mitigating air pollution at the city-level

AQI Reporting as per National Clean Air Programme (NCAP)

Map view of CPCB Ambient Air Quality Stations in PCMC



AQI Range considering all major pollutants

No. of live stations under NCAP

Scan to view real-time air quality updates from CPCB monitoring stations across cities in India

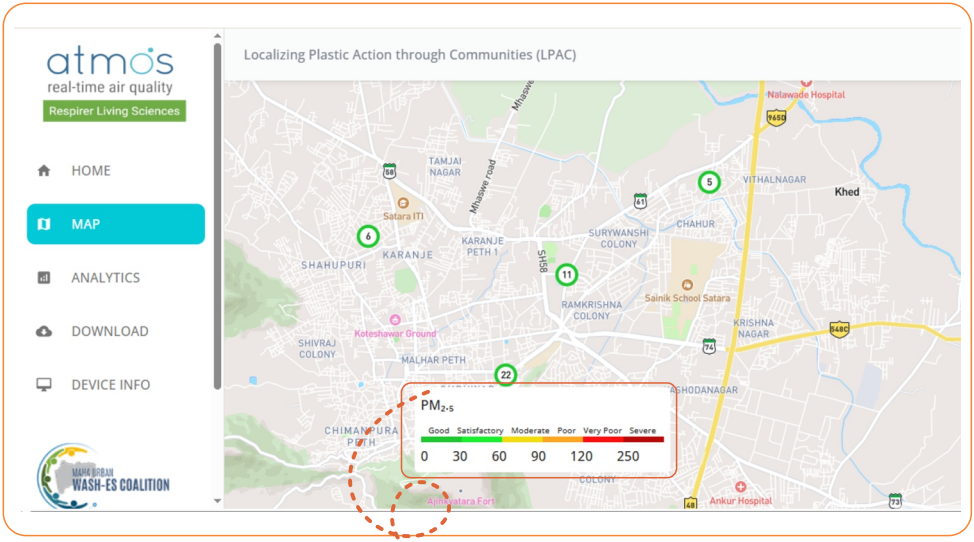
Some cities can also deploy real-time, low-cost air quality sensors as a complementary layer to state and national monitoring networks

- *What they measure: Low-cost sensors are typically used to track $PM_{2.5}$, PM_{10} and other major pollutants, along with environmental parameters such as temperature and humidity that affect sensor readings.*
- *Role alongside official networks: These decentralized sensors provide higher spatial resolution across traffic corridors, residential areas, and peri-urban zones, while state-led ref*
- *erence stations continue to provide regulatory-grade data.*
- *Community and planning benefits: When presented in accessible formats, real-time sensor data empower communities to advocate for local interventions, help planners identify pollution hotspots, and support evidence-based decisions for mitigation and public health advisories.*

Installed devices measure $PM_{2.5}$, PM1 temperature, humidity in Satara Municipal Council and can be used for reference (supported by UMICORE Autocat India Pvt. Ltd as part of the Localizing Plastic Action through Communities (LPAC) initiative

Data Utilization of AQI in SMC as per Real-time Air Quality Monitoring Devices (Atmos-STAT)

Map view of Atmos Air Quality Monitoring Stations in SMC



AQI Range considering only PM 2.5 concentrations

Section Five

Engaging in Air Quality Advocacy & Youth Clean Air Manifesto

From Local Action to Global Impact: Clean Air Success Stories

Our Kids' Climate – Global Network

Across more than 50 countries, parents and grandparents have united under ***Our Kids'*** Climate to demand a safer, cleaner future for their children. This movement connects grassroots family groups, amplifying their voices in international climate negotiations and local campaigns. By framing clean air as a matter of love and responsibility, they are showing that climate action is not just policy, but a moral duty to protect the next generation.

Mums for Lungs – United Kingdom

Born in London, ***Mums for Lungs*** began as a small group of mothers worried about the toxic air their children were breathing. Their advocacy quickly grew into a national campaign, raising awareness about diesel emissions, wood burning, and the dangers of poor air quality on child health. Their persistent efforts influenced debates on clean air zones and stricter vehicle standards, proving that community voices, especially those of parents, can shape public policy.

Sources

https://www.cleanairfund.org/resources/

From Local Action to Global Impact: Clean Air Success Stories

Breathe Mongolia – Clean Air Coalition

In Ulaanbaatar, where winter smog often blankets the city, young Mongolian activists launched Breathe Mongolia to fight for clean air. Operating across 10 countries, this volunteer-driven coalition combines open data, citizen science, and advocacy to reduce coal dependence and empower families with cleaner energy solutions. Their workshops and campaigns have engaged hundreds of youth, transforming air quality from a silent crisis into a visible, actionable issue.

CanAIRy Alert – Global South

Born in London, ***Mums for Lungs*** began as a small group of mothers worried about the toxic air their children were breathing. Their advocacy quickly grew into a national campaign, raising awareness about diesel emissions, wood burning, and the dangers of poor air quality on child health. Their persistent efforts influenced debates on clean air zones and stricter vehicle standards, proving that community voices, especially those of parents, can shape public policy.

Sources

https://www.cleanairfund.org/resources/

Youth Networks & Organizations Pioneering Clean Air Advocacy in India

India Youth Climate Network (IYCN)

India Clean Air Connect (ICAC)

India Air Quality Network(IAQN)

The Energy & Resources Institute (TERI)

Greenpeace India

SwitchON Foundation

Clean Air Fund - India

EARTH5R Foundation

Bhumi Youth Network

Waatavaran - Clean Air for All

Introducing the Youth Air Quality Manifesto

Why Youth Matter?

Future Stakeholders — **Bridge Builders** — **Local Champions**

About the Youth Air Quality Manifesto

As part of the Localizing Plastic Action through Communities (L-PAC) initiative, youth between the ages of 17 and 22 in Pimpri Chinchwad Municipal Corporation (PCMC) and Satara Municipal Council (SMC) are being empowered to develop the ***Youth Air Quality Manifesto*** as a tool for upstream advocacy.

This process recognizes young people as future stakeholders in climate governance, bridge builders across communities and institutions, and local champions capable of shaping collective action. By equipping them with evidence, voice, and agency, the Manifesto positions youth at the forefront of efforts to demand cleaner air and healthier urban environments.

How to develop the Youth Air Quality Manifesto?

Identify the Air Quality Issue

Conduct observation & gather local data to recognize the key sources of air pollution within your community.

Link with Local Policies

Examine existing municipal or regional policies, regulations, and frameworks that address the identified issue.

Co-Create Solutions

Design practical interventions with peers, educators, and community stakeholders, ensuring feasibility and sustainability.

Upstream Advocacy to Officials

Develop the findings and solutions into a structured report and present them to relevant authorities for consideration and action.

Ready to Breathe Better? Your Clean Air Journey Starts Here!

- **Track Your Air** - *Use apps like SAMEER, Central Control Room for Air Quality Management (CCR) or third-party apps to check daily AQI and share it with your peers*
- **Spot & Report** - *Document pollution hotspots such as burning waste, dusty roads, traffic jams and tag your local officials!*
- **Join the Movement** - *Be part of #LPAC in PCMC or Satara Co-create the next version of the Youth Air Quality Manifesto*
- **Speak Up** - *Write to your local body, elected representatives, attend public consultations, or host a campus awareness drive*
- **Stay Curious** - *Keep learning, questioning, and connecting the dots between data and policy!*

Your voice matters. Your actions shape the future of clean air.

Follow the Localizing Plastic Action through Communities (#LPAC) on -

https://www.linkedin.com/in/maha-uwesc/

https://x.com/Maha_WASH_C

https://www.facebook.com/MahaWASHcoalition/

https://mahawashcoalition.com/

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