BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

IN

ORIGINAL APPLICATION NO. 1228 OF 2024

**IN THE MATTER OF:**

News Item titled "Lancet study links alarming mortality rates to poor air quality 12 strategies to combat country's air pollution crisis" appearing in the Indian Express dated 13. 09.2024

# STATUS REPORT OF RESPONDENT- TELANGANA POLLUTION CONTROL BOARD

PAPER BOOK

(FOR INDEX KINDLY SEE INSIDE)

ADVOCATE FOR RESPONDENT No. 7- TELANGANA POLLUTION CONTROL BOARD : DHANANJAY BAIJAL

## INDEX

| S. No. | Particulars | Page Nos. |
|---|---|---|
| 1. | Status Report of Respondent No. 7-Telangana Pollution Control Board with affidavit. | 1-12 |
| 2. | **Annexure R-7/1:** A true copy of the article of the Indian Express, titled "Lancet study links alarming mortality rates to poor air quality 12 strategies to combat country's air pollution crisis" appearing in the Indian Express dated 13.09.2024. | 13-20 |
| 3. | **Annexure R-7/2**: Lancet Publication titled, "Ambient air pollution and daily mortality in ten cities of India: A causal modelling study report", dated July, 2024. | 21-28 |
| 4. | **Annexure R-7/3:** True copy of the Action Plan, dated 2019. | 29-81 |
| 5. | **Annexure R-7/4:** True copy of GO Rt.No.182, dated 20.11.2018. | 82-87 |
| 6. | **Annexure R-7/5:** True copy of the GO Rt.84 dated 07.06.2019. | 88-89 |
| 7. | **Annexure R-7/6:** True copy of the list of monitoring stations. | 90. |
| 8. | **Annexure R-7/7:** True copy of the gist of the source apportionment study conducted with IIT Kanpur. | 91-93 |
| 9. | **Annexure R-7/8:** True copy of the details of fund utilization, under the National Clean Air programme as per the 15th Finance Commission | 94. |
| 10. | Proof of Service | -95. |

Through

**DHANANJAY BAIJAL**

Advocate for the Respondent No.7
2/20 B Lower Ground Floor,
Jangpura A
New Delhi:110014
Code: 2906
E-mail: dhananjay@dbaijallaw.in
Phone:- +91 9958667540

Date 04.11.2024

Place : New Delhi

BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

IN

ORIGINAL APPLICATION NO. 1228 OF 2024

**IN THE MATTER OF:**

News Item titled "Lancet study links alarming mortality rates to poor air quality 12 strategies to combat country's air pollution crisis" appearing in the Indian Express dated 13.09.2024

TO

THE HON'BLE CHAIRPERSON AND OTHER COMPANION MEMEBERS OF THE HON'BLE NATIONAL GREEN TRIBUNAL

**MOST RESPECTFULLY SHOWETH:**

1. It is submitted that Original Application No. 1228 of 2024 has been registered by this Hon'ble Tribunal *suo motto* as per the decision of the Hon'ble Supreme Court in *Municipal Corporation of Greater Mumbai* vs. *Ankita Sinha & Ors.*, 2021 SCC Online SC 897. This Hon'be Tribunal issued notice on 15.10.2024 and thereafter on 23.10.2024 granted a further week to the Respondents to file their reply.

2. The answering Respondent has been arrayed as Respondent No. 7 herein. The answering Respondent is providing its reply in the form of the following Report.

3. It is submitted that the gist of the Indian Express Article, dated 13.09.2024 on the basis of which the *suo motto* petition has originated was that a Lancet Study, which studied the air quality in 10 major Indian cities namely Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, Shimla, and Varanasi, revealed that 33000 deaths

annually are linked to air pollution levels exceeding WHO guidelines. The study advocated for large scale policy changes as being crucial for long term development. The news article further recommended certain citizen centric strategies to combat the adverse health impacts of air pollution. A true copy of the article of the Indian Express, titled "Lancet study links alarming mortality rates to poor air quality 12 strategies to combat country's air pollution crisis" appearing in the Indian Express dated 13.09.2024, is annexed herewith as **ANNEXURE R-7/1**.

4. It is further submitted that the Lancet publication titled, "Ambient air pollution and daily mortality in ten cities of India: A causal modelling study report" provided the following insights:

**A.** The evidence for acute effects of air pollution on mortality in India is scares despite the extreme concentrations of air pollution observed.

**B.** The multi city study in India examines the association between short term exposure to PM2.5 and daily mortality using causal methods.

**C.** A time series analysis data of 10 cities in India between 2008 -2019 was taken.

**D.** City wide daily PM2.5 concentrations using a novel hybrid Nationwide, spatio-temporal model and estimated city specific effects of PM2.5 using Poisson regression model was carried out.

**E.** The city specific exposure-response curves are calculated, the fraction of death attributable to air pollution concentrations exceeding the current WHO 24 hour ambient PM2.5 guidelines of 15 μg/m3 was taken.

**F.** A 10 µg/m3 increase in 2 day moving average of PM2.5 was associated with 1.4% higher daily mortality.

**G.** The data of daily mortality from hospitals was taken from the 10 cities for the period 2008-2019.

**H.** It was observed that 7.2% of all daily deaths are attributable to PM2.5 concentrations higher than the WHO guidelines.

A true copy of the Lancet Publication titled, "Ambient air pollution and daily mortality in ten cities of India: A causal modelling study report", dated July, 2024 is annexed herewith as **ANNEXURE R-7/2**.

5. It is respectfully submitted that the published study has used WHO benchmarks to base its study and therefore the annual average for Pm 2.5 in the study is taken as 5 ug/$m^3$ as compared to the National Ambient Air Quality Standard (Annual average) prescribed by the Respondent No. 2- CPCB, which is set at 40 ug/$mg^3$.

6. It is respectfully submitted that Hyderabad has steadily improved its Ambient Air Quality Standard (Annual average) and is now well below that prescribed by the CPCB. A tabular representation of the improvement is depicted hereinafter:

| S.No. | Years | $PM_{2.5}$ (µg/$m^3$) |
|---|---|---|
| 1 | 2008 | 64 |
| 2 | 2009 | 64 |
| 3 | 2010 | 49 |
| 4 | 2011 | - |
| 5 | 2012 | 56 |
| 6 | 2013 | - |
| 7 | 2014 | 45 |
| 8 | 2015 | 40 |
| 9 | 2016 | 40 |
| 10 | 2017 | 43 |
| 11 | 2018 | 45 |
| 12 | 2019 | 41 |

| S.No. | Years | $PM_{2.5}$ ($\mu g/m^3$) |
|---|---|---|
| 13 | 2020 | 33 |
| 14 | 2021 | 37 |
| 15 | 2022 | 35 |
| 16 | 2023 | 35 |
| **National Ambient Air Quality Standards (Annual averages) prescribed by CPCB** | | **40** |

7. It is respectfully submitted that the marked decline in Pm 2.5 concentration has been achieved due to the implementation of a stringent action plan developed in coordination with the answering Respondent and the Government of the State of Telangana. The said action plan was submitted and approved by the Respondent No. 2-CPCB. A True copy of the Action Plan, dated 2019 is annexed herewith as **ANNEXURE R-7/3**.

8. The said action plan was developed pursuant to the pan-India directions issued by this Hon'ble Tribunal in O.A. No. 681/2018: News Item Published In "The Times Of India" Authored By Shri Vishwa Mohan Titled "NCAP With Multiple Timelines To Clean Air In 102 Cities". The Government of Telangana in coordination with the answering Respondent constituted Air-Quality Monitoring Committee (AQMC). True copy of GO Rt.No.182, dated 20.11.2018, is annexed herewith as **ANNEXURE R-7/4.**

9. It is further humbly submitted that the Government of Telangana also constituted a State Steering Committee, under Chairmanship of Chief Secretary to oversee the implementation of the approved action plan. True copy of the GO Rt.84 dated 07.06.2019 is annexed herewith as **ANNEXURE R-7/5**.

10. It is respectfully submitted that through the initiative of the answering Respondent the Ambient air quality network in Hyderabad has been improved over a period of time from with

one location, initially that has been expanded to 30 locations (14 are CAAQMS and 16 are manual) to cover the spatio-temporal variations like residential, commercial, industrial and sensitive locations. PM.25 is monitored at all the 14 CAAQMS and at 16 Manual Locations monitored under the National Air Monitoring Program(NAMP).

11. It is respectfully submitted that the CPCB criteria of having 12 CAAQMS and 4 manual) of Ambient Air Quality Monitoring Stations have been substantially exceeded due to the efforts of the answering Respondent in coordination with the Government of Telangana.

12. It is further submitted that The Ambient Air Quality data is disseminated to the public through the 14 Electronic Display Boards installed across the city and also through the TGPCB and CPCB website. All these 14 stations are operated by answering Respondent and are connected to the Central Pollution Control Board and TGPCB servers.

13. In this regard the answering Respondent has implemented the following initiatives:

**A.** Established 8 more continuous Ambient Air Quality Monitoring Stations (CAAQMS) in addition to the existing 6 - CAAQMS for assessing the Ambient Air quality. True copy of the list of monitoring stations is annexed herewith as **ANNEXURE R-7/6.**

**B.** Ambient Air Quality is also monitored through 16 manual stations. [See **ANNEXURE R-7/6.**]

**C.** The air quality data is disseminated to the public through 14 Electronic Display Boards and also on the website. Further, the data is also being shared with all the stakeholder depts on monthly basis.

**D.** The answering Respondent has established a 24 hour toll free line '10274' for redressing the public grievances. Grievances are also addressed through social media and the online portal.

**E.** All 17 category and air polluting industries have installed continuous emission monitoring system which are connected to central server at CPCB and TGPCB and hence are monitored continuously and any deviations are being reviewed regularly.

**F.** The answering Respondent is also perusing with industries for switching over to cleaner fuels and so far 61 industries have switched to gas based fuels.

**G.** Awareness programmes among school children and stake holders are being carried out regularly.

**H.** The answering Respondent along with IIT Kanpur has conducted source apportionment, emission inventory and carrying capacity study for Hyderabad to assess the contribution of different sources. The answering Respondent has included the mitigation measures suggested in the report are incorporated in the action plan that is under implementation for reducing the air pollution. True copy of the gist of the source apportionment study conducted with IIT Kanpur is annexed herewith as **ANNEXURE R-7/7**.

14. It is submitted that the various measures undertaken by stakeholder departments is as follows:

**A. Pollution Under Control Certification for vehicles**: Regular enforcement on Pollution Under Control Testing Centres to conduct online testing of vehicles and not issue offline certificates.

i. Number of Pollution Under Control Testing Centres linked through network are 432 in the State.

ii. Number of cases booked under violation of Pollution Under Control for the Year 2024-2025 (up to 16th August, 2024) are 6026.

iii. The Green Tax collected for the Year 2024-2025 (upto 16th August,2024) is 24.56 Crore.

**B. Promotion of Cleaner Fuels**: Government of Telangana has released "Telangana Electric Vehicle and Energy Storage Policy" with incentives and subsidies to encourage growth of EV and ESS sector in the State for faster EV adoption.

i. EV charging stations are established at 97 location out of 150.

**C. Strengthening of public transport:** Mono Rail Transit System(MRTS), MMTS and TGRTC are catering the daily requirement of about 2 million passengers. Further, TGRTC is deploying 550 electric buses and apart from it CNG buses are also under operation.

**D. Improvement in Infrastructure:**

i. End-to-end paving of roads along with black-topping and maintaining potholes free roads.

ii. GHMC is Sweeping 1850KMs of Roads thorough Mechanical Road Sweeping machines (MRS) to remove the re-suspended dust.

iii. Black topping & maintenance of damaged paved roads : till FY 2022-23, a total 608 nos. of BT & CC pavement works completed and 72 nos. road

stretched under CRMP works has been completed.

iv. Regular pothole filling on roads: In FY 2022-23, a total 25,628 nos. of potholes were filled & till Fy. 2022-23, 64no. works completed in additional to roads maintained under CRMP project.

**E. Green buffer along the traffic corridor:**

i. Greenery is developed and maintained along the central median of 105 nos. on main road stretches.

ii. 60 Traffic Islands, Rotaries have been developed for improving the streetscape visuals

iii. 25 Flyovers across the GHMC have been embedded with landscape greenery

iv. Vertical Gardens for 85 pillars of 19 flyovers are developed

v. Green ways, Green Curtains, Wayside views were developed on road margins at 56 Locations

**F. Constructed Water fountains at major Traffic junctions:** 55 nos. of water fountains were constructed and maintained at major traffic junction

**G. Greening of open areas, gardens, community places, schools and housing societies**

i. 19 Major Parks each having more than 5 Acres in extent.

ii. 970 Colony parks and 57 Major Theme Parks (> 1 Acre area) have also been developed across GHMC limits

iii. Institutional plantation and distribution of saplings to public are being taken up under HARITHA-HARAM programme.

**H. 482 no. compost pits in colony parks and other major parks has been taken up and completed**

**I. C&D Waste Management Facility:** 2 in operation and 4 under process. Out of 2,35,256 MT of C&D waste collected and transported, 24,316 MT C&D waste processed by GHMC.

**J. Intelligent Traffic System for synchronizing traffic movement:** Introduced Adaptive Traffic Signal Control (ATSC) and Pelican Signal System (PSS) for synchronising traffic movement and pedestrians safety.

i. Repairs and rehabilitation of existing signals : 14 Nos.

ii. O&M of existing signals : 175 Nos.

iii. New ATSC signals : 92 Nos.

**K. Electric Crematoriums:** 2 Nos.

**L. Regular enforcement for garbage and agriculture residue burning:**

i. GHMC sanitation team is conducting regular inspections and imposing penalty on violators which was controlled year by year.

ii. Agriculture department is increasing awareness through rhytu vedika on ill effects of agriculture residue burning and ways and means to manage the residue.

15. It is respectfully submitted that the implementation of the action plan is being reviewed at State level through

committees and also at National level committees on regular basis. The implementation of the action points is regularly being updated in the portal of regulation of air pollution in non-attainment cities (PRANA) instituted by Govt. of India. The funds released under the National Clean Air programme as per the 15th Finance Commission are being utilized in a proper manner. True copy of the details of fund utilization, under the National Clean Air programme as per the 15th Finance Commission are annexed herewith as **ANNEXURE R-7/8**.

16. It is therefore humbly submitted that the concentration of PM 2.5 are on declining trend in spite of the challenges with regards to economic growth, increasing urban population, no. of vehicles and kilometres travelled due to the continuous efforts of all stakeholder departments, including the answering Respondent herein and also increased public awareness.

Respondent No. 7 – Telangana Pollution Control Board

Through

**DHANANJAY BAIJAL**

Advocate for the Respondent No.7
2/20 B Lower Ground Floor,
Jangpura A
New Delhi:110014
Code: 2906
E-mail: dhananjay@dbaijallaw.in
Phone:- +91 9958667540

Date 04.11.2024

Place : New Delhi

BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

IN

ORIGINAL APPLICATION NO. 1228 OF 2024

**IN THE MATTER OF:**

News Item titled "Lancet study links alarming mortality rates to poor air quality 12 strategies to combat country's air pollution crisis" appearing in the Indian Express dated 13.09.2024

**AFFIDAVIT**

I, Ravi Gugulothu, S/o G. Bheema, aged 44 years, resident of Hyderabad do hereby solemnly affirm and state as under:-

1. That I am the Member Secretary in Respondent Telangana Pollution Control Board, who has been arrayed as a party Respondent No. 7 in the above mentioned matter and as such am conversant with the facts and circumstances of the case as available from the records of the Respondent No. 7 and am competent to swear the present affidavit on behalf of Respondent Telangana Pollution Control Board.

2. That the contents of paragraphs 1 to 16 of the accompanying status report are true to the best of my knowledge as borne from the records of the Respondent No. 7 Telangana Pollution Control Board.

NOTARY
P.S.P.RAO
NOTARY
LR. No. NR/
3526/2022
AMEERPET,
HYD-16.
APPOINTED BY THE GOVT. OF TELANGANA

3. That the documents filed along with this reply are true copies of their originals.

**DEPONENT**
MEMBER SECRETARY
Telangana Pollution Control Board,
Paryavarana Bhavan, A-3,
Industrial Estate, Sanathnagar,
Hyderabad-500 018.

**VERIFICATION:**

Verified at _____ on this ____ day of November 2024 that the contents of this affidavit are true and correct and nothing material has been concealed herefrom.

**DEPONENT**
MEMBER SECRETARY
Telangana Pollution Control Board,
Paryavarana Bhavan, A-3,
Industrial Estate, Sanathnagar,
Hyderabad-500 018.

ATTESTED
P.SURYA PRAKASA RAO
B.A.B.L.
ADVOCATE & NOTARY
Appointed by the Govt. of T.S.
Lr.No. NR-3220/2022
Ameerpet, Hyderabad-500016
My Commission Expires on 24-5-2027
Ph : 9848 474 855

NOTARIAL

# Lancet study links alarming mortality rates to poor air quality: 12 strategies to combat country's air pollution crisis

The study examined data collected from major cities in India including Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, Shimla, and Varanasi.

Written by Swarupa Tripathy

Updated: September 13, 2024 15:06 IST


Dr Bhargav Krishna, fellow at the Sustainable Futures Collaborative and a lead author on the study, emphasised the nationwide nature of this challenge. (Source: Freepik)

A recent study published in *Lancet Planetary Health* shed light on alarming air quality in 10 major Indian cities, revealing around 33,000 deaths annually are linked to air pollution levels exceeding World Health Organization (WHO) guidelines. The study analysed data from Ahmedabad, Bengaluru, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, Shimla, and Varanasi between 2008 and 2019.

Dr Bhargav Krishna, fellow at the Sustainable Futures Collaborative and a lead author of the study, emphasised the widespread nature of this issue. He said, "The results of this first-of-its-kind multi-city study show us that reducing air pollution is a nationwide challenge. Our analyses highlight air pollution's substantial effects on mortality even in cities previously considered less polluted, such as Mumbai, Bengaluru, Kolkata, and Chennai."

While large-scale policy changes are crucial for long-term improvement, individuals aren't powerless in the face of this crisis. Here are some practical, personal-level strategies that residents of these polluted urban areas can implement to protect their health, according to experts.

## Monitor air quality and adjust outdoor activities

Dr Nana Kunjir, consultant pulmonologist and intensivist, Sahyadri Super Speciality Hospital, Hadapsar, Pune, states, "Limit outdoor activities if you're staying in highly urban and heavy traffic areas." He recommended staying informed about air quality levels and adjusting your outdoor routines accordingly.



For fitness enthusiasts, Kate Austin, head coach at MultiFit, suggested, "Schedule your outdoor workouts for early morning or late evening when pollution levels tend to be lower." She also recommended opting for moderate activities like walking or light jogging instead of intense exercises on high-pollution days.

## Create a clean indoor environment

Dr Kunjir emphasised the importance of indoor air quality, "Use air purifiers at home to reduce indoor pollution levels. Ensure that the devices are equipped with HEPA filters to effectively capture fine particles."



Gaurav Sanghavi, co-founder and principal architect at Pentaspace Design Studio, said, "Ensuring carpets, curtains, and air filters are well-maintained can make a significant difference. Regularly servicing air filters and utilising home automation systems can help in managing indoor air quality

with natural organic polishes can help improve air quality. For example, the use of recycled wood which is locally sourced can be finished in an organic wax or oil. This is completely non-toxic as opposed to melamine of polyurethane sprays, which can be highly toxic."

There are tiles and ceiling panels available that are made of recycled materials, he adds. These too, are very easy to install as compared to conventional gypsum or plaster-of-Paris ceilings. "The use of organic paints over conventional chemical-based paints also helps improve air quality."

## Use protective gear outdoors

"Wearing masks that are designed to filter out PM2.5 particles (particulate matter with a diameter of 2.5 micrometres or less) can provide some protection when it is necessary to be outdoors. N95 masks are particularly effective," advised Dr Kunjir.



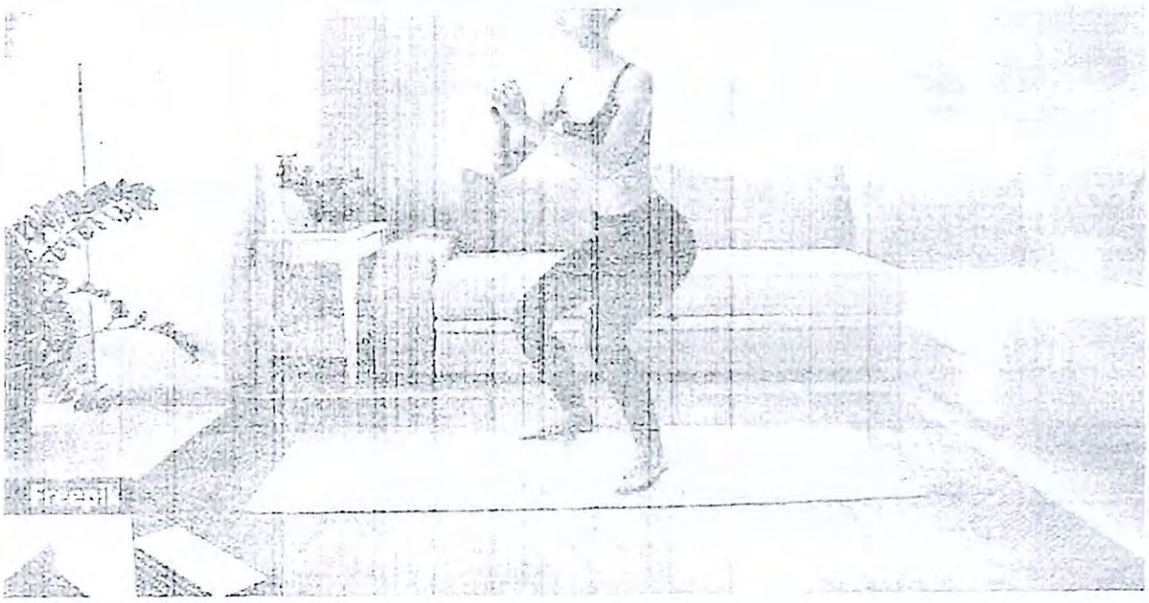
## Improve ventilation

Dr Kunjir also suggested ensuring "proper ventilation in living spaces while keeping windows closed" during peak pollution hours. Use exhaust fans and ventilation systems to reduce indoor pollution.

27-10-

17





Focus on indoor exercises when outdoor air quality is poor. (Source: Freepik)

## Maintain a healthy lifestyle

Drink plenty of water to keep the respiratory tract moist, Dr Kunjir recommended. This can help the body naturally filter out pollutants. He also advises consuming a diet "rich in antioxidants, vitamins, and minerals to combat the oxidative stress caused by pollutants."

## Regular health check-ups

"Schedule regular medical check-ups to monitor your lung health, especially for people with pre-existing conditions or those living in high-pollution areas," said Dr Kunjir.

## Be aware of early warning signs

Dr Kunjir also listed early warning signs to watch out for such as "persistent cough, shortness of breath, wheezing, chest tightness or pain, increased incidences of respiratory infections, and worsening of pre-existing respiratory conditions such as asthma or chronic obstructive pulmonary disease (COPD)."

## Consider indoor exercise alternatives

Austin recommends focusing on indoor exercises when outdoor air quality is poor. "Treadmill workouts, stationary cycling, elliptical trainer, rowing machine exercises, and HIIT workouts can provide effective cardiovascular training indoors."

## Educate and involve the next generation

Anushree Gupta, counselling psychologist, emphasised the importance of involving children in the conversations about pollution and tackling it: "Introducing children to environment solutions can be done in the form of fun activities such as at-home composting, growing veggies from scratch in grow bags, revamping old clothes into a new outfit."

## Embrace green solutions

Hrishit Panthry, co-founder of Envirocare Foundation, shared his experience. Travelling from Indirapuram (Ghaziabad) to his place in Raj Nagar (Ghaziabad), "we noticed a stark difference in air quality due to the presence of green barriers. The air felt cooler, the environment was more comforting, and overall, it was greenly peaceful."

Trees like neem, peepal, and banyan, he says, are known for their high pollutant absorption capacities. These trees and certain plants trap particulate matter (PM) on their leaves and branches, preventing it from circulating in the air.

## Understand the impact on reproductive health

Dr Rashmi Agrawal from Nova IVF Fertility, Gurgaon warned that exposure to high levels of PM2.5 and other pollutants leads to "male and/or female infertility." Air pollution can lead to diminished sperm quality, hormonal disruptions, and higher miscarriage risk.

Pregnant women in highly-polluted cities can minimise exposure to harmful pollutants by staying indoors during peak pollution times, using air purifiers, avoiding high-traffic areas, wearing masks in polluted places, planting trees, increasing greenery, and advocating for systemic change.

## Advocate for bigger change

Anup Garg, founder and director of World of Circular Economy (WOCE), emphasised the need for broader action. "More than home modifications, human behaviour modifications are important. We must understand what we are doing to ourselves and our immediate environment."

Khozema Chitalwala, principal architect and founder of Designers Group, said that as designers, architects, and consultants, "we need to be more responsible and responsive to environmental concerns, striving to achieve as green a footprint as possible."

While these personal strategies can help mitigate the immediate effects of air pollution, it's crucial to remember that this is a collective problem requiring systemic solutions. As Dr Poornima Prabhakaran, director of the Centre for Health Analytics Research and Trends at Ashoka University, pointed out, "The insights signal an urgent need to revisit our air quality management strategies that currently focus only on 'non-attainment cities', rethink current air quality standards accounting for the lower risk thresholds and shift from addressing regional to local sources to effectively protect human health."

These personal strategies can help mitigate air pollution's immediate effects, but systemic solutions are essential. Dr. Poornima Prabhakaran, director at the Centre for Health Analytics Research and Trends at Ashoka University, stresses the need to revisit air quality management, rethink standards, and shift focus from regional to local sources to better protect human health.

Dr Jeroen de Bont, a postdoctoral researcher at Karolinska Institute, emphasises the importance of targeting local pollution sources as efforts to combat air pollution intensify.

Professor Joel Schwartz of Harvard University said that enforcing stricter air quality standards in India could save tens of thousands of lives annually and urged the adoption of proven pollution control methods.

ANNEXURE R-/2

# Ambient air pollution and daily mortality in ten cities of India: a causal modelling study

Jeroen de Bont*, Bhargav Krishna*, Massimo Stafoggia, Tirthankar Banerjee, Hem Dholakia, Amit Garg, Vijendra Ingole, Suganthi Jaganathan, Itai Kloog, Kevin Lane, Rajesh Kumar Mall, Siddhartha Mandal, Amruta Nori-Sarma, Dorairaj Prabhakaran, Ajit Rajiva, Abhiyant Suresh Tiwari, Yaguang Wei, Gregory A Wellenius, Joel Schwartz†, Poornima Prabhakaran†, Petter Ljungman†

## Summary

**Background** The evidence for acute effects of air pollution on mortality in India is scarce, despite the extreme concentrations of air pollution observed. This is the first multi-city study in India that examines the association between short-term exposure to $PM_{2.5}$ and daily mortality using causal methods that highlight the importance of locally generated air pollution.

**Methods** We applied a time-series analysis to ten cities in India between 2008 and 2019. We assessed city-wide daily $PM_{2.5}$ concentrations using a novel hybrid nationwide spatiotemporal model and estimated city-specific effects of $PM_{2.5}$ using a generalised additive Poisson regression model. City-specific results were then meta-analysed. We applied an instrumental variable causal approach (including planetary boundary layer height, wind speed, and atmospheric pressure) to evaluate the causal effect of locally generated air pollution on mortality. We obtained an integrated exposure–response curve through a multivariate meta-regression of the city-specific exposure–response curve and calculated the fraction of deaths attributable to air pollution concentrations exceeding the current WHO 24 h ambient $PM_{2.5}$ guideline of 15 μg/m³. To explore the shape of the exposure–response curve at lower exposures, we further limited the analyses to days with concentrations lower than the current Indian standard (60 μg/m³).

**Findings** We observed that a 10 μg/m³ increase in 2-day moving average of $PM_{2.5}$ was associated with 1·4% (95% CI 0·7–2·2) higher daily mortality. In our causal instrumental variable analyses representing the effect of locally generated air pollution, we observed a stronger association with daily mortality (3·6% [2·1–5·0]) than our overall estimate. Our integrated exposure–response curve suggested steeper slopes at lower levels of exposure and an attenuation of the slope at high exposure levels. We observed two times higher risk of death per 10 μg/m³ increase when restricting our analyses to observations below the Indian air quality standard (2·7% [1·7–3·6]). Using the integrated exposure–response curve, we observed that 7·2% (4·2%–10·1%) of all daily deaths were attributed to $PM_{2.5}$ concentrations higher than the WHO guidelines.

**Interpretation** Short-term $PM_{2.5}$ exposure was associated with a high risk of death in India, even at concentrations well below the current Indian $PM_{2.5}$ standard. These associations were stronger for locally generated air pollutants quantified through causal modelling methods than conventional time-series analysis, further supporting a plausible causal link.

**Funding** Swedish Research Council for Sustainable Development.



## Introduction

Exposure to air pollution is a global public health hazard, with a considerable body of evidence linking short-term and long-term exposures to a range of health outcomes, including all-cause and cause-specific mortality, respiratory and cardiovascular conditions, neurodevelopmental deficiencies, and adverse pregnancy and birth outcomes.[1–4] Evidence of these health harms has led to sustained reductions in air pollution exposures globally, yet many low-income and-middle income countries, including India, continue to experience high concentrations of air pollution.

Air pollution levels in many parts of India routinely exceed the WHO guidelines for safe exposure (24 h ambient $PM_{2.5}$ standard of 15 μg/m³ not to be exceeded more than three to four times per year), and even exceed India's own less stringent ambient air quality standards for 24 h ambient exposure (60 μg/m³).[5,6] Annual average exposure to $PM_{2.5}$ in the nation's capital Delhi exceeded 100 μg/m³ in 2021 (WHO guideline value 5 μg/m³; Indian standard 40 μg/m³), with similar concentrations faced across much of the Indo-Gangetic Plain airshed.[9] Meteorological factors and seasonal high combustion events, such as festivals or crop residue burning, often push short-term exposures to concentrations as high as 700–1000 μg/m³.[10] These hyperlocal pollution episodes that trigger greater exposures, especially to ambient air pollution, can cause increased vulnerability and burden of disease. The 2019 subnational burden of disease study estimated that

Lancet Planet Health 2024; 8: e433–40

*Joint first authors

†Joint last authors

Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden (J de Bont PhD, S Jaganathan MPH, P Ljungman PhD); Sustainable Futures Collaborative, Delhi, India (B Krishna DrPH); Department of Epidemiology, Lazio Region Health Service / ASL Roma 1, Rome, Italy (M Stafoggia PhD); Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, India (T Banerjee PhD); Smart Prosperity Institute, University of Ottawa, ON, Canada (H Dholakia PhD); Public Systems Group, National Investment & Infrastructure Fund Chair in Environment, Social & Corporate Governance, Indian Institute of Management, Ahmedabad, India (A Garg PhD); Environmental, Climate, and Urban Health Division, Vital Strategies, New York, NY, USA (V Ingole PhD); Office for National Statistics, Newport, Wales, UK (V Ingole); Centre for Chronic Disease Control, New Delhi, India (S Jaganathan, S Mandal PhD, Prof D Prabhakaran DM, A Rajiva MESc, P Prabhakaran PhD); Public Health Foundation of India, New Delhi, India (P Prabhakaran); Ashoka University, Sonipat, India (S Jaganathan, S Mandal, A Rajiva, P Prabhakaran); Ben-Gurion University of the Negev, Beer-Sheva, Israel (Prof I Kloog PhD, A Rajiva); Department of Environmental Medicine and Climate Science, Icahn School of Medicine at Mount Sinai, New York, NY, USA (Prof I Kloog, Y Wei PhD); Department of Environmental Health, Boston University School of Public Health,

Boston, MA, USA; (Prof A N-Sarma PhD, Prof G A Wellenius PhD, K Lane PhD); DST-Mahamana Center of Excellence in Climate Change Research, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, India (R K Mall PhD); NRDC India Private Limited, New Delhi, India (A S Tiwari MPH); Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston, MA, USA (Y Wei, Prof J Schwartz PhD); Department of Cardiology, Danderyd Hospital, Stockholm, Sweden (P Ljungman)

Correspondence to: Dr Jeroen de Bont, Institute of Environmental Medicine, Karolinska Institutet, 171 77 Stockholm, Sweden jeroen.de.bont@ki.se

## Research in context

### Evidence before this study

We carried out two PubMed searches without language restrictions from database inception to March 14, 2024. We used the search terms "air pollution", "particulate matter", "short-term", and "mortality" and then added "India". Our search identified that numerous studies globally have found effects of short-term ambient air pollution on daily mortality. However, we observed no multi-city studies conducted in India and no global multi-city, multi-country analyses that featured Indian cities. Further, no study has applied causal inference methods to capture the role of locally generated pollutants in a low-income and-middle income setting. In addition, previous studies from India have not investigated exposure–response curves across such broad range of exposures, including evaluating the effect of air pollution at lower thresholds, even below the Indian recommended air quality guidelines. Finally, policy makers are reluctant to set standards based solely on studies conducted in other continents.

### Added value of this study

We observed an important effect of short-term exposure to $PM_{2·5}$ on daily mortality in the first multi-city study including data from some of the largest and most polluted cities in India. These associations were observed to be stronger when using causal modelling methods accounting for locally generated pollutants. We were able to generate an integrated exposure–response curve for India that indicates increased risk of mortality even at lower concentrations of $PM_{2·5}$ exposure. We did not observe any evidence of a safe threshold nor lower incremental effects on mortality at lower concentrations of $PM_{2·5}$.

### Implications of all the available evidence

This study adds to the vast body of research globally showing increased effects of $PM_{2·5}$ on daily mortality and provides strong evidence for such an association in India. Accounting for locally generated air pollutants by using causal methods might indicate a previous underestimation of the effect of air pollution. In line with previous studies regarding the exposure–response curve, no safe threshold for air pollution exposure exists. Our findings support the current evidence that approximately 7·2% of all deaths in India are attributable to daily $PM_{2·5}$ exposure.

more than 10·4% of total deaths (approximately 980 000) and 6·7% of total disability-adjusted life years (approximately 31·1 million) are associated with exposure to ambient $PM_{2·5}$.[10] These estimates are treated with relative scepticism by policy makers because they are not based on studies from India. However, a growing body of local evidence has begun to fill the gaps in knowledge on both long-term and short-term exposures.[11–14]

Many studies elsewhere have evaluated the effect of short-term ambient air pollution on daily mortality. Although many of these studies are focused on specific geographical areas, some have conducted multi-city analyses in the USA, Latin America, Europe, China, and globally.[15–19] To the best of our knowledge, there have been no multi-city studies conducted in India, and neither have any Indian cities featured in global multi-city, multi-country analyses. Previous studies on the effect of short-term $PM_{2·5}$ exposures on daily mortality in India are scarce—they have focused only on one or two cities and have not investigated exposure–response curves across a broader range of exposures.[11,20] Further, there are only a few studies that have evaluated the possible effect of locally generated air pollution on mortality through causal modelling techniques such as instrumental variable analysis.[21,22] The instrumental variable approach relies on the selection of a variable (the instrument) that can cause a build-up of locally generated pollution but does not have other plausible links with daily changes in mortality, except through air pollution itself.[21,22] In effect, the instrument allows local pollutants to vary independently in relation to both measured and unmeasured confounders, thus eliminating any effects that might influence the relationship between exposure and outcome. This approach allows us to provide causal estimates of the effect of changes in local air pollution levels.

Using a national spatiotemporal exposure model and daily mortality data from ten cities, we aimed to conduct the first multi-city analysis for India, including the use of causal modelling methods. The ultimate goal of our study was to provide a first national causal exposure–response function directly relevant to policy. Furthermore, the inclusion of cities with different exposure levels aimed to increase statistical power and capture a broader range of daily exposure to $PM_{2·5}$.

## Methods

### Daily mortality

We obtained daily counts of all-cause mortality from the death registries of ten municipal corporations in India (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata, Mumbai, Pune, Shimla, and Varanasi), covering each of the five climate zone classifications (appendix p 2). The data covered the period from 2008 to 2019, with 3–7 years of data available for each city (appendix p 2). We acquired de-identified mortality records from each municipal corporation, and we cleaned and aggregated the data to compile daily deaths for use in our analyses. International Classification of Diseases codes were not available for most cities, leaving us unable to conduct analyses of cause-specific mortality.

See Online for appendix

The city-specific populations varied from 170 000 in Shimla to approximately 16·8 million in Delhi.[23]

### Exposure assessment: daily ambient air pollution

We generated daily average $PM_{2.5}$ concentrations at 1 km² spatial resolution across India using a hybrid ensemble averaging approach from 2008 to 2020.[3] Briefly, we collected ground monitoring-based observations of daily average $PM_{2.5}$ and $PM_{10}$ across 1056 locations and an extensive set of predictors encompassing satellite-based observations, meteorology, land-use patterns, emissions inventories, and reanalysis-based data. Using a cross-validation approach by leaving out 20% of the monitors, we trained four machine learning methods (deep learning, random forests, gradient boosting, and extreme gradient boosting) on the training data. The optimised models were implemented on the left-out validation data to obtain learner-specific predictions and combined using a Gaussian process regression to obtain the final predictions. The ensemble averaging was done to borrow strength across the different machine learning algorithms. We observed that certain algorithms performed better in specific areas and used a Gaussian process-based model (including elevation and land-use features) to combine the predictions from the four different algorithms into one final prediction for each grid-day combination. This method allowed us to obtain $PM_{2.5}$ exposures in regions with no monitoring data across time. The daily ensemble averaged predictions had a cross-validated $R^2$ of 86% and mean absolute error ranging between 14·4 μg/m³ and 25·4 μg/m³ across India. In this study, we estimated daily population weighted $PM_{2.5}$ concentrations of all 1 km² grid cells contained within the municipal boundaries of each of the ten cities included in the study throughout our study period. Population-weighted averages were used to provide a more accurate representation of the actual exposure experienced by the population.

### Analytical strategy

We applied a two-stage analysis approach to evaluate the effects of $PM_{2.5}$ on daily mortality counts. In the first stage, we used quasi-Poisson generalised additive models (GAMs) to estimate city-specific associations. The models were adjusted for a penalised spline smooth function of calendar day with nine degrees of freedom (df) per year to account for underlying long-term and seasonal time trends, an indicator of day-of-week to account for weekly variations, and a natural spline function with four df for daily mean air temperature (lag 0–4). We used the 2-day moving average of current and previous day $PM_{2.5}$ concentration (lag 0–1) to estimate the effect on daily mortality, in line with the current literature.[15,16] We explored different lag patterns including single lags of same day (lag 0), previous day (lag 1), 2 days preceding level (lag 2), and 4-day moving average (lag 0–3). We modelled $PM_{2.5}$ as a linear term, and expressed the effect estimates as percentage change in daily mortality, with 95% CIs per 10 μg/m³ increase in $PM_{2.5}$ (lag 0–1). In the second stage, we applied a random-effects meta-analytical model to pool the city-specific estimates of associations of $PM_{2.5}$ with mortality. We calculated $I^2$ statistics and Cochran's Q-test to evaluate the between-city heterogeneity.

### Effect of locally generated pollutants using instrumental variable analysis

We used an instrumental variable approach to estimate the causal effect of locally generated air pollution in India. A more comprehensive overview of this approach can be found elsewhere;[21,22] briefly, the authors identified three instruments: planetary boundary layer height (PBLH), wind speed, and atmospheric pressure. PBLH is the elevation height at which vertical mixing of local emission occurs in the atmosphere. The mean PBLH varies day to day through dynamic interplay of various atmospheric processes. Wind speed affects horizontal transport of pollutants, with lower speeds increasing local influence and higher speeds promoting turbulent mixing and reduced concentrations. High atmospheric pressure typically induces weather conditions such as lower vertical temperature gradients, which impede both vertical and horizontal mixing of pollutants. Although each variable can individually capture distinct aspects of air pollution variation, the daily variability of each instrument is unlikely to be associated with daily deaths except through air pollution changes. Therefore, these three instruments serve as the most appropriate options for an instrumental variable in our study.[21,22] If these variables are not predictors of mortality except through air pollution, then they should not be associated with any confounders. If these instruments produce variations in air pollution that are randomised with respect to measured and unmeasured confounders, and if that fraction of variation in air pollution is associated with daily mortality, the effect estimates should be causal.

We obtained daily mean levels of PBLH, wind speed, and atmospheric pressure from the European Centre for Medium-Range Weather Forecasts.[21,22] Similar to $PM_{2.5}$, we used the 2-day moving average of current and previous day PBLH, atmospheric pressure, and wind speed. We regressed our $PM_{2.5}$ values (lag 0–1) on time trends, air temperature (lag 0–4), and day of the week, then extracted the residuals. To obtain a single final instrumental variable, the three instruments were combined to derive one single pollution-calibrated instrumental variable by applying a support vector regression (SVM) with a radial kernel to account for non-linear interaction between the predictors and the residuals of local pollution. We used the SVM function in the R package e1071. The obtained fitted values represent the remaining variation in $PM_{2.5}$ that was explained by the three instrumental variables, and are independent of season, time trend, and temperature.[21,22] Then, we used the instrument as our exposure in the

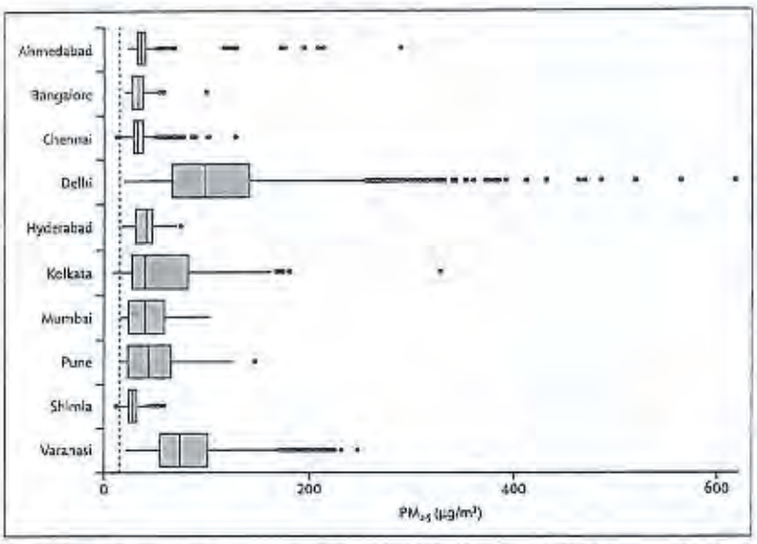



*Figure 2:* Daily $PM_{2.5}$ concentrations across ten Indian cities (dashed line shows the WHO recommended air quality guidelines [24 h of 15 µg/m³])
Boxplot showing the median, IQR, minimum, maximum, and extreme values of $PM_{2.5}$ concentrations. Extreme $PM_{2.5}$ events, which significantly exceed the WHO guidelines, are particularly observed in cities such as Ahmedabad, Delhi, Kolkata, and Varanasi.

quasi-Poisson regression in each city as specified previously. The effect estimates obtained from this model are on the same scale as $PM_{2.5}$.

### Meta-analytic regression and attributable fraction

We assessed the shape of the exposure–response curve for each city using our main GAM. To account for possible non-linearity, we applied a quadratic B-spline with one single knot located at the 50th percentile of the city-specific air pollution distribution (2-day moving average of $PM_{2.5}$). Then we applied a multivariate meta-regression of the city-specific predictions of the exposure–response curve to obtain an integrated exposure–response curve.[24] As we observed a supralinear relationship, we used the integrated exposure–response curve to calculate the fraction of deaths attributable to air pollution concentrations exceeding the WHO 24 h ambient $PM_{2.5}$ guideline of 15 µg/m³.[25] To do so, for each day in each city, we used the overall integrated relative risk comparing each day's air pollution with WHO guidelines to calculate the attributable deaths and attributable fraction, using a previously described method.[25] Then, we obtained the total deaths attributable to $PM_{2.5}$ above the WHO guidelines by summing all the daily attributable deaths series, and estimated the total attributable fraction by dividing the total number of attributable deaths by the total deaths. 95% CIs were derived through 1000 Monte Carlo simulations. Finally, we investigated if associations persisted at successively lower concentrations of air pollution (<250 µg/m³, <125 µg/m³, <100 µg/m³, <75 µg/m³, and <60 µg/m³, the last being the Indian standard of 24 h ambient $PM_{2.5}$ concentration).

### Sensitivity analysis

To assess the robustness of our results we performed several sensitivity analyses. We applied different df (between six and ten df per year) to account for time trends, and we applied different adjustments for temperature (at lag 1 and 3 and using three and six df in the smoothing variables). Relative humidity is used as a confounder in previous studies, but these data were not available for all cities or all time periods.[9,22] Thus, as a sensitivity analysis, we adjusted for relative humidity from meteorological stations for those cities when data were available (Ahmedabad, Bangalore, and Hyderabad). Finally, we estimated the integrated exposure–response curve and attributable fraction using different knot points for $PM_{2.5}$, with equidistant knots (at 25th, 50th, and 75th percentiles) and at specific percentiles (10th, 50th, and 90th). We also estimated fractions of deaths attributable to air pollution concentrations exceeding the Indian 24 h ambient $PM_{2.5}$ standard.

### Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

## Results

This time series analysis included more than 3·6 million deaths in India from 2008 to 2019 (appendix p 2). The long-term average of daily means of $PM_{2.5}$ over this period ranged from 28·4 µg/m³ in Shimla to 113·0 µg/m³ in Delhi (figure 1). The maximum daily $PM_{2.5}$ concentration was registered in Delhi at 617·6 µg/m³, and in 99·8% of all days across all cities (27 091 of 27 146 days) the daily $PM_{2.5}$ concentrations exceeded the 2021 WHO recommended 24 h air quality guidelines of 15 µg/m³ (figure 1).

From our main analyses, we observed a 1·42% (95% CI 0·67–2·19, $I^2$ 95·7%) increase in daily mortality per a 10 µg/m³ increase of $PM_{2.5}$ (lag 1; figure 2). The city-specific estimates showed large variations, ranging from 0·31% (0·21–0·41) in Delhi to 3·06% (1·54–4·59) in Bangalore. In our instrumental variable analysis, we observed an increase in daily mortality of 3·57% (2·11–5·04, 96·3%) per 10 µg/m³, which was higher than in the conventional time-series analyses (figure 2). The causal effects were especially strong in cities with lower concentrations of air pollution, such as Bangalore, Chennai, and Shimla.

Estimates are provided as percentage change in mortality and 95% CIs per 10 µg/m³ increase in $PM_{2.5}$ (lag 1). Models were adjusted for a penalised spline smooth function of calendar day with nine df, an indicator of day-of-week, temperature (lag 4), and relative humidity (lag 4).

We observed a supralinear relationship in our integrated exposure–response curve, with steeper slopes at lower levels of exposure and an attenuation of the slope at higher levels of exposure (figure 3). We looked at the relative risk of air pollution against the minimum air pollution concentration at which an effect was observed in our study (17·1 μg/m³), as selecting the WHO 24 h ambient $PM_{2·5}$ guideline of 15 μg/m³ was not feasible as there were not enough days in which such concentrations were observed in our dataset (figure 3). Using the estimated integrated exposure–response curve, we estimated that 7·2% (95 % CI 4·2–10·1) of all deaths were attributable to $PM_{2·5}$ concentrations higher than the WHO recommended 15 μg/m³, corresponding to 33 627 (19 443–47 426) annual deaths across our ten cities (table). Delhi had the largest attributable fraction and highest attributable yearly deaths. The steeper slope at lower levels of exposure was supported when we restricted our analyses at different thresholds as we observed an increase in the effect estimates as we lowered the thresholds. When we restricted our analyses to days that observed $PM_{2·5}$ concentrations below the recommended Indian guidelines (<60 μg/m³ recommended daily $PM_{2·5}$ concentrations), we observed two times higher risk estimates compared with our main analyses without restriction (percent change [<60 μg/m³] of 2·65 [95%CI 1·68–3·63] per 10 μg/m³; figure 4).

Exploring different lag patterns, we observed similar associations for single lags of 0 and 1 days and lag 0–3 on daily mortality, but we observed a smaller effect on lag 0–2 days (appendix p 5). In the sensitivity analyses, we observed almost identical effect estimates adjusting for different df per year for time trend (six to ten df), and similar effect estimates were observed by adjusting for different degrees of smoothness for temperature (appendix p 6). The effect estimates of $PM_{2·5}$ and mortality did not change after adjusting for relative humidity (appendix p 7). Finally, when using different knot points for $PM_{2·5}$, we observed similar integrated exposure–response curves, but slightly higher attributable fractions and total attributable deaths (appendix p 8). Using the Indian standard, we observed lower deaths attributed to $PM_{2·5}$ concentrations higher than 60 μg/m³ compared with the WHO guidelines (appendix p 3).

## Discussion

Our study analysed the association between $PM_{2·5}$ exposure and approximately 3·6 million daily deaths in ten Indian cities between 2008 and 2019. As such, it is the first multi-city study to examine the association between short-term exposures to air pollution and daily mortality in India. We observed a clear association between daily $PM_{2·5}$ exposure and increased risk of mortality. These associations were stronger when using causal modelling methods incorporating instrumental variables that isolated the effect of locally generated air pollution, indicating that previous studies probably underestimated the effect of short-term exposure to air pollution on daily

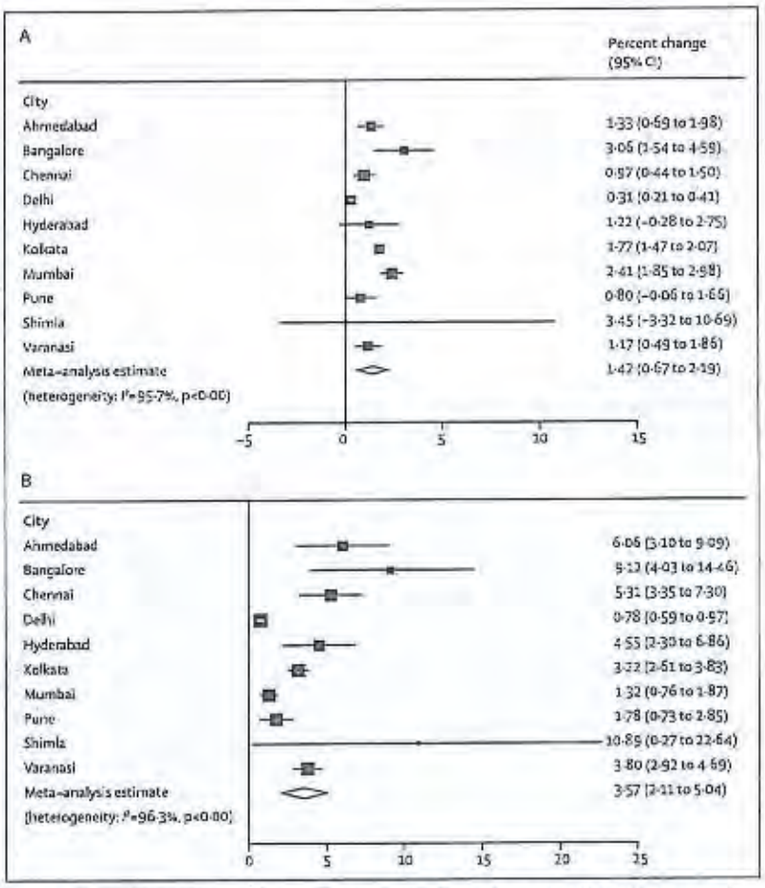



*Figure 2:* City-specific and pooled estimates using conventional time-series analyses (A) and instrumental variables causal analyses (B) of the association between short-term exposure to $PM_{2·5}$ and daily mortality per 10μg /m³

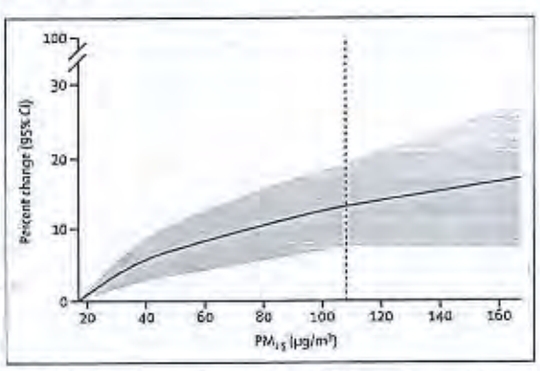



*Figure 3:* Integrated exposure–response curve (2-day moving average) between air pollution and mortality, with 95% CIs
The figure represents the relative risk of air pollution against the minimum air pollution concentration (grey area) at which an effect was observed in our study (17·1 μg/m³). Ideally, this would be assessed at the WHO 24 h ambient $PM_{2·5}$ guideline of 15 μg/m³, but this was not feasible as there were very few days where such concentrations were observed in our dataset. The dashed line shows the 99th percentile.

| | $PM_{2.5}$, mg/m³ mean (SD) | Attributable fraction (95% CI) | Attributable deaths (95% CI) | Attributable deaths per year (95% CI) |
|---|---|---|---|---|
| Ahmedabad | 37·9 (9·7) | 5·6% (2·8–8·1) | 28 680 (13 859–40 632) | 2495 (1230–3588) |
| Bangalore | 33·0 (5·5) | 4·8% (2·2–7·2) | 10 509 (5323–15 652) | 2102 (969–3167) |
| Chennai | 33·7 (9) | 4·9% (2·2–7·3) | 28 674 (12 883–43 266) | 2870 (1329–4298) |
| Delhi | 113·0 (64·5) | 11·5% (5·2–16·4) | 95 715 (45 449–135 217) | 11 964 (5389–16 983) |
| Hyderabad | 38·9 (10·4) | 5·6% (2·8–8·3) | 5552 (2972–8274) | 1597 (805–2363) |
| Kolkata | 55·2 (35·3) | 7·3% (4·0–10·5) | 45 458 (26 227–63 911) | 4678 (2573–6735) |
| Mumbai | 41·7 (18·5) | 5·6% (3·0–8·0) | 30 544 (15 507–43 843) | 5091 (2761–7340) |
| Pune | 45·3 (22·6) | 5·9% (3·3–8·6) | 7169 (3866–10 328) | 1367 (761–1999) |
| Shimla | 28·4 (6·9) | 3·7% (1·9–5·6) | 281 (132–415) | 59 (30–90) |
| Varanasi | 82·1 (35·3) | 10·2% (6·2–14·4) | 8263 (4973–11 517) | 831 (506–1178) |
| Total | 53·6 (39·5) | 7·2% (4·2–10·1) | 260 845 (151 397–367 490) | 33 627 (19 443–47 426) |

Table: Attributable fraction (%) and deaths (N) to daily $PM_{2.5}$ exposure with 95% CIs during the follow-up period, by city

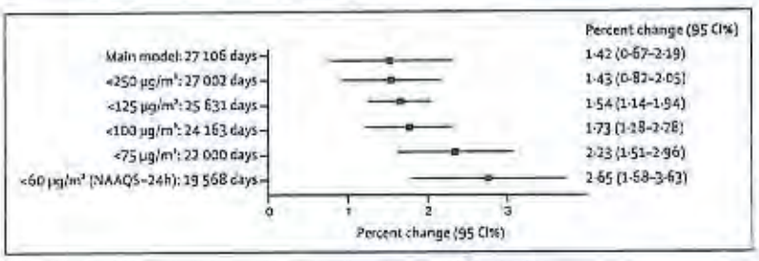



Figure 4: The effect of air pollution on daily mortality at lower thresholds of $PM_{2.5}$
Days with daily $PM_{2.5}$ concentrations above the selected thresholds were excluded. Models were adjusted for a penalised spline smooth function of calendar day with nine degrees of freedom, an indicator of day-of-week, temperature (lag 0–4) and humidity (lag 0–4). The Indian National Ambient Air Quality Standards recommend 24 h average $PM_{2.5}$ concentrations to not exceed 60 µg/m³. The number of days at each threshold of $PM_{2.5}$ per city are added in the appendix (p 4).

mortality. Exposure–response curves generated as part of this study show the risk of mortality escalated rapidly at lower levels of exposure and tapered off at higher levels.

Overall, we found an increase of 1·42% (95% CI 0·67–2·19) in daily mortality associated with each 10 µg/m³ $PM_{2.5}$ exposure. This effect estimate is higher than those reported by previous studies conducted in India[10,12,23] and is higher than a recently published multi-city meta-analysis (499 cities) that reported a pooled estimate of 0·68% increase in daily mortality per 10 µg/m³ increase in $PM_{2.5}$.[15] When compared with regions that experience similar concentrations of $PM_{2.5}$ exposure as India, our estimate remained higher, with a 272-city study in China reporting a 0·22% increase, and an 11-city east Asian study reporting a 0·38% increase in daily mortality per 10 µg/m³ increase in $PM_{2.5}$.[16] However, our effect estimate was lower than some country-specific effect estimates from Greece (2·54%), Japan (1·42%), and Spain (1·96%).[15] Several factors could explain the stronger effects of $PM_{2.5}$ observed in our study, including the differential composition and toxicity of $PM_{2.5}$, varied age structures and susceptibility patterns, and climatological differences. We also found substantial heterogeneity in effect estimates across the cities studied, indicating the need for further research on local $PM_{2.5}$ mortality associations, particularly since different cities have different pollutant source profiles.

Our integrated exposure–response curve showed a plateauing of risk at higher concentrations of $PM_{2.5}$ exposure, similar to other city-specific studies from India and multi-city studies published elsewhere.[11,12,23] For instance, the Chinese study of 272 cities had similar annual concentrations of $PM_{2.5}$, but our exposure–response curve plateaus at higher concentrations of $PM_{2.5}$.[16] In addition, we observed stronger effects in lower polluted areas, such as Shimla and Bangalore, than higher polluted areas such as Delhi. This effect is probably related to the supralinear exposure–response curve, since Shimla and Bangalore had considerably lower concentrations. This sharp increase in risk at lower levels of exposure, which plateaus at higher levels, was reported by other studies in the region and studies in Europe.[12,14,23]

Analysis of the same relationship using an instrumental variable yielded a much higher effect estimate than the conventional time-series analysis. This difference could be due to several factors. First, the instrumental variable might be better at capturing the effect of locally generated air pollution because the instruments (planetary boundary layer height, wind speed, and atmospheric pressure) are directly related to higher contributions to ambient $PM_{2.5}$ from local sources since they cannot be easily dispersed, and since when the boundary layer is low, transported pollution from elsewhere is generally not mixed downwards to the surface. It is likely that given the plurality of local sources observed in most Indian cities (including waste burning, local transport, and diesel generator sets), the air pollution generated from these sources might be more toxic than transported particles. However, this hypothesis requires further study. Second, it is possible that our model using the instrumental variable might capture the effect of other local air pollutants—such as $NO_2$—and not just $PM_{2.5}$. Since our model does not generate estimates of local $NO_2$, we were unable to study the so-called cocktail effect[17] of both pollutants, and we highlight the need for further study of this complex area.

As the first multi-city, time series analysis of short-term exposure to $PM_{2.5}$ and daily mortality in India, our study has several strengths. First, the large dataset comprising approximately 3·6 million deaths provided us with more than adequate statistical power to estimate the observed effects. Second, we developed and used an innovative spatiotemporal exposure model to estimate $PM_{2.5}$ concentrations. This model allowed us to move beyond the use of fixed site monitors and to generate population-weighted exposure metrics for each of the cities we studied. Third, through the use of instrumental variables, we have been able to generate causal estimates for the association between $PM_{2.5}$ and mortality, providing deeper insight on the role of local sources of $PM_{2.5}$ in this relationship.

Our study also had some limitations. First, although we were able to use our spatiotemporal exposure model to

generate 1 km² gridded predictions of $PM_{2.5}$, the exposure metrics used in this study were daily city-level average $PM_{2.5}$. This limitation is likely to have resulted in some non-differential misclassification of exposure, thereby lowering our effect estimates. Second, there is heterogeneity in the strength of death registration across the various states and cities in India, resulting in a proportion of deaths being missed by the civil registration system each year. We expect that these deaths are probably missed at random in relation to daily variations in air pollution concentrations and unlikely to bias our effect estimates.[25,29] Third, we were unable to obtain data for more cities and larger time periods, and on age, sex, and other individual-level effect modifiers, the analysis of which could have yielded information relevant to policy. For instance, analysis of effect modification of the $PM_{2.5}$ mortality relationship in Delhi revealed a larger effect among elderly and male populations.[11] As additional health data and contextual information become increasingly accessible in India, we anticipate that forthcoming studies will have the opportunity to address these limitations. Finally, the minimum $PM_{2.5}$ concentration observed across all cities in our study was 17·1 mg/m³, and this therefore served as the counterfactual for our analyses. Research from other settings has shown considerable health harms observed well below these concentrations, and the high minimum concentrations of $PM_{2.5}$ in our study presents a challenge in understanding these risks locally.[30,31] In the absence of such local data, policy makers must rely on evidence from other settings in defining appropriate health-based thresholds.

The results of our study have direct relevance to policy in several ways. First, India is currently conducting its decadal process of reviewing its national ambient air quality standards (NAAQS). The NAAQS are substantially more relaxed than the WHO guidelines for acceptable exposure for all pollutants (eg 60 µg/m³ *vs* 15 µg/m³ for 24 h $PM_{2.5}$ exposure). This study could serve as a strong addition to the growing local evidence base that the review could include in developing new standards for India. Second, the effect of $PM_{2.5}$ at lower concentrations and the associated steep risk gradient means ambient $PM_{2.5}$ must be reduced substantially from current concentrations to garner concomitant health benefits. Although India launched the National Clean Air Program in 2019, its target of reducing air pollution by 25–30% from 2017 concentrations will fall short in protecting health and preventing possible deaths from exposure to poor air quality. Furthermore, several cities have or are currently formulating Graded Response Action Plans to tackle high exposure events. These action plans kick in at high concentrations of air pollution (often above 150 µg/m³), which, based on our results, would only yield marginal benefits with respect to daily mortality, and negative health effects could continue to accrue even at lower pollution concentrations.[9,32,33] Third, the estimates generated from our instrumental variable analysis have shown the substantial effect of local sources of air pollution, which are numerous in most Indian cities. Action plans to tackle air pollution must therefore direct as much attention to these dispersed sources of air pollution as they do to traditional point or line sources. Finally, the large fraction of deaths attributable to short-term $PM_{2.5}$ exposures across all the cities we studied indicate that the emphasis on policy and action, which has gradually expanded to regions of India besides the Indo-Gangetic Plain, must intensify in coming years.

Short-term $PM_{2.5}$ exposure increased the risk of daily mortality in multiple Indian cities of varying size and location. Our results generally show stronger associations than other studies, and highlighted the more pronounced associations for locally generated $PM_{2.5}$. The plurality of study sites allowed us to extend analysis to lower ambient $PM_{2.5}$ concentrations than previously studied in India, and the results revealed a steep increase in risk well below the current Indian $PM_{2.5}$ standard. Daily deaths attributable to short-term $PM_{2.5}$ exposure over the course of the study period amounted to approximately 30 000 (7·2%) deaths each year in the ten included cities. As efforts to develop and strengthen air pollution action plans at state, district, and city levels continue, the results of this study show the growing need to address dispersed local sources of air pollution in addition to traditional fixed and line sources. This work also provides important insights on harmful health outcomes even at lower pollution concentrations in India and reinforces the message that there is no safe level of exposure to air pollution, even in highly polluted regions.

**Contributors**

JdB contributed to conceptualisation, investigation, methodology, data curation, formal analysis, validation, visualisation, writing the original draft, and review and editing. BK contributed to conceptualisation, investigation, methodology, data curation, validation, writing the original draft, and review and editing. MS contributed to conceptualisation, validation, methodology, and review and editing. TB, HD, AG, and VI contributed to investigation, data curation, and review and editing. SJ contributed to conceptualisation, data curation, and review and editing. IK, KL, AN-S, and GAW contributed to conceptualisation and review and editing. RKM, AST, and YW contributed to investigation, data curation, and review and editing. SM and AR contributed to conceptualisation, investigation, resources, and review and editing. DP contributed to conceptualisation, funding acquisition, and review and editing. JS contributed to conceptualisation, methodology, validation, and review and editing. PP contributed to conceptualisation, methodology, supervision, project administration, funding acquisition, resources, and review and editing. PL contributed to conceptualisation, methodology, supervision, project administration, funding acquisition, resources, writing the original draft, and review and editing.

**Declaration of interests**

PP reports working as a consultant for World Bank for climate change and health outcomes. GAW reports receiving consulting income from the Health Effects Institute and Google. PL has received air travel and hotel accommodation paid by Fondazione Menarini to attend and hold a presentation at the Respirami meeting in Milan. He is the Scientific Secretary of the Swedish Society of Cardiology and co-chair of the European Chapter of International Society of Environmental Epidemiology (both unpaid). He was a paid member of the ethical committee board for the Swedish Ethical Authority 2022–23. All other authors declare no competing interests.

-23-



## Data sharing

All the data in this study are routinely collected and contain no information about specific people. Our data are available upon request to the corresponding author, subject to the agreement of the CHAIR-India steering group.

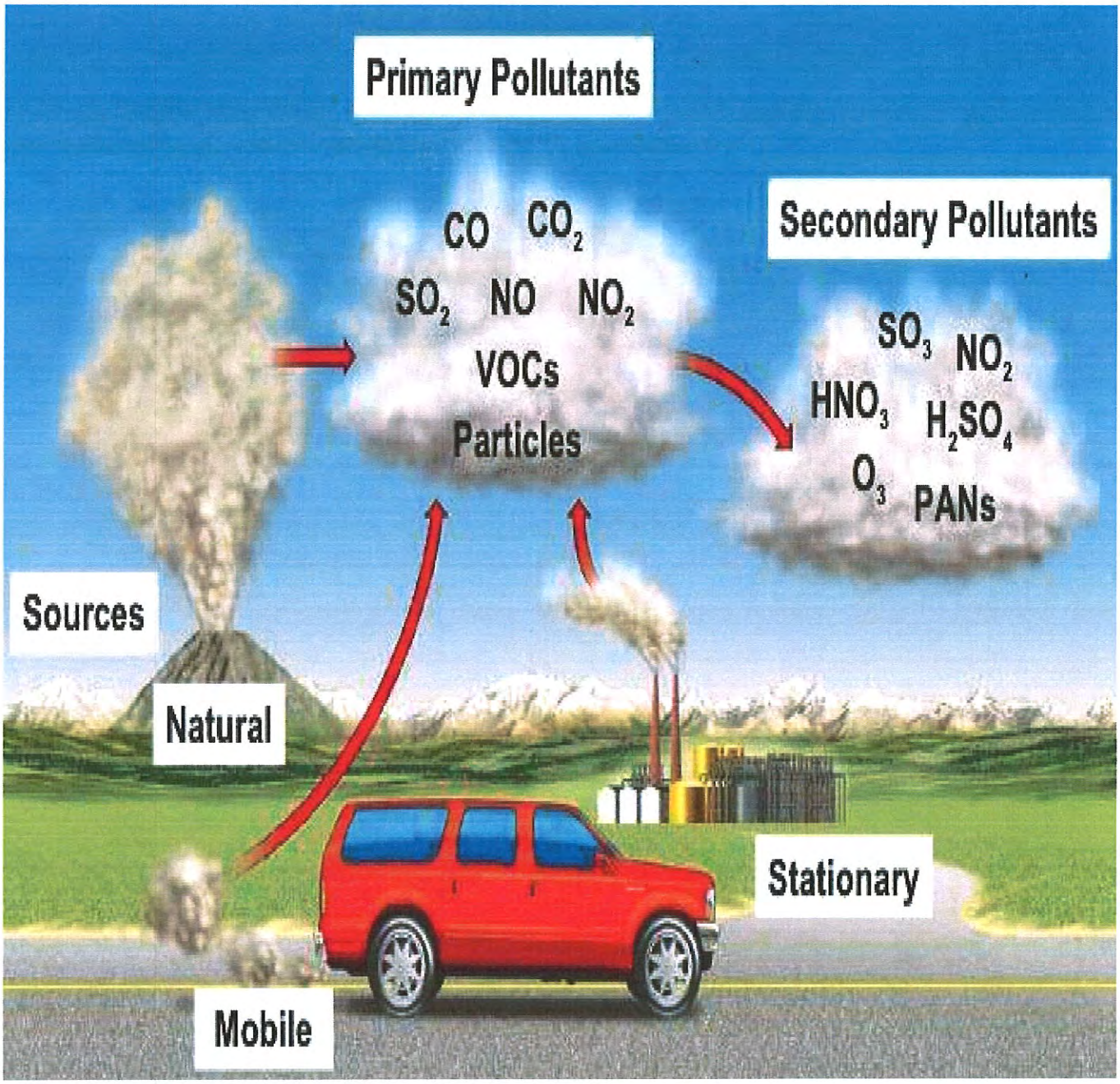
## Acknowledgments

We acknowledge the Swedish Research Council for Sustainable Development (FORMAS; 2020–00446). TB acknowledges financial support from the Climate Change Programme, Department of Science and Technology (DST/CCP/CoE/80/2017-G), and Banaras Hindu University under IoE grant (6031), and Municipal Corporation of Varanasi for providing mortality data. We further thank and acknowledge Pune Municipal Corporation for providing the all-cause mortality data. RKM acknowledges support from the Climate Change Programme, Department of Science and Technology, and the New Delhi to Mahamana Centre of Excellence in Climate Change Research (DST/CCP/CoE/80/2017[G]).

## References

1 Di Q, Dai L, Wang Y, et al. Association of short-term exposure to air pollution with mortality in older adults. *JAMA* 2017; 318: 2446–56.
2 Dehbi H-M, Blangiardo M, Gulliver J, et al. Air pollution and cardiovascular mortality with over 25 years follow-up: a combined analysis of two British cohorts. *Environ Int* 2017; 99: 275–81.
3 Mokoena KK, Ethan CJ, Yu Y, Shale K, Liu F. Ambient air pollution and respiratory mortality in XTan, China: a time-series analysis. *Respir Res* 2019; 20: 139.
4 Hystad P, Larkin A, Rangarajan S, et al. Associations of outdoor fine particulate air pollution and cardiovascular disease in 157436 individuals from 21 high-income, middle-income, and low-income countries (PURE): a prospective cohort study. *Lancet Planet Health* 2020; 4: e235–45.
5 Lin C-K, Chang Y-T, Lee F-S, Chen S-T, Christiani D. Association between exposure to ambient particulate matters and risks of autism spectrum disorder in children: a systematic review and exposure-response meta-analysis. *Environ Res Lett* 2021; 16: 063003.
6 Goyal N, Canning D. The association of in-utero exposure to ambient fine particulate air pollution with low birth weight in India. *Environ Res Lett* 2021; 16: 054034.
7 Dey S, Purohit B, Balyan P, et al. A satellite-based high-resolution (1-km) ambient $PM_{2.5}$ database for India over two decades (2000–2019): applications for air quality management. *Remote Sens (Basel)* 2020; 12: 3872.
8 Mandal S, Rajiva A, Kloog I, et al. Nationwide estimation of daily ambient $PM_{2.5}$ from 2008 to 2020 at 1km² in India using an ensemble approach. *PNAS Nexus* 2024; 3: 088.
9 Guttikunda SK, Dammalapati SK, Pradhan G, Krishna B, Jethva HT, Jawahar P. What is polluting Delhi's air? A review from 1990 to 2022. *Sustainability (Basel)* 2023; 15: 4209.
10 Gandhiok J. $PM_{2.5}$ level improves in Delhi but still twice national average. 2023. https://www.hindustantimes.com/cities/delhi-news/pm25-level-improves-in-delhi-but-still-twice-national-average-101672598174528.html (accessed March 31, 2023).
11 Krishna B, Mandal S, Madhipatla K, Reddy KS, Prabhakaran D, Schwartz JD. Daily nonaccidental mortality associated with short-term $PM_{2.5}$ exposures in Delhi, India. *Environ Epidemiol* 2021; 5: e167.
12 Singh N, Mhawish A, Ghosh S, Banerjee T, Mall RK. Attributing mortality from temperature extremes: a time series analysis in Varanasi, India. *Sci Total Environ* 2019; 665: 453–64.
13 deSouza PN, Dey S, Mwenda KM, Kim R, Subramanian SV, Kinney PL. Robust relationship between ambient air pollution and infant mortality in India. *Sci Total Environ* 2022; 815: 152755.
14 Pandey A, Brauer M, Cropper ML, et al. Health and economic impact of air pollution in the states of India: the Global Burden of Disease Study 2019. *Lancet Planet Health* 2021; 5: e25–38.
15 Liu C, Chen R, Sera F, et al. Ambient particulate air pollution and daily mortality in 652 cities. *N Engl J Med* 2019; 381: 705–15.
16 Chen R, Yin P, Meng X, et al. Fine particulate air pollution and daily mortality. A nationwide analysis in 272 Chinese cities. *Am J Respir Crit Care Med* 2017; 196: 73–81.
17 Romieu I, Gouveia N, Cifuentes LA, et al. Multicity study of air pollution and mortality in Latin America (the ESCALA study). *Res Rep Health Eff Inst* 2012; Oct: 5–86.
18 Samoli E, Analitis A, Touloumi G, et al. Estimating the exposure-response relationships between particulate matter and mortality within the APHEA multicity project. *Environ Health Perspect* 2005; 113: 88–95.
19 Dai L, Zanobetti A, Koutrakis P, Schwartz JD. Associations of fine particulate matter species with mortality in the United States: a multicity time-series analysis. *Environ Health Perspect* 2014; 122: 837–42.
20 Singh N, Mhawish A, Ghosh S, Banerjee T, Mall RK. Attributing mortality from temperature extremes: a time series analysis in Varanasi, India. *Sci Total Environ* 2019; 665: 453–64.
21 Schwartz J, Fong K, Zanobetti A. A national multicity analysis of the causal effect of local pollution, $NO_x$, and $PM_{2.5}$ on mortality. *Environ Health Perspect* 2018; 126: 087004.
22 Schwartz J, Bind M-A, Koutrakis P. Estimating causal effects of local air pollution on daily deaths: effect of low levels. *Environ Health Perspect* 2017; 125: 23–29.
23 Registrar General & Census Commissioner of India. Census of India 2011. 2011. http://www.censusindia.gov.in/ (accessed March 18, 2024).
24 Gasparrini A, Armstrong B, Kenward MG. Multivariate meta-analysis for non-linear and other multi-parameter associations. *Stat Med* 2012; 31: 3821–39.
25 Gasparrini A, Leone M. Attributable risk from distributed lag models. *BMC Med Res Methodol* 2014; 14: 55.
26 Joshi P, Dey S, Ghosh S, Jain S, Sharma SK. Association between acute exposure to $PM_{2.5}$ chemical species and mortality in megacity Delhi, India. *Environ Sci Technol* 2022; 56: 7275–87.
27 Castro A, Künzli N, de Hoogh K, et al. Mortality attributable to ambient fine particulate matter and nitrogen dioxide in Switzerland in 2019: use of two-pollutant effect estimates. *Environ Res* 2023; 231: 116029.
28 Registrar General of India. Vital statistics of India based on the Civil Registration System 2020. 2020. https://crsorgi.gov.in/web/uploads/download/CRS_report_2020.pdf (accessed March 18, 2024).
29 Saikia N, Kumar K, Das B. Death registration coverage 2019–2021, India. *Bull World Health Organ* 2023; 101: 102–10.
30 Brauer M, Brook JR, Christidis T, et al. Mortality-Air Pollution Associations in Low Exposure Environments (MAPLE): phase 2. *Res Rep Health Eff Inst* 2022; 2022: 1–91.
31 Awad YA, Di Q, Wang Y, et al. Change in $PM_{2.5}$ exposure and mortality among Medicare recipients: combining a semi-randomized approach and inverse probability weights in a low exposure population. *Environ Epidemiol* 2019; 3: e054.
32 Krishna B, Dey S. Making health the focus of air pollution policy. 2022. https://www.thehindu.com/opinion/op-ed/making-health-the-focus-of-air-pollution-policy/article66140242.ece (accessed Feb 27, 2023).
33 Krishna B, Ganesan K, Prabhakaran P, Dey S. The bad science choking India. 2022. https://www.theindiaforum.in/article/bad-science-choking-india (accessed March 9, 2022).

# Action Plan for Non Attainment cities/ area (Air Pollution) of Telangana state




**TELANGANA STATE POLLUTION CONTROL BOARD**
Paryavarana Bhavan, A-3, Industrial Estate, Sanath nagar,
Hyderabad – 500018, Phone: 040 – 23887500

Contents:

## ABBREVIATIONS

AAQ - Ambient Air Quality

AAQMS - Ambient Air Quality Monitoring systems

AQMC - Air Quality Monitoring Committee

CAAQMS - Continuous Ambient Air Quality Monitoring Station

CPCB - Central Pollution Control Board

DRI - Desert Research Institute

EPTRI - Environment, Protection Training Research Institute

GHMC - Greater Hyderabad Municipal Corporation

MA&UD - Municipal Administration and Urban Development

NGT - National Green Tribunal

NAMP - National Air Quality Monitoring Programme

NREL - National Renewable Energy Laboratory

NAAQS - National Ambient Air Quality Standards

PM - particulate Matter

SAAQM - State Ambient Air Quality Monitoring Programme

SPCBs - State Pollution Control Boards

SPCC - State Pollution Control Committees

TSPCB - Telangana State Pollution Control Board

USEPA - United States Environmental Protection Agency

**List of Figures and tables:**

## 1. Back ground:

Central Pollution Control Board (CPCB) prepared a list of non-attainment cities/towns based on the Ambient Air Quality (AAQ) data with respect to Particulate Matter Concentration for the years 2011-2015. According to which Telangana state is having three non-attainment cities/towns (Hyderabad, Nalgonda and Patancheruvu). The CPCB issued directions under section 18(I)(b) of Air (prevention and control) Act to the Chairman, TSPCB dated:01.07.2016 with various action points and time frame for implementation to lower the air pollution in the non attainment cities in the country. Also, a 42 point action plan was attached for preparation of the action plan.

Accordingly, TSPCB issued directions to the stakeholder departments i.e. MA&UD, Transport, Police, Civil supplies, Revenue Department, GHMC, etc, for submitting time bound action plan for the action points with respect to their departments. The concerned departments submitted action plan, which are consolidated by TSPCB.

The action points and time frame for implementation for various activities was reviewed by the Chairman, TSPCB with all the stake holder departments on 11.01.2017. In Telangana state 3 non attainment cities / town are listed by CPCB Hyderabad, Patancheruvu and Nalgonda. A common action plan was prepared for the Hyderabad and Patancheruvu as the later falls under GHMC area. The action plan was forwarded to the CPCB on 10.03.2017.

The Hon'ble NGT issued order in OA No.681/2018, dt.8-10-2018 about time bound preparation and implementation of the Action Plan for lowering the ambient air pollution in the non-attainment cities.

The Hon'ble NGT issued the following directions in the above order:

i. All the states and union territories with nonattainment cities must prepare appropriate action plans within two months aimed at bringing the standards of air quality within the prescribed norms within 6 months from date of finalisation of the action plans.

ii. The action plan may be prepared by 6 member committee comprising of Directors of Environment, Transport, Industries, Urban Development Agriculture and Member Secretary, State Pollution Control Board or committee of the concerned state/Union Territory. The committee may be called Air Quality Monitoring Committee (AQMC). The AQMC will function under the overall supervision and coordination of Principal Secretary, Environment of the concerned State/Union Territory. This may be further supervised by the Chief Secretaries concerned or their counterparts in Union Territories by ensuring inter-sectoral coordination.

iii. The action plans may take into account the GRAP, the CAP and the Action Plan prepared by CPCB as well as all other relevant factors. The action plans may be forwarded to the CPCB by 31.12.2018. The same may be placed before the committee as directed in Direction number vi. The Action Plan will include components like identification of source and its apportionment considering sectors like vehicular pollution, industrial pollution shall also consider measures for strengthening of ambient air quality monitoring and steps for public awareness including issuing of advisory to public for prevention and control of air pollution and involvement of schools colleges and other academic Institutions and awareness programs.

iv. The Action Plan will indicate steps to be taken to check different sources of pollution having speedy, definite and specific timelines for execution.

v. The Action plan should be consistent with the carrying capacity assessment of the non-attainment cities in terms of vehicular pollution, Industrial emissions and population density, extent of construction and construction activities etc., The carrying capacity assessment shall also lay emphasis on agricultural and indoor pollution in rural areas. Depending upon assessed carrying capacity and source apportionment, the authorities may consider the need for regulating number of vehicles and their parking and plying, population density, extent of construction and construction activities etc., Guidelines may accordingly be

framed to regulate vehicles and industries in non-attainment cities in terms of carrying capacity assessment and source apportionment.

vi. The committee shall examine the action plans and on the recommendation of the committee the Chairman, CPCB shall approve the same by 31-01-2019.

vii. The Chief Secretaries of the State and Administrators/Advisors to Administrators of the union territories will be personally accountable for failure to formulate action plans, as directed

viii. The CPCBs, SPCBs and State Pollution Control Committees shall develop a public grievance redressal portal for redressal of public complaints on air pollution along with a supervisory mechanism for its disposal in a time bound manner. Any visible air pollution can be reported at such portal by email/SMS.

ix. The CPCB and all the State Pollution Control Boards and Pollution Control Committees shall collectively workout and design a robust Nationwide ambient air quality monitoring programme in a revised format by strengthening the existing monitoring network with respect to coverage of more cities/towns. The scope of monitoring should be expanded to include all 12 notified parameters as per Notification No. B-29016/20/90 /PCI-L dated 18th November 2009 of CPCB. The Continuous Ambient Air Quality Monitoring stations should be preferred in comparison to manual monitoring stations. The CPCB and States shall file a composite Action Plan with timelines for its execution which shall not be more than 3 months. It is expected that all such AAQMS shall be connected to Central server of CPCB for reporting analysis of results in a form of Air Quality Bulletin for general public at regular intervals at least on weekly basis and ambient air quality on continuous basis on e-portal. MOEF&CC will provide the requisite funds for the purpose. MoEF&CC in consultation with Ministry of Housing and Urban Affairs, MoRTH, Ministry of Petroleum and Natural Gas, Ministry of Agriculture Cooperation and Farmers Welfare or any other Ministry to lay down such guidelines as may be considered necessary for improvement of air quality in the country.

x. A copy of this be sent by e-mail to all the concerned i.e., Ministries of Environment Forest & Climate Change, Housing and Urban Affairs.

xi. We understand that some of the Zonal Benches of the National Green Tribunal have also pass directions on the subject of Ambient Air Quality and the states in those Zones are in the process of implementation of search directions. Specific reference may be made in this regard to judgement dated: 11.8.2016 in O.A.No.333/2018/EZ in the matter of Subhas Dutta vs State of West Bengal & Ors. We make it clear that this order shall not be considered as an impediment to those actions but as an addition or supplement thereto for achieving the object of this order at the macro level and of the said order at the micro level in the concerned cities.

xii. Needless to say, that order of National Green Tribunal is binding as a decree of court and non-compliance is actionable by way of punitive action including prosecution, in terms of National Green Tribunal Act, 2010

xiii. The CPCB may compile the data and furnish the same to this tribunal by email at filling.ngt@ gmail.com on or before 15.2.2019.

## 2. Telangana State and Non Attainment cities/areas:

Central Pollution Control Board (CPCB) prepared a list of non-attainment cities/towns based on the Ambient Air Quality (AAQ) data with respect to Particulate Matter Concentration for the years 2011-2015. According to which Telangana state is having three non-attainment cities/towns (Hyderabad, Patancheruvu and Nalgonda).

Telangana is the 29th state of India formed on the 2nd of June 2014, the Telangana state map along with the districts are given in the Figure-1 below. The state has an area of 1,12,077 Sq. Km. and has a population of 3,50,03,674. Hyderabad is the capital city of Telangana.


**Figure.1 Map of Telangana State**

### 3. Constitution of the Air Quality Management Committee(AQMC):

The Government of Telangana through EFS&T G.O.Rt.No.182, dated: 20.11.2018 (**Annexure-I**) constituted the Air Quality Monitoring Committee (AQMC) with the following members.

1. Director General, Environment, Protection Training Research Institute, Hyd. - Member
2. Commissioner / Director of Transport, Hyderabad -Member
3. Commissioner/Director of Industries, Hyd. –Member
4. Commissioner/Director of Municipal Administration and Urban Development, Hyd - Member
5. Commissioner / Director of Agriculture, Hyderabad. -Member
6. Member Secretary, Telangana State Pollution Control Board, Hyd. – Member Convener

The committee is constituted for reviewing and fine tuning of the existing action plan for Air Quality in Hyderabad, Patancheru with latest developments and preparation of action plan for Nalgonda city. The committee has to work under the supervision of the Secretary, Environment.

## 4. Hyderabad and Patancheru:

### a. Demographic Details:

Hyderabad city is on Deccan plateau at an average altitude of 542 metres (1,778 ft), much of Hyderabad is situated on hilly terrain around artificial lakes, including Hussain Sagar and along the River Musi. Hyderabad City covers an area of 650 square kilometres (250 sq mi), has a population of 68,09,970 making it the fourth most populous city in India. There are 35,00,802 male and 33,09,168 female citizens as per the 2011 census. It is anticipated that, the present population may be around 10 million in Hyderabad. The area under the municipality increased from 170 square kilometres (66 sq mi) to 650 square kilometres (250 sq mi) in 2007 when the Greater Hyderabad Municipal Corporation was created. The population density is 18,480 persons per square kilometre. The map of Greater Hyderabad Municipal Corporation(GHMC) area is placed as Figure-2.

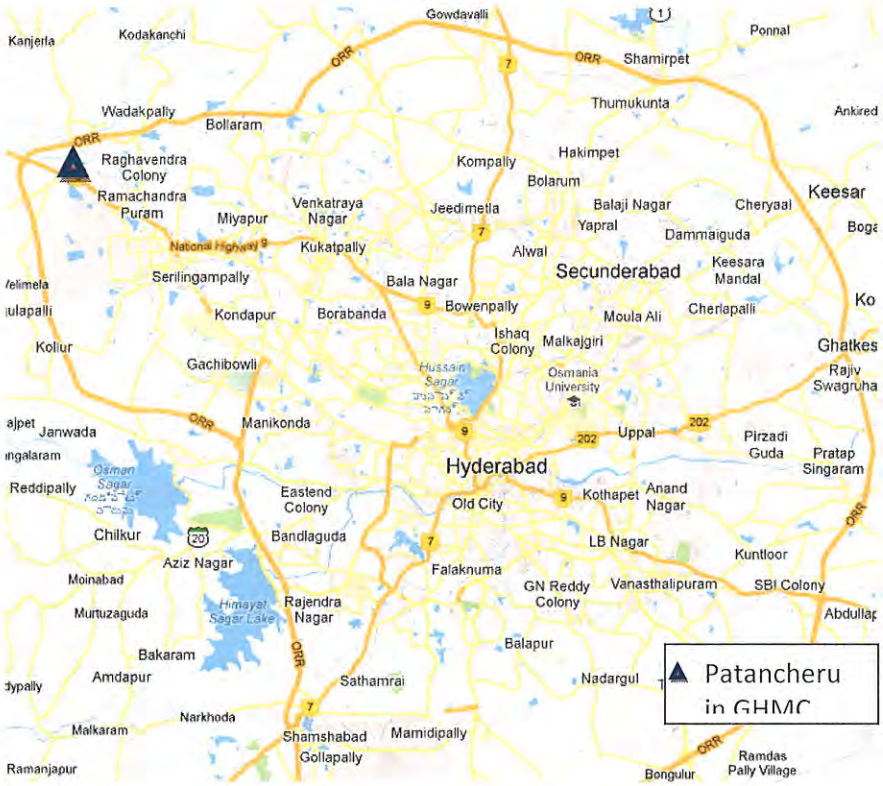



**Figure.2 Map showing the Hyderabad area (GHMC) with Patancheruvu**

The Greater Hyderabad Municipal Corporation (GHMC) comprises the erstwhile Hyderabad Municipal Corporation, plus 10 municipalities & 8 panchayats in erstwhile Ranga Reddy district, 2 municipalities in erstwhile Medak district.

The 10 municipalities in erstwhile Ranga Reddy district are: L. B. Nagar, Gaddi annaram, Uppal Kalan, Malkajgiri, Kapra, Alwal, Qutubullapur, Kukatpally, Serilingampalle and Rajendranagar.

The 8 panchayats in erstwhile Ranga Reddy district are: Shamshabad, Satamarai, Jallapalli, Mamdipalli, Mankhal, Sardanagar and Ravirala.

The 2 municipalities in erstwhile Medak district are: Ramachandrapuram and **Patancheru**

**b. Meteorological Data:**

Hyderabad has a tropical wet and dry climate bordering on a hot semi-arid climate. The annual mean temperature is 26.6 °C (79.9 °F); monthly mean temperatures are 21–33 °C (70–91 °F). Summers (March–June) are hot and humid, maximum temperatures often exceed 40 °C (104 °F) between April and June. The coolest temperatures occur in December and January, when the lowest temperature occasionally dips to 10 °C (50 °F). May is the hottest month, when daily temperatures range from 26 to 39 °C (79–102 °F); December, the coldest, has temperatures varying from 14.5 to 28 °C (57–82 °F). Annual average rainfall is around 700mm.

**c. Economic activity in Hyderabad:**

Hyderabad city is an IT hub hosting several Global Software companies and is known for Pharmaceutical Industries and others. The city has an extensive network of public transport with state owner Road Transport, Multi Modal Transit system, elevated Mono Rail transit system apart from the para-transit system(3 wheeler Autos) and private cabs to cater the needs of different sections of the commuters. The total number of vehicles are around 50 lakhs with about 1000 vehicles being registered on an average per day. The vehicular fleet is dominated by the two wheelers and in the recent years the percentage growth in the passenger car segments is increasing.

The increased economic activity coupled with migration of the population has resulted in an outward expansion of the city making the erstwhile industrial estates an integral part of the city. The details of the Industrial Estates are given in the Figure-3 below:

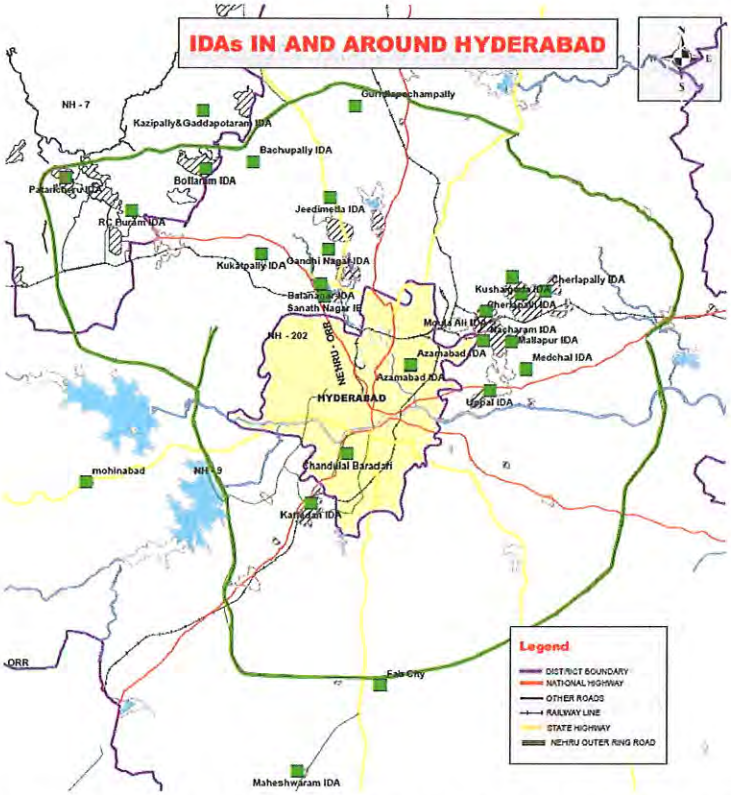



**Figure 3: Map showing the details of Hyderabad with Industrial Estates**

### e. Ambient Air Quality Monitoring Program

The TSPCB has been monitoring ambient Air quality under National Air Quality Monitoring Programme (NAMP), State Ambient Air Quality Monitoring Programme (SAAQM) and Continuous Ambient Air Quality Monitoring Station (CAAQMS)

#### i) National Air Quality Monitoring Programme (NAMP):

The State Board is monitoring ambient air quality at 22 stations situated across the Telangana State under NAMP Programme. The parameters monitored are: $PM_{10}$, $SO_2$, NOx, CO, Ammonia, Heavy metals, etc. Eight out of 22 stations are in the GHMC area

### ii) State Ambient Air Quality Monitoring Programme (SAAQM):

The Telangana Board is also monitoring ambient air quality at 16 stations in addition to NAMP stations. 12 out of the 16 stations are operated in GHMC area.

### iii) Continuous Ambient Air Quality Monitoring Station (CAAQMS):

TSPCB is monitoring Ambient Air Quality at 6 CAAQMS stations (1) Sanathnagar, Head Office (2) HCU (3) Zoo Park (4) Pashamylaram IDA (5) Bollaram IDA and (6) ICRISAT. The CAAQMS has been equipped with analyzers to monitor $NO_2$, $SO_2$, $NH_3$, $PM_{10}$, $PM_{2.5}$, $O_3$, BTX, CO and meteorological parameters. Instant data is generated with these CAAQMS stations and the same is disseminated through CPCB and TSPCB websites.

### iv) Ambient Air Quality Trends

**I.a) PM10:** The trends in Ambient Air Quality with respect to particulate Matter of Size less than 10µm is given in the Figure-4 below:

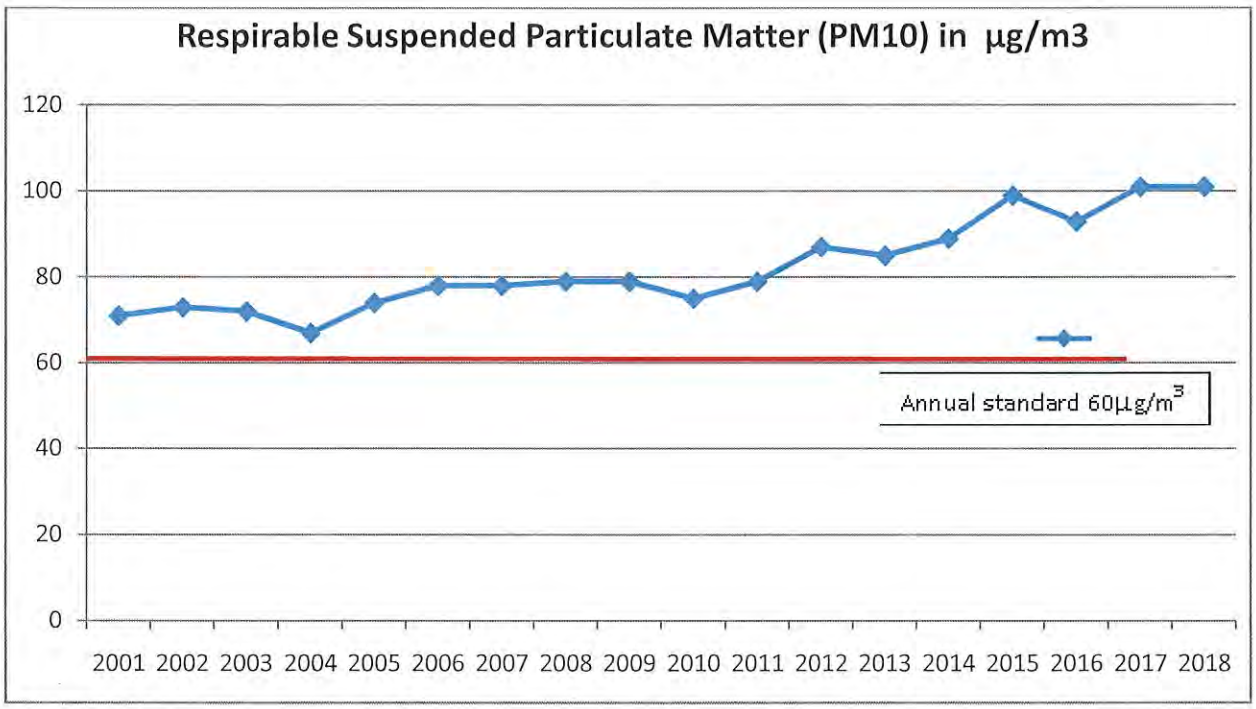



**Figure 4- Ambient Air Quality Trends in Hyderabad from 2001 to 2018 for RSPM**

**I.b) PM2.5:**CPCB has notified the New National Ambient Air Quality Standards(NAAQS) in the year 2009 and the standards for the Particulate Matter of Size PM2.5 was introduced. Accordingly, TSPCB commenced the monitoring of the PM2.5. The trends in Ambient Air Quality with respect to particulate Matter of Size less than 2.5µm is as follows

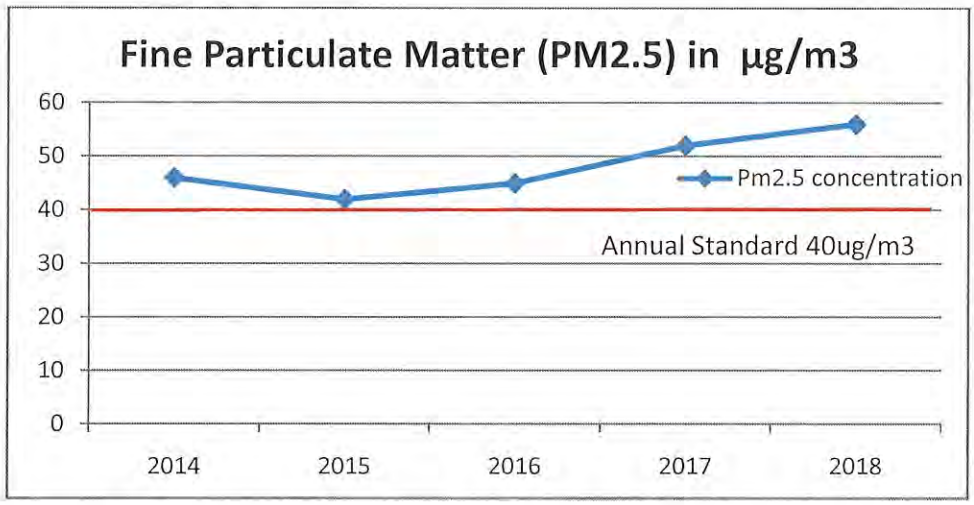



**Figure 5- Ambient Air Quality Trends in Hyderabad from 2014 to 2018 for FPM**

- The Particulate matter concentration of PM10 & PM2.5 is exceeding the annual National Ambient Air Quality Standards.
- As per the trend the concentrations of particulate matter is increasing every year.
- The growth in vehicular population and the number of Vehicle Kilometers Travelled per day is increasing at a higher pace every year.
- The action plan that was implemented could sustain the concentration of particulate matter from 2004 to 2010 inspite of increase in economic activity, Number of Vehicles, Vehicle Kilometers travelled per day and increased fuel combustion. Subsequently from 2011 onwards there is a marginal increase in concentration of particulate matter every year.

**I.c) Air Quality Index:** TSPCB is preparing the air quality index for the Ambient Air Quality. The AQI of CAAQMS is available on the TSPCB website on daily basis and that of the Manual Stations data is available on weekly basis in the website. The AQI of Hyderabad was prepared from the year 2011 onwards to understand the trends of the quality of the air at each of the monitoring location. The details of the AQI is given below in Table-1 and the monthly AQI for the year 2018 is placed in Table -2 understand the seasonal variations in the AQI:

The details of the Air Quality index during the years 2010-2018

| A. | NAMP stations | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Balanagar | 100 | 100 | 118 | 129 | 123 | 103 | 125 | 141 | 123 |
| 2 | Uppal | 89 | 97 | 106 | 90 | 99 | 88 | 96 | 112 | 110 |
| 3 | Jubilee Hills | 52 | 78 | 83 | 72 | 80 | 85 | 103 | 122 | 115 |
| 4 | Paradise | 82 | 99 | 93 | 84 | 113 | 109 | 119 | 115 | 107 |
| 5 | Charminar | 78 | 103 | 107 | 95 | 108 | 109 | 109 | 130 | 113 |
| 6 | Jeedimetla | 97 | 105 | 97 | 92 | 105 | 115 | 113 | 133 | 124 |
| B. | SAMP stations | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| 1 | Abids | 97 | 98 | 99 | 81 | 103 | 92 | 100 | 99 | 102 |
| 2 | KBRN Park | 51 | 57 | 60 | 44 | 58 | 54 | 58 | 69 | 76 |
| 3 | Langar House | 102 | 99 | 103 | 103 | 91 | 151 | 84 | 96 | 100 |
| 4 | Madhapur | 74 | 47 | 82 | 88 | 66 | 50 | 74 | 83 | 92 |
| 5 | MGBS | 72 | 66 | 66 | 79 | 69 | 67 | 75 | 95 | 94 |
| 6 | Chikkadapally | 68 | 87 | 87 | 79 | 84 | 81 | 80 | 82 | 92 |
| 7 | Kukatpally | 90 | 100 | 111 | 125 | 109 | 115 | 86 | 102 | 114 |
| 8 | Nacharam | 85 | 86 | 85 | 74 | 94 | * | 87 | 97 | 102 |
| 9 | Rajendranagar | 38 | 35 | 43 | 42 | 33 | 41 | 67 | 64 | 65 |
| 10 | Sainikpuri | 59 | 72 | 85 | 108 | 92 | 108 | 80 | 87 | 77 |
| 11 | BPPA | 66 | 61 | 72 | 54 | 68 | 64 | 63 | 68 | 74 |
| 12 | Shameerpet | 51 | 59 | 68 | 74 | 79 | 70 | 73 | 73 | 68 |
| C. | CAAQMS Stations | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| 1 | Panjagutta | 106 | 99 | 115 | 113 | 111 | * | * | * | * |
| 2 | University of Hyd | * | * | * | * | 71 | 76 | 87 | 95 | 92 |
| 3 | Zoopark | 61 | 60 | 68 | 73 | 73 | 105 | 131 | 130 | 118 |
| 4 | Sanathnagar | 98 | 115 | 124 | 73 | * | 90 | 97 | 111 | 104 |
| 5 | Pashamylaram | * | * | * | * | | | | 105 | 113 |
| 6 | Bollaram | * | * | * | * | * | * | * | 122 | 109 |
| 7 | ICRISAT | * | * | * | * | * | * | * | 101 | 98 |

AQI Colour Index & Health Effects:

| | |
|---|---|
| GOOD (0 – 50) | Minimal Impact |
| SATISFACTORY (51– 100) | Minor Breathing Discomfort to Sensitive People |
| MODERATE (101 – 200) | Breathing discomfort to with Lung & Heart Disease, children and Old adults |
| POOR (201 – 300 ) | Breathing discomfort to People on Prolonged Exposure |
| VERY POOR (301 – 400 ) | Respiratory Illness to People on Prolonged Exposure |
| SEVERE > 400 | Respiratory Effects on Healthy people |

**Monthly Air Quality Index Values of Hyderabad city from Jan to Dec – 2018**

| Monthly Air Quality Index Values of Hyderabad city from Jan to Dec - 2018 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| **Hyderabad Zone - NAMP Stations** | | | | | | | | | | | | |
| Balanagar | 141 | 129 | 127 | 127 | 121 | 107 | 90 | 97 | 123 | 132 | 136 | 148 |
| Uppal | 141 | 126 | 126 | 112 | 107 | 87 | 85 | 82 | 91 | 107 | 122 | 134 |
| Jubilee Hills | 129 | 124 | 124 | 104 | 116 | 109 | 100 | 101 | 106 | 106 | 135 | 123 |
| Paradise | 130 | 125 | 117 | 106 | 118 | 104 | 83 | 93 | 102 | 96 | 102 | 106 |
| Charminar | 145 | 128 | 117 | 102 | 101 | 106 | 91 | 97 | 111 | 123 | 111 | 129 |
| Jeedimetla | 135 | 141 | 128 | 126 | 126 | 97 | 83 | 105 | 125 | 129 | 154 | 136 |
| **SAAQM stations:** | | | | | | | | | | | | |
| Abids | 126 | 122 | 112 | 99 | 105 | 98 | 90 | 91 | 85 | 100 | 94 | 106 |
| KBRN Park | 100 | 90 | 87 | 77 | 79 | 53 | 53 | 51 | 62 | 78 | 86 | 93 |
| Langahouse | 116 | 128 | 113 | 90 | 97 | 89 | 75 | 84 | 103 | 103 | 100 | 98 |
| Madhapur | 112 | 100 | 105 | 104 | 97 | 72 | 71 | 68 | 84 | 99 | 91 | 105 |
| MGBS | 102 | 107 | 110 | 89 | 83 | 73 | 75 | 86 | 98 | 100 | 100 | 105 |
| Chikkadapally | 99 | 99 | 96 | 99 | 90 | 81 | 76 | 82 | 94 | 95 | 88 | 108 |
| Kukatpally | 144 | 131 | 127 | 120 | 111 | 100 | 83 | 78 | 97 | 125 | 123 | 126 |
| Nacharam | 115 | 106 | 123 | 113 | 114 | 107 | 88 | 84 | 90 | 101 | 91 | 98 |
| Rajedranagar | 61 | 56 | 60 | 55 | 60 | 48 | 46 | 64 | 72 | 86 | 73 | 93 |
| Sainikpuri | 90 | 85 | 68 | 69 | 74 | 74 | 67 | 71 | 78 | 54 | 99 | 90 |
| BPPA | 88 | 78 | 86 | 62 | 74 | 67 | 53 | 60 | 75 | 77 | 74 | 90 |
| Shameerpet | 63 | 75 | 66 | 65 | 57 | 55 | 69 | 68 | 70 | 71 | 83 | 73 |
| **CAAQMS stations:** | | | | | | | | | | | | |
| HCU | 146 | 106 | 107 | 93 | 93 | 56 | 42 | 41 | 73 | 111 | 112 | 129 |
| Sanathnagar | 229 | 125 | 122 | 83 | 69 | 45 | 33 | 33 | 60 | 86 | 163 | 202 |
| Zoopark | 217 | 123 | 115 | 97 | 89 | 50 | 44 | 48 | 94 | 157 | 165 | 216 |
| Pashamylaram | 171 | 105 | 105 | 85 | 86 | 68 | 80 | 100 | 100 | 131 | 156 | 173 |
| Bollaram | 156 | 118 | 129 | 109 | 107 | 80 | 66 | 75 | 93 | 127 | 111 | 136 |
| ICRISAT | 152 | 110 | 109 | 89 | 91 | 54 | 43 | 45 | 75 | 121 | 138 | 151 |

Ambient Air quality with respect to $SO_2$ and NOx reveals that the air quality of Hyderabad is within the prescribed standards (NAAQS) of 50µg/m$^3$ (annual standard for $SO_2$) & 40µg/m$^3$ (annual standard for NOx). With respect to $PM_{10}$ & $PM_{2.5}$, Hyderabad is not meeting the national standard (NAAQS) of 60 µg/m$^3$ & 40 µg/m$^3$ (annual Standard).

Source Apportionment studies indicates that the main contributor of $PM_{10}$ and $PM_{2.5}$ is the vehicular pollution. The Govt. of Telangana has taken measures for traffic management, improved infrastructure like elevated expressway, Outer Ring Road, fly-overs, road widening etc, promoting the use of alternate fuels and implementation of Bharat Stage-IV norms. The metro project is expected to carry 15 lakh passengers easing pressure on road traffic.

f. **Source Apportionment of Air Pollutants:**

TSPCB with the support of USEPA and Technical assistance of National Renewable Energy Lab(NREL) and the Desert Research Institute (DRI) carried out the Source Apportionment study for Hyderabad city in the year 2005-06. As per the study, the major source contributors are given in the Figure-6 below:

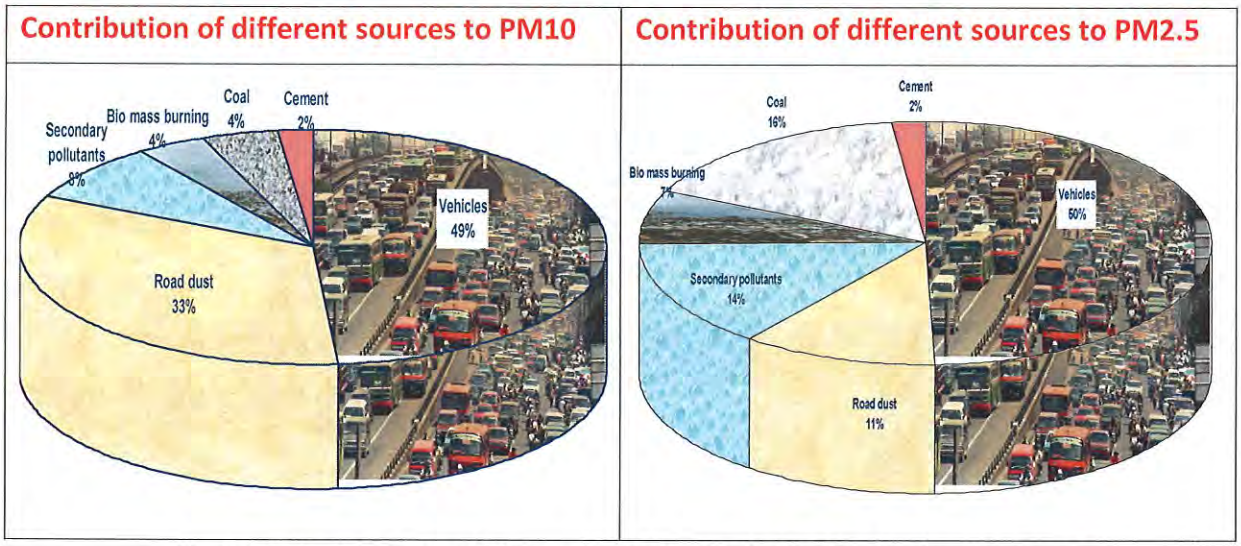



**Figure-6 Source Apportionment study results for the Hyderabad area**

**Major Sources of Air Pollution:**

**Vehicles:** The major source contributing to Particulate Matter air pollution is Vehicles for both the PM10 & PM2.5. On an average about 50% of the air pollution is caused by the Vehicular emissions.

**Road Dust:** The second major contributor for the particulate matter pollution is Road dust in case of the PM10. About 33% of the particulate matter contribution is due to the lofted dust on account of the vehicular movement.

This may be attributed not only to poor maintenance of the road, but also due to the movement of the vehicles on the unpaved shoulders leaving the carriage way where the roads are not paved.

The re-entrained particles entering into the air is also due to the construction and demolition activity and related material handling .

The Road dust contribution to the PM2.5 is about 11%.

**Coal:** The contribution of the coal due to combustion of the coal for industrial usage is one of the source of air pollution for the particulate matter. The contribution of which is higher in case of PM2.5 when compared to PM10. Most of the industries have turned to cleaner fuels.

**Bio Mass Burning:** Open burning of the biomass and also in Industrial boilers is one of the source of the particulate matter.

Secondary Pollutants: The secondary pollutants due to various chemical reactions in the atmosphere lead to formation of the particulate matter.

Cement: The construction activity to cater the housing, infrastructure requirements are contributing to the particulate matter contribution.

**Patancheru:** It is a part of the GHMC administration. The AAQ data of patancheru is presented below in the Figure-7 from the period 2011-2018. The graph indicate a peak period followed by decreasing trend in the concentration of the particulate matter with the improvement of the road conditions.

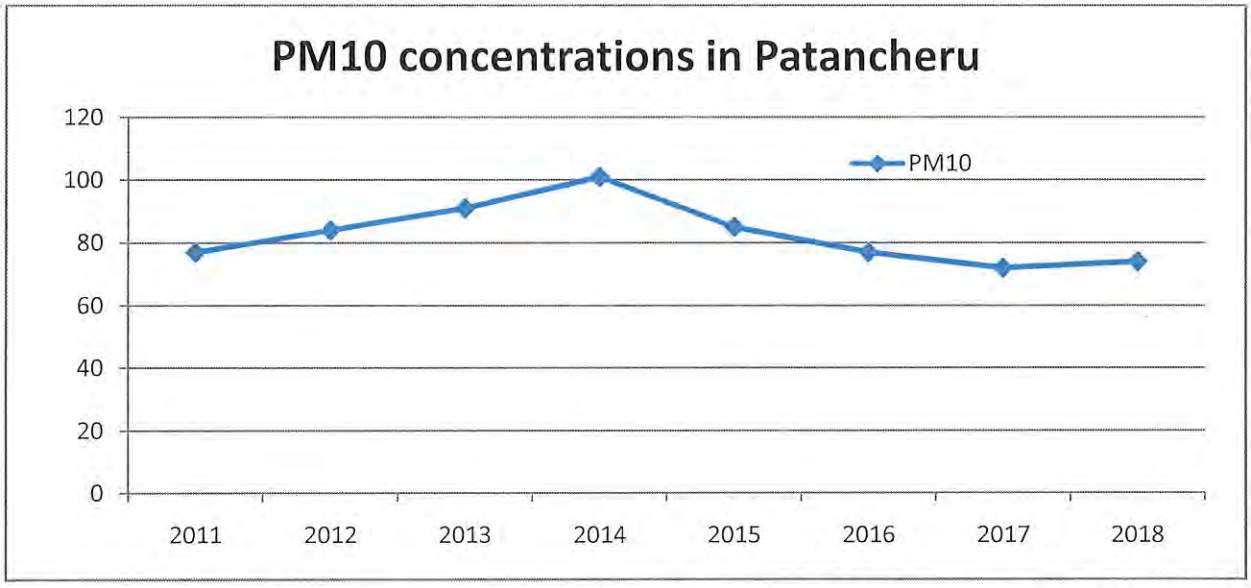



**Figure-7: RSPM concentrations of Patancheru(part of GHMC) from 2011 to 2018**

The PM2.5 is being monitored in Patancheru area from 2016 onwards the annual average concentrations are given in the Figure-8 below

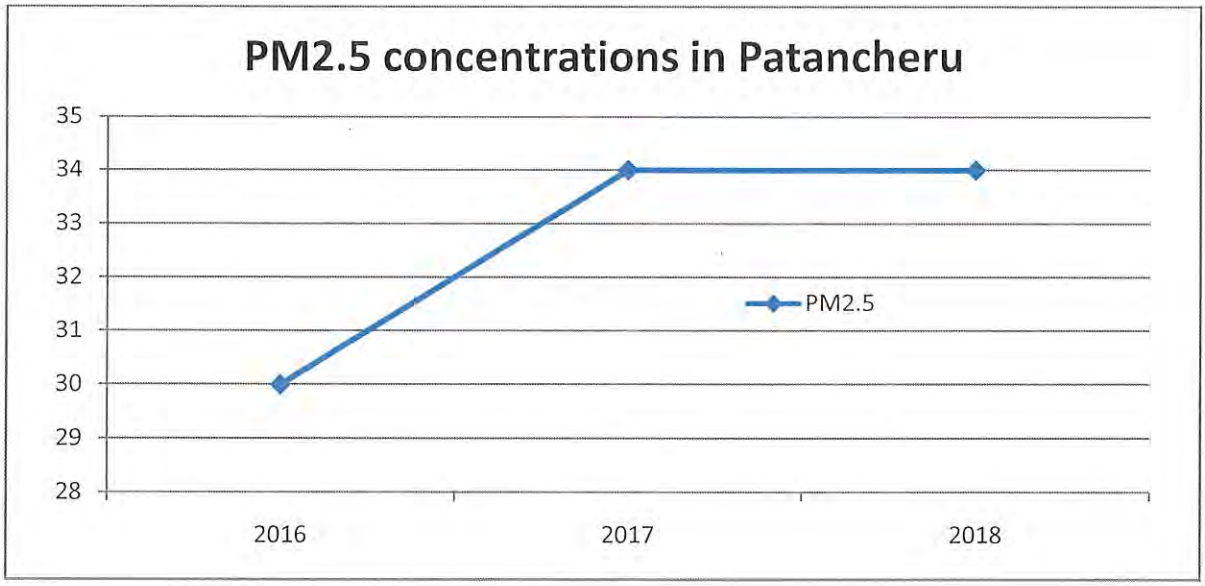



**Figure-8: FPM concentrations of Patancheru(part of GHMC) from 2016 to 2018**

The PM2.5 concentrations are within the limits and PM10 concentrations are marginally higher than the standards.

**5. Action Plan for reducing the air pollution:**

The AQMC during the meeting held on 5th March, 2019 has revised the action plan duly considering the key components given in the comments of CPCB. The Committee on perusal of the National Clean Air Program has recommended to adopt the tentative National level target of 20%–30% reduction of PM2.5 and PM10 concentration by 2024 keeping 2017 as base year for Hyderabad and Patancheru.

The approved revised action plan for Hyderabad and Patancheru (Patancheru is a part of the Greater Hyderabad Municipal Corporation) is as follows.

**REVISED ACTION PLAN FOR CONTROL OF AIR POLLUTION BY ALL THE STAKE HOLDER DEPARTMENTS IN HYDERABAD, TELANGANA STATE (PATANCHERUVU IS PART OF GHMC)**

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| A. Vehicle Emission Control | i) | Launch extensive drive against polluting vehicles for ensuring strict compliance | Short | continue as regular activity. | **Transport & Traffic** | • Special drives are being conducted at regular intervals and in the year 2018 7225 cases against polluting vehicles under relevant sections of MV Act were booked.<br>• Vigorous enforcement measures are taken on prevention of overloading in goods carriages. During the period April, 2018 to 18th February, 2019- 4400 numbers of cases are booked against overloading in goods carriages.<br>• The transport department authorised pollution testing centres are computerised for scientific testing of vehicular emission and issue of PUC certificates.<br>• Valid PUC certificates are made mandatory at the time of every vehicle transaction at RTA offices. | **As a part of the department activity** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | ii) | Launch public awareness campaign for air pollution control, vehicle maintenance, minimizing use of personal vehicles, lane discipline, etc. | Short | Continuous activity at regular intervals | **Transport Traffic TSPCB, GHMC & HMRL** | • Awareness Programmes is a continuous process in different departments. The details of the awareness programs taken and ongoing are:<br>• Awareness programmes are conducted at 572 locations in entire Cyberabad Commissionerate from January to December, 2018.<br>• TSPCB is also promoting public awareness by conducting workshops, awareness campaigns at regular intervals on all important environmental related occasions through print, electronic media and through Short messages to the mobile users<br>• TSPCB procured vehicles with electronic media in order to promote awareness among educational institutions by displaying short video clips and models.<br>• Telangana National Green Corps (NGC) is actively involved in promoting environmental awareness among the students by conducting various year long programs in educational institutions | **As a part of the department activity from the budget of the respective departments** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | • Greater Hyderabad Municipal Corporation (GHMC) & Hyderabad Metro Rail Limited (HMRL) are promoting the usage of public transport instead of personal vehicles.<br>• Strict enforcement and awareness programmes on vehicle pollution control are being taken by Transport and traffic police. | |
| | iii) | Prevent parking of vehicles in the non-designated areas | Short | continue as regular activity. | **Traffic police** | 9032 cases on petrol, 1063 cases on diesel and 55 cases against CNG vehicles were booked up to Jun., 2018.<br><br>The commuters are educated not to put their vehicles haphazardly on the roads and also not to disturb free flow of traffic.<br><br>**Developing of parking facilities:** In order to augment parking facilities Multi Level Parking facilities are proposed.<br><br>The process of inviting Request for Proposal (RfP) for Multi Level Parking (MLP)Complexes is initiated by HMRL. | **Parking facilities On DBFOT basis in PPP mode** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | About 20 sites belonging to HMRL, TSIIC, GHMC & HMDA are identified for Integrated Parking Plan and Development of Automated Multi Level Parking (MLP) Complexes at various locations in Hyderabad on DBFOT basis in PPP mode with usage of latest MLP technology in order to ease the congestion on the roads and facilitate personal feeder services for the last mile connectivity.<br><br>The draft RFP document will be submitted to the Government in the next couple of weeks.<br><br>Further, Govt. has issued order for providing free parking at all commercial establishments | |
| | iv) | Initiate steps for retrofitting of particulate filters in diesel vehicles, when BS-VI fuels are available | Long | Action plan as per the availability of BS-VI fuels | **Transport and TSRTC** | As GoI has taken a decision to implement BS-VI. The actions and adoption will be initiated with the introduction of the BS-VI fuels in Hyderabad. | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | v) | Prepare action plan to check fuel adulteration and random monitoring of fuel quality data. | Short | 30 days and continue as regular activity | **Civil Supplies department** | (a) Constituted Task Force to check adulteration of petrol, diesel, oils and lubricants.<br>(b) Joint teams comprising officials of civil supplies, Revenue, Legal Metrology and officers of oil companies have inspected 25 petrol bunks to check fuel adulteration.<br>(c) Detailed inspections conducted by special teams at 5 petrol bunks<br>(d) One case is booked in fuel adulteration<br>(e) Mobile testing labs have been introduced.<br>(f) Prepared an action plan for public transport on CNG mode by installing 21 nos. of CNG stations and additional 12nos. are under proposal.<br>(g) Implementation of vapour recovery system in fuel refilling stations at retail outlets are under progress and will be completed in 3 years. | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | vi) | Prepare plan for widening of road and improvement of infrastructure for decongestion of road. | Long | Tentatively two years at some of the places where the works are yet to be grounded the land acquisition is under process | **GHMC & HMDA** | It was planned to widen 117 identified roads (150.39KM) & junctions in the GHMC limits and another 54 roads (under different authorities) are also in the process of widening. The acquisition of the properties for the same is under process.<br><br>GHMC for improvement of Arterial Routes for decongestion has evolved a **Strategic Road Development Plan (SRDP)** with an outlay of Rs.27,000 Cr. in different Phases.<br><br>SRDP comprises of<br>1. Skyways – 7no. 135 km.<br>2. Major Corridors – 11 no. 166 km<br>3. Major Roads – 68 no. 348 km.<br>4. Others Roads 1,400 km.<br>5. Grade Separators 54 no.<br><br>On implementation it results in perceivable relief to the present traffic problems there by reduce the air pollution and cater to the future traffic needs in Hyderabad and also provides<br>• Conflict free Road Network | **Budget approved and the GHMC/HMDA is already implementing the works as detailed Strategic Road Development** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | • Minimizes the travel time<br>• Increases the average journey speeds from 15 kmph to 35 kmph<br>• Reduces the air pollution levels by minimizing the fuel consumption and decrease the stopped delay.<br><br>**Works Completed:**<br>1.Chintalakunta Check post junction<br>2.Kamineni Hospital junction :LHS Flyover<br>3.Ayyappa Society Junction<br>4.Mind space: Underpass &Flyover<br><br>**Works in Progress:**<br>5. Elevated Corridor along Road No.45 , Jubilee hills to Durgam Cheruvu -- Rs.150.00 Cr<br>6. LB Nagar Junction<br>7. Bairamalaguda Junction<br>8. Kamineni Hospital junction(RHS Flyover) & Nagole Junction<br>9.Biodiversity park Junction<br>10.Rajiv Gandhi Statue Junction<br>11.Bahadurpura -- Rs.69.00 Cr | **Plan (SRDP) with an outlay of Rs.27,000 Cr. in different Phases as detailed.** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | 12. Owaisi Hospital -- Rs.63.00 Cr<br>13.Cable Stayed Bridge across Durgam Cheruvu -- Rs.184.00 Cr<br>14. Narsapur X Roads : Taken up by HMDA -- Rs.387.00 Cr<br>15. Amberpet 6 No. X roads flyover ()– Under progress by R&B (NH) -- Rs.270.00 Cr.<br>16. Construction of 6 lane two way flyover crossing 7 Tombs (Shaikpet), Film Nagar road Jn., O.U Colony Jn, and Whisper Valley Jn -- Rs.333.55 Cr<br>17.Construction of Multi Level flyovers / Grade Separators at Botanical Garden, Kothaguda and Kondapur Junctions -- Rs.263.09 Cr<br>**Note:**<br>1) Cost of works at SlNo.1,2,6,7,8 Rs.448.00 Cr in one Package.<br>2) Cost of works at SlNo.3,4,9 & 10- Rs.379.00 Cr. in one Package.<br>**Works to be Grounded:**<br>1.Rethibowli and Nanalnagar Jn.- Rs.175.00 Cr.<br>2. Shilpa layout, Gachibowli via gas | |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Company to Gachibowli junction -- Rs.330.00 Cr.<br>3. Aramgarh – Bahadurpura – Muslim jung Bridge--Rs.636.60Cr<br>4. Extension of Chandrayangutta Flyover-Rs.37.00 Cr<br>5.Rehabilitation and upgradation of Hyderabad outer ring road to Medak Section of NH-765D from km.15/970 to km.78/700 to two lane with paved shoulder/four lane – Rs 426.52 Cr<br>6. Six laning from km.9/900 to 19/948 (Aramgarh-shamshabad section) of Hyderabad-Bengaluru Section of NH-44 -- Rs 283.15 Cr<br>7. Construction of six lane Elevated Corridor from (Uppal) to (CPRI) of NH-163 to De-Congest the Urban Limits of Hyderabad-Bhopalpatnam Section -- Rs 626.76 Cr | |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Infrastructure facilities by developing Two logistic parks as regional hubs as an integrated one stop facility, freight operators, third party logistic operators, cargo handling companies on PPP mode at two locations (batasingaram-40acres and mangalpally-22acres) to reduce the congestion in the city are under development and about to commission in two months. | on PPP mode at two locations |
| | | | | | | Six bus terminals (Inter City Bus Terminals) are also proposed under PPP mode at Miyapur, pedda amberpet, shamshabad, patancheruvu and Manoharabad to ease the traffic congestion. | on PPP mode |
| | vii) | Prepare plan for construction of express ways/ by-passes to avoid congestion due to non – destined vehicles. | Long | 2 Years, , some works are completed, some are in progress and others yet to be grounded the land acquisition is | GHMC & HMDA | Government to ease the traffic load has developed an Outer Ring Road from the existing outer ring road with 8 lanes of 158 KM with 19 access points. To improve the connectivity between inner ring road and outer ring road 33 radial roads development was taken up<br>5 radial roads with 83.35KM is already widened connecting the North & west part | Budget approved and the GHMC/HMDA is already impleme |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | under process | | of IRR with ORR<br>7 radial roads of 53.72km have been completed to connect west and south sectors of IRR with ORR.<br>5 Radial roads of 54.43 KM connecting North and West sectors of ORR with IRR with the loan assistance of the Japanese International Co-operation agency have been taken up.<br>Remaining 16 radial roads development is transferred to R&B department for a length of 185km. | nting the works as detailed |
| | viii) | Steps for promoting battery operated / electric vehicles | Long | 180 days | **Transport** | The State Government have issued notification for exemption from payment of tax in respect of motor vehicles operated with battery / compressed natural gas / solar energy for a period of five years from the date of registration of such vehicles.<br>GoT is developing the E-vehicle policy to promote the same. The draft policy is released for comments. The road map is also proposed.<br>Under Faster adoption of electric mobility vehicle by the Central Government, | E-Buses O&M part to be borne by |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Telangana is allotted with 100 E-vehicles in two phases. 40 vehicles are received under first phase and commenced. Another 60 E-buses will be procured under phase-II later in this year. | **TSRTC** |
| | ix) | Synchronizing traffic movements / introduce intelligent traffic systems for lane driving. | Short | Already installed and to continue the activity | **Traffic police** | Hyderabad traffic integrated management system (HTRIMS) is installed with 66.5 Crs. for centralised monitoring system. Some features are:<br>1. Automated and centrally controlled, for 330 signal junctions up to June 2018.<br>2. Vehicle Actuated Technology (VAC).<br>3. ATC (Area Traffic Control) with Synchronized signal and corridor management.<br>4. Cameras to monitor the traffic congestions, density on each road.<br>5. Fall back Connectivity, Full backup power management, **Green energy initiative** (Solar power backup).<br>6. Variable Message Sign boards (VMS) across the city for traffic alerts @ 20 places.<br>7. Synchronization of corridors. | **Already established no additional requirement only implementation** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | 8. Signalling services around the clock, traffic command centres, traffic information online in the portal are special features. It is working from Aug., 2012. | |
| | x) | Installation of remote sensor based PUC system, regular calibration of the checking instruments and online integration of the vehicle details with PUC | Long | 180 days | **Transport** | All the PUC testing centres are computerized. Tenders have been finalised for identification of the service provider for online PUC integration of the certificates across the state.<br>It is mandatory that the Pollution testing stations have to get their instrument calibrated at regular intervals | **Nil** |
| | xi) | Promotion of Alternate Fuels –<br>Conversion of the Public Transport buses and educational institute buses and commercial taxis | Long | Under implementation and to continue | **Transport** | Bio-Diesel with 10% (B10) is being used in 35 depot and it is planned to extend to another 47 depots.<br>CNG buses in Hyderabad: TSRTC is operating 130 nos., Stage carriages-129, goods carriage -88, educational institute buses- 74, contract carriage-11.<br>All the 3 wheeler Autos-83,585 operate on LPG/CNG/Bifuel.<br>Motor cars that run on LPG/CNG/Bifuel are | **TSRTC has got funds under JNNURM for procurement of the buses** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | 48, 867<br>Motor cabs that run on LPG/CNG/Bifuel are -1285 | |
| | xii) | Disincentivising the growth of Vehicles | Short | Under implementation and to continue | **Transport** | Government issued G.O disincentivising the purchase of second vehicle by way of 2% additional tax | **Nil** |
| | xiii) | Restriction on plying of 15 years old vehicles | Short | Under implementation and to continue | **Transport and Traffic** | The Govt. issued G.O. Ms.No.124, dated: 07.10.1999 no four wheel and above vehicles more than 15 years old, unless scientifically tested and certified by competent authority shall be renewed of fitness certificate in the HUDA<br>3 wheeler vehicles which have covered 15 years shall not ply within the HUDA | **Nil** |
| | xvi) | Strengthening of the public transport<br>-Increasing awareness on usage of public transport available –MRTS, MMTS, City buses | Long | Under implementation and to continue | **GHMC HMRL & TSRTC** | **Multi Modal Transport System (MMTS),** jointly developed by State Government and Ministry of Railways, has been implemented, by making use of the augmented capacity of existing railway lines covering 43 Kms. The no. of services have been increased from 87 to 92 and some of the peak time service capacity is augmented by converting 6 car rake in to 9 | **MMTS-Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | car rakes.<br><br>**(ii) Hyderabad Metro Rail Project:** As part of the strengthening of the public transport system, the state government has taken up the Hyderabad Metro Rail Project to provide an efficient, safe, reliable and affordable public transportation system in Hyderabad, The Government has undertaken development of Metro Rail (MRTS) projects in 3 high density traffic corridors (71.16 kms) on BOT basis in PPP (Public Private Partnership) mode are being taken up in phase-I i.e.,<br>• Miyapur – L.B.Nagar: (28.87 kms - 27 Stns)<br>• Jubilee Bus Station – Falaknuma : (14.78 kms - 16 Stns)<br>• Nagole – Shilparamam: (27.51kms - 23 Stns)<br><br>The First line from Nagole to Ameerpet to Miyapur commenced from November, 2017 and that of the Miyapur to LB Nagar | **MRTS-PPP mode BOT** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | in September, 2018. The Nagole to Shilparamam is due for commencement and expected to operationalise within one months. The traffic congestion on these roads is decreased and thereby anticipated reduced pollution levels<br>(iii) **Telangana State Road Transport Corporation(TSRTC)** is operating 3800 city buses in the city covering 2.89 crore KMs per month.<br><br>Greater Hyderabad Municipal Corporation (GHMC) & Hyderabad Metro Rail Limited (HMRL) are promoting the usage of public transport instead of personal vehicles. | |
| | | | | | | | |
| **B).Re- suspension of road dust and other fugitive emissions** | i) | Prepare plan for creation of green buffers along the traffic corridors | Mid | Continue as regular activity | **GHMC & HMDA** | • During 2016-17, GHMC had successfully taken up 84.91 Lakhs plantations including free distribution of plants to public under homestead plantation in Governments flagship program Haritha Haram. Out of which 2.11 Lakhs planting are done in Open spaces, Institutions, Grave Yards, Avenue Plantation, Lakes | **Part of Governments flagship program Haritha Haram (green** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | etc., and protecting them through contract system and their survival is 91%.<br>• During 2017-18 a target of 76 Lakhs has been achieved, including planting and homestead plants distribution to the households, as per their preferred species under TKHH. Out of which GHMC has planted 3.53 Lakhs in Institutions Open Spaces, Lakes, Green Ways, Green Curtains and protecting them through contract system and the Survival having 93%.<br>• During the year 2018-19 a target of 43.13 Lakhs has been achieved including planting and homestead plants distribution to the households, as per their preferred species under TKHH. Out of which GHMC has planted 4.58 Lakhs (in Avenue Plantations, Central Medians, Institutions, Open Spaces, Lakes, Green Ways, Green Curtains) and protecting them through contract system and the | garland) |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Survival having 95.87%.<br>• GHMC have proposed 40 lakhs plants to take-up Avenue Plantation through the Government and non-government organizations including homestead plantations. All are to be completed within 9 months. | |
| | ii) | Maintain pot holes free roads for free-flow of traffic | Short | Continue as regular activity | **GHMC & HMDA** | Pot holes are being filled on machine mode<br>• **2016-17:** 90,466 pot holes are repaired.<br>• **2017-18:** 58,222 potholes are repaired<br>  • 120 nos. instant repair teams were involved in filling the potholes.<br>  • 140 no. of Monsoon Emergency Teams and 55 no. of Static labour teams also taken up pothole filling on non-rainy days.<br>• **2018-19:** from 01.07.2018 to till date 36530 No. of pot holes have been filled up.<br>  • 79 nos Instant repair teams are involved in filling the potholes.<br>  • 173 no. of Monsoon Emergency Teams have also take up pothole | **As a part of the departmental activity from the Budget of GHMC & HMDA** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | filling on non-rainy days.<br>The same is being continued as regular activity and is monitored by Commissioner, GHMC. | |
| | iii) | Introduce water fountains at major traffic intersection, wherever feasible | Mid | Continuing activity | **GHMC & HMDA** | • There are 48 fountains existing.<br>• In addition to the above during the year 18-19, two fountains are developed at lakdikapool junction and Nalgonda X road. | **Nil** |
| | iv) | Greening of open areas, gardens, community places, schools and housing societies. | Mid term | Continuing activity | **GHMC & HMDA** | The greenery work in the open spaces, grave yards, gardens and also plants have been distributed among Government and NGOs under Haritha Haram programme.<br>• Greenery of open areas / parks are existing 1195 nos.<br>• Traffic islands and central medians, greenways and green curtains existing 179 no's are maintaining and 41 Vertical gardens are developed and maintaining.<br>• 56 no's colony parks, Central medians and green curtains 5 nos are proposed to be completed within 9 months. | **As a part of the departmental activity from the Budget of GHMC & HMDA** |
| | v) | Blacktopping of metalled roads, including pavement | Long | Continuing activity | **GHMC & HMDA** | • During the year 2016-17, there were 418 No. of BT roads works taken up | **Budget approved** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | of road shoulders. | | | | amounting to Rs. 65.95 Crs.<br>• During the year 2017-18 GHMC has taken up 1364 no of roads works amounting to Rs. 220.17 Crs.<br>• In the year 2018-19 GHMC has taken up 52 No. of packages of BT roads amounting to 381.36 Crs which are in progress. In addition to this 1015 no of road works are taken up with an estimated cost of Rs. 142.24 Cr.<br>• GHMC has developed 24.7KMs length of Foot paths from the year April, 2018 onwards. | and the GHMC/HMDA is already impleme nting the works as detailed |
| | vi) | Regular cleaning of the roads with mechanised sweepers and removing the silt from the roads | Short | Regular Activity | **GHMC & HMDA** | GHMC is implementing mechanised and Manual sweeping of the road on daily basis | **Departmental activity** |
| | | | | | | | |
| **(C). Control of emissions from biomass /open** | i) | Launch extensive drive against open burning of bio-mass, crop residue, garbage, leaves etc., | Short | Within 90 days continue as regular activity. | **GHMC** | The EFS&T Department vide G.O.Ms.No. 27 dt. 10.07.2017 issued Notification prohibiting open burning of waste and utilization of RDF as fuel in power generation and cement plants.<br>GHMC in 2017-18 booked 341 cases and Rs | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | 2.08 lakhs penalties were levied and in the year 2018-19 up to September 190 cases with about 0.92 lakhs of penalties were levied. | |
| | ii) | Regular check and control of burning of municipal solid wastes. | Short | Within 90 days continue as regular activity. | **GHMC** | Special drives conducted regularly and daily monitoring by the field staff in Sanitary section i.e Sanitary Supervisors, Sanitary Jawans and Sanitary field Assistants. | **Nil** |
| | iii) | Proper collection of horticulture waste (bio-mass) and its disposal following composting – cum-gardening approach. | Mid | Within 90 days continue as regular activity. | **GHMC & Agriculture** | In all parks composting pits were provided for collecting the horticulture waste. The compost generated from such pits utilized within the parks itself.<br>It is proposed to produce 10 tons of compost per day at Chandulal Bowli Park by utilising available Horticulture waste. | **Nil** |
| | iv) | Ensure ban on burning of agriculture waste and crop residues and its implementation. | Long | 180 days continue as regular activity. | **Agriculture** | Burning of the agriculture waste is not a common practice in the state. The Agriculture department will issue a notification for Ban on burning of agriculture waste and crop residues with implementation mechanism. | **Nil** |
| | | | | | | | |
| D . 9 | i) | Identification of brick kilns | Mid | 60 days | **TSPCB &** | The Govt. of Andhra Pradesh has issued | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | and their regular monitoring, including use of designated fuel, and closure of un-authorised unit | | | **Revenue** | guidelines vide GO Ms.No.80, dt:22.04.2010 and the Revenue authorities i.e., Collector, District Magistrate / RDO – Tahsildar are taking action against defaulting units under provisions of Cr.P.C. The District Collectors are monitoring the implementation of guidelines. | |
| | ii) | Conversion of natural draft brick kilns to induced draft | Long | 120 days | **TSPCB** | TSPCB based on the guidelines issued by CPCB has directed the field Officers to conduct an inventory of Brick kilns, as most of them are in unorganized sector.<br>Based on the inventory of the Brick kilns an action plan will be prepared duly considering the size of the Brick kilns, the economic feasibility of placing induced draft and alternate fuels | **Nil** |
| | iii) | Action against non-complying industrial units | Short | continue as regular activity. | **TSPCB** | TSPCB is taking regular action on all non-complying industries.<br><br>Online monitoring systems are installed by the air polluting industries and are connected to the server of CPCB.<br><br>TSPCB is carrying out regular monitoring of | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | the industries, also night patrolling of the Industrial Estates, computerised inspection are being carried out. The non-complying units are reviewed and directions are being issued for compliance which range from imposing the Bank Guarantee for implementing the actions recommended by the Task force committee, stop production and closure. | |
| | iv) | Shifting of polluting industries | Long | | **Industry department, TSIIC & TSPCB** | G.O.MS.No.20 dated:01-03-2013: Government has taken a decision to shift the polluting industries (compulsory) and non-polluting industries (optional) from within the outer ring road(ORR) to outside ORR.<br>1. **AN INDUSTRIAL PARK ( TEXTILE PARK) AT INDRAKARAN,** Sangareddy District, in an extent of 163.90 Acres has been developed for Shifting & Relocation of Textile Industries.<br>• Laying of Roads Completed in all respects. | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | • Water supply and power supply is available.<br>• Environmental Clearance (EC) and Consent for Establishment (CfE) obtained.<br>• Out of the 16 allotments 9 allotments are under Shifting & Relocation category. These relocation category industries are yet to be shifted and relocated to the new location. Presently 5 units are working at IP Indrakaran.<br>**2. <u>AN INDUSTRIAL PARK (EDIBLE OIL PARK) AT BUCHINELLY,</u>** Sangareddy District, in an extent of 314.40 Acres has been developed out of which an extent of 214.40 Acres is earmarked for Shifting & Relocation of Edible Oil Industries.<br>• Laying of Roads are completed in all respects.<br>• Water supply and Power is available.<br>• Environmental Clearance is obtained. | |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Consent for Establishment is being obtained.<br>• 64 plots are reserved for Shifting & Relocation category of industries, out which 20 plots are allotted to the Shifting & Relocation category of Industries<br>3. **AN INDUSTRIAL PARK (STEEL RE-ROLLING PARK) AT RAKAMCHERLA (V), PUDUR (M) RANGA REDDY (District)**, in an extent of Acres 112. 48 is proposed for Shifting & Relocating Steel Re-Rolling industries.<br>• Laying of roads are completed in all respects.<br>• Water supply and Power Supply is available.<br>• 11 No Plots were allotted for Shifting & Relocation category of industries | |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | v) | Ban on polluting industries | Short | Already under implementation and continuing | **TSPCB & Industry Department** | G.O.MS.No.111 dated 8th March, 1996 prohibits polluting industries, major hotels, residential colonies or other establishments that generate pollution, in the catchment of the lakes upto 10 kms from full tank level of the lakes<br><br>G.O.MS.No.95 dated:21-09-2007 imposing ban on establishment and expansion of certain polluting industries in Medak, Mahboobnagar, Rangareddy and Nalgonda District | **Nil** |
| | | | | | | | |
| **(E). Control of air pollution from construction and demolition activities** | i) | Enforcement of Construction & Demolition Rules | Short | continue as regular activity. | **GHMC & TSPCB** | The penalties proposed for offences under C&D waste management in GHMC are proposed and sent to Government for approval for the following activities.<br>a) For illegal transportation and dumping of C&D waste at unauthorized/ objectionable places/ points like nalas, lakes, public utility open places etc.<br>For illegal disposing of C&D waste generated through any activity at place (like roadside, open plots, streets, dumper bins) other than notified by GHMC. | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | The GHMC has been stipulating following conditions for controlling and preventing the Air Pollution while granting the building construction permission:<br>As per Clause 3(e) of G.O.Ms.No.168 MA, dated: 07.04.2012, it is mandatory to obtain the Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA), MoEF&CC, Govt. of India for the building with 20,000 sq. mts. and above built-up area. | |
| | ii) | Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units. | Short | continue as regular activity | **GHMC** | A condition is stipulated in the building sanction plan that, the applicant should erect temporary screen (blue tin sheet) around the construction are to avoid spilling of the building material outside the plot / site during the construction to stop environmental pollution and to ensure safety and security to the neighbouring / surrounding areas.<br>A condition also insisted that the building owner shall not dump the building material on foot-path / road side and the same shall | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | be dumped inside the compound premises without creating nuisance and air pollution and to this effect an undertaking is being obtained before release of permission.<br>The C&D waste management plants were planned at (4) locations in the GHMC area through a private operator on PPP mode. For (2) locations at Jeedimetla & Fattullaguda were finalized. Agreement was concluded on 22.02.2018 for the plant at Jeedimetla and Collection and transportation of C&D waste was commenced since April 2018 and about 2.5lakh MT of waste was lifted from the city roads.<br>Following conditions were made in the Concessionaire agreement for the purpose.<br>• Deployment of covered vehicles for transportation of the C&D waste to the plant site.<br>• Water cleaning of truck after completion of unloading of C&D waste at site<br>• The plant shall be established with wet-process | C&D management on PPPmode |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | • Buffer zone shall be created with plants all-round the plant site. | |
| | iii) | Ensure carriage of construction material in closed / covered vessels. | Short | Being implemented and to continue as regular activity | **GHMC** | C&D waste is being transported with covered vehicles to arrest fugitive emissions. | **Nil** |
| | | | | | | | |
| **(F). Other steps to control Air Pollution:** | i) | Air quality index to be calculated and disseminated to the people through website and other media (maximum weekly basis for manually operated monitoring stations and real time basis for continuous monitoring stations) | Short | Being implemented and to Continue the activity | **TSPCB** | • Air quality index booklet is initiated from Jan., 2016 onwards. The AQI data is appearing in CPCB / SPCB website on realtime basis.<br>• The AQI of all the manual monitoring stations are kept in TSPCB website. | **Nil** |
| | ii) | Establish an air quality management division at SPCB Head quarters to oversee air quality management activities in the state and interact with | Short | Already established and to Continue the activity | **TSPCB** | • AQM division is established under SES, CL supervision with 2 dedicated scientific officers to look into all air quality issues.<br>• Through e-samiksha platform of CPCB regular interactions will be carriedout. | **Nil** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | CPCB | | | | All the monitoring data is entered through online portal of CPCB i.e. Environmental Air Quality Data Entry System (EAQDES). | |
| | iii) | Set–up and publicize helpline in Hyderabad City for complaints against reported non-compliance. | Short | Already established and to Continue the activity | **TSPCB & GHMC** | TSPCB established online public grievance redressal system in its website to receive online complaints. In addition, a 24x7 toll free number 10741 and 040-23887500.<br><br>'My GHMC' mobile application and helpline number 040-2111111 was set-up for the purpose of reporting grievances. | **Nil** |
| | iv) | Engage with concerned authorities for continual basis for maximising coverage of LPG / PNG for domestic and commercial cooking with target of 100% coverage | Long | 180 days from approval of action plan | **State oil co-ordinator & Bhagya-nagar Gas Ltd.** | • PNG availability is through Bhagyanagar Gas Ltd., and supplying to 8294 residents in Medchal, Alwal and Quthbullapur. Still plenty of gas is available up to one Lakh connections in the area.<br>• 130 TSRTC buses are also using the CNG as fuel | Nil |
| | v) | Monitoring of DG sets and action against violations | Short | Continue as regular activity | **TSPCB** | TSPCB is monitoring the industrial DG sets for compliance of the standards. | **Nil** |
| | vi) | Strengthening of Ambient Air Quality Management | Short | Proposal submitted to | **TSPCB** | TSPCB has established 5 CAAQMS and 6 Manual AAQMS under NAMP in the | 7 crores as per |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | Additional stations proposed to CPCB | | CPCB and the proposed time line is two years | | Hyderabad and Patancheruvu area(GHMC) area. Apart from the above Manual AAQ Monitoring is being carried out at 12 locations under state program.<br>As per the recent criteria communicated by the CPCB which is based on the population criteria, the number of CAAQM stations required for Hyderabad & Patancheruvu as per the 2011 census are 12. Hence, additional 7 CAAQMS are to be installed. The Manual AAQM stations are adequate. The requirement is communicated to CPCB through letter dated:08.02.2019 for providing the funds as per the Hon'ble NGT order that MoEF&CC will provide requisite funds for the purpose. | NGT order to be provided by MoEF& CC, GoI |
| | vii) | Source Apportionment Study | Long | Two years after the approval of the action plan as it involves seasonal monitoring | **TSPCB** | TSPCB has carried out Source Apportionment Study in the year 2005-06 with the assistance of the USEPA and others for Hyderabad city.<br>As per the study, about 50% of the Particulate matter of size less than 10 and 2.5 microns are contributed by vehicles and another 30% by road dust. | **Rs.50.00 Lakhs by TSPCB** |

| source | S. No. | Action points | Implementation period (short/mid/ long) term | time frame for implementation from the date of approval | Responsible Departments / agency | Any other information (Status on implementation of the action plan in Hyderabad) | Financial Implications (If any) |
|---|---|---|---|---|---|---|---|
| | | | | | | Source Apportionment study will be taken up by TSPCB as per the guidelines issued by the CPCB duly encompassing the seasonal variations. | |
| | viii) | Emission Inventory | Long | One year after the approval of the action plan | **TSPCB** | An Emission inventory is carried out for Hyderabad city for both ambient air pollutants and greenhouse gases for year 2001.<br>The results of the emission inventory and subsequent air quality modeling indicated that the primary source of PM10 emissions in Hyderabad is the transportation sector (~62percent) with the industrial sector being the second largest source of PM10.<br>The Emission inventory will be taken up as per the CPCB guidelines for the Hyderabad | **Rs.50 lakhs by TSPCB** |
| | ix) | Hotels, restaurants and dhabas to use cleaner fuels | Long | 180 days from approval of action plan | **GHMC, BGNL and SLOC** | Almost all the Hotels and Restaurants are using Cleaner fuels like Commercial LPG and actions to promote the usage of cleaner fuels in Dhabas located in the outskirts will be taken up. | **Nil** |

Graded Response Action Plan(GRAP): The AQI of Hyderabad is mostly from satisfactory to moderate with few occasions under poor category in winter due to inversion in atmosphere. The GRAP is prepared in lines with that of CPCB action plan for Delhi.

| **Moderate to poor (ambient PM2.5 or PM10 concentration value is between 61-120 µg/m3 respectively)** | **Agency responsible/Implementing Agency** |
|---|---|
| Stringently enforce / stop garbage burning in landfills and other places and impose heavy fines on person responsible | GHMC and surrourding municipalities |
| Close/stringently enforce all pollution control regulation in brick kilns and industries | TSPCB |
| Do periodic mechanized sweeping on roads with heavy traffic and water sprinkling also on unpaved roads every two days | GHMC and Surrounding municipalities |
| | Commissioner, Traffic Police of Hyderabad to identify roads with heavy traffic and provide information to respective Municipal Commissioners |
| | Chief Engineers of officers in charge of CPWB, PWB of Hyderabad to identify unpaved roads with heavy traffic and provide information to Municipal Commissioners |
| Strict vigilance and no tolerance for visible emissions – stop plying of visibly polluting vehicles by impounding or heavy fine | Commissioner or Officer in charge, Transport Department and Traffic Police |
| Strict vigilance and enforcement of PUC norms | |
| Stringently enforce rules for dust control in construction activities and close non-compliant sites | GHMC and Traffic Police |
| Deploy traffic police for smooth traffic flow at identified vulnerable areas | Commissioner, Traffic Police |

Member Secretary
TSPCB

Special Chief Secretary
EFS&T

-True Copy-

ANNEXURE R-7/4

GOVERNMENT OF TELANGANA
ABSTRACT

EFS&T Deptt., - Constitution of Air Quality Monitoring Committee (AQMC) for preparation and implementation of Action Plan for attaining Ambient Air Quality(AAQ) for lowering of Air Pollution places of Hyderabad, Patancheru and Nalgonda, as per the orders of the NGT, dated:8.10.2018 in O.A.No.681 of 2018 - Orders – Issued .

ENVIRONMENT, FORESTS, SCIENCE & TECHNOLOGY (FOR.III) DEPARTMENT

G.O.Rt.No. 182 Dated: 20-11-2018

Read the following:-

1) Orders of Hon'ble NGT, Dated.8.10.18 in O.A.No.681 of 2018.
2) Letter from the Regional Director, CPCB, Regional Directorate, Bengaluru, Tech/163/non-attainment/RDS/2018-19/1289, Dt.12.10.2018.
3) From the M.S., TSPCB, Hyd., Lr.No.93 /TSPCB /LAB/EPCA /2018-2494, dated: 9.11.2018.

*****

**ORDER:**

The Member Secretary, Telangana State Pollution Control Board, Hyderabad in his letter 3rd read above, with reference to the orders of Hon'ble NGT 1st read above and also as per the correspondence of CPCB 2nd read above has reported that the following directions are issued by the Hon'ble NGT in respect of Air Quality:

i) all the states and union territories with nonattainment cities must prepare appropriate action plans within two months aimed at bringing the standards of air quality within the prescribed norms within 6 months from date of finalisation of the action plans;

ii) the action plan may be prepared by 6 member committee comprising of Directors of Environment, Transport, Industries, Urban Development Agriculture and Member Secretary, State Pollution Control Board or committee of the concerned state/Union Territory. The committee may be called Air Quality Monitoring Committee (AQMC). The AQMC will function under the overall supervision and coordination of Principal Secretary, Environment of the concerned State/Union Territory. This may be further supervised by the Chief Secretaries concerned or their counterparts in Union Territories by ensuring inter-sectoral coordination;

iii) the action plans may take into account the GRAP, the CAP and the Action Plan prepared by CPCB as well as all other relevant factors. The action plans may be forwarded to the CPCB by 31.12.2018. The same may be placed before the committee as directed in Direction number vi. The Action Plan will include components like identification of source and its apportionment considering sectors like vehicular pollution, industrial pollution shall also consider measures for strengthening of ambient air quality monitoring and steps for public awareness including issuing of advisory to public for prevention and control of air pollution and involvement of schools colleges and other academic Institutions and awareness programs;

iv) the Action Plan will indicate steps to be taken to check different sources of pollution having speedy, definite and specific timelines for execution;

(P.T.O)

v) the Action plan should be consistent with the carrying capacity assessment of the non-attainment cities in terms of vehicular pollution, Industrial emissions and population density, extent of construction and construction activities etc., The carrying capacity assessment shall also lay emphasis on agricultural and indoor pollution in rural areas. Depending upon assessed carrying capacity and source apportionment, the authorities may consider the need for regulating number of vehicles and their parking and plying, population density, extent of construction and construction activities etc., Guidelines may accordingly be framed to regulate vehicles and industries in non-attainment cities in terms of carrying capacity assessment and source apportionment;

vi) the committee shall examine the action plans and on the recommendation of the committee the Chairman, CPCB shall approve the same by 31-01-2019;

vii) the Chief Secretaries of the State and Administrators/Advisors to Administrators of the union territories will be personally accountable for failure to formulate action plans, as directed;

viii) the CPCBs, SPCBs and State Pollution Control Committees shall develop a public grievance redressal portal for redressal of public complaints on air pollution along with a supervisory mechanism for its disposal in a time bound manner. Any visible air pollution can be reported at such portal by email/SMS;

ix) the CPCB and all the State Pollution Control Boards and Pollution Control Committees shall collectively workout and design a robust Nationwide ambient air quality monitoring programme in a revised format by strengthening the existing monitoring network with respect to coverage of more cities/towns. The scope of monitoring should be expanded to include all 12 notified parameters as per Notification No. B-29016/20/90 /PCI-L dated 18th November 2009 of CPCB. The Continuous Ambient Air Quality Monitoring stations should be preferred in comparison to manual monitoring stations. The CPCB and States shall file a composite Action Plan with timelines for its execution which shall not be more than 3 months. It is expected that all such AAQMS shall be connected to central server of CPCB for reporting analysis of results in a form of Air Quality Bulletin for general public at regular intervals at least on weekly basis and ambient air quality on continuous basis on e-portal. MOEF&CC will provide the requisite funds for the purpose. MoEF&CC in consultation with Ministry of Housing and Urban Affairs, MoRTH, Ministry of Petroleum and Natural Gas, Ministry of Agriculture Cooperation and Farmers Welfare or any other Ministry to lay down such guidelines as may be considered necessary for improvement of air quality in the country.

2. The Member Secretary, Telangana State Pollution Control Board (TSPCB) has also informed that Central Pollution Control Board (CPCB) prepared a list of non-attainment cities/towns based on the Ambient Air Quality (AAQ) data for the years 2011-2015. According to which Telangana state is having three non-attainment cities/towns viz., Hyderabad, Nalgonda and Patancheruvu. An action plan for lowering the air pollution in Hyderabad is under implementation. In Telangana state 3 non attainment cities / town are listed by CPCB as per the AAQ data from the year 2011 to 2015.

3. The Member Secretary, Telangana State Pollution Control Baord (TSPCB) has therefore requested for constitution of the Air Quality Monitoring Committee (AQMC) at the earliest for reviewing and fine tuning of the existing action plan for Hyderabad and Patancheruvu with the latest developments has to be taken up along with the preparation of action plan for Nalgonda City, to enable the state to comply with the directions of the Hon'ble NGT in their orders 1st read above.

4. Accordingly, Government, hereby constitute the Air Quality Monitoring Committee (AQMC) with the following members for reviewing and fine tuning of the existing action plan for Air Quality for Hyderabad, Patancheru with latest developments and preparation of action plan for Nalgonda city:

1. Director General, Environment, Protection Training Research Institute, Hyderabad. - Member
2. Commissioner / Director of Transport, Hyderabad. -Member
3. Commissioner/Director of Industries, Hyd. -Member
4. Commissioner/Director of Municipal Administration and Urban Development, Hyderabad. -Member
5. Commissioner/Director, of Agriculture, Hyderabad. -Member
6. Member Secretary, Telangana State Pollution Control Board, Hyderabad. -Member Convener

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

AJAY MISRA
SPECIAL CHIEF SECRETARY TO GOVERNMENT (FAC)

To
The Member Secretary, Telangana State Pollution Control Board, Hyderabad.
The Director General, Environment Protection Training and Research Institute, Hyderabad.
The Commissioner / Director of Transport, Hyderabad.
The Commissioner/Director of Industries, Hyderabad.
The Commissioner/Director of Urban Development, Hyderabad.
The Commissioner/Director, of Agriculture, Hyderabad.

Copy to:
P.S. to C.S.,
P.S., to Spl. C.S., EFS&T Deptt.,
The TR&B Deptt., Telangana State, Secretariat, Hyderabad.
The Industries & Commerce Department Telangana State, Secretariat, Hyderabad.
The Municipal Administration &Urban Development Department , Telangana State, Secretariat, Hyderabad.
The Agriculture & Cooperation Deptt., Telangana State, Secretariat, Hyderabad.
The Central Pollution Control Board, Regional Directorate of (South) "Nisarga Bhawan", 1st Floor, Thimmaiah Road, 7th 'D' Cross, Shivanagar, Bengaluru- 560079.

SF/SC

//FORWARDED :: BY ORDER//

SECTION OFFICER

GOVERNMENT OF TELANGANA
ABSTRACT

EFS&T Department - Constitution of District Level Air Quality Monitoring Committee for implementation of the Action Plan in HMDA Area and Nalgonda District - Reg.

ENVIRONMENT, FORESTS, SCIENCE & TECHNOLOGY (FOR.III) DEPARTMENT

G.O.Rt.No.33 Dated:14-3-2019.

Read the following:-

1. Orders of the Hon'ble NGT, dated: 8.10.2018 in O.A.No.681 of 2018.
2. From the M.S., TSPCB, Hyd., Lr.No.93/ TSPCB/LAB /EPCA /2018-2494, dated: 9.11.2018.
3. G.O.Rt.No.182, EFS&T (For.III) Deptt., dated: 20.11.2018.
4. Minutes of the 2nd AQMC Meeting held on 23rd January, 2019.
5. From the M.S., TSPCB, Hyd., letter No.93/ TSPCB /LAB /EPCA/2018-3139, dated: 04.02.2019.

*****

**ORDER:**

As per the orders of the Hon'ble NGT 1st read above, The Member Secretary, Telangana State Pollution Control Board (TSPCB) has also informed that Central Pollution Control Board (CPCB) prepared a list of non-attainment cities/towns based on the Ambient Air Quality (AAQ) data for the years 2011-2015. According to which Telangana state is having three non-attainment cities/towns viz., Hyderabad, Nalgonda and Patancheruvu. An action plan for lowering the air pollution in Hyderabad is under implementation. In Telangana state 3 non attainment cities / town are listed by CPCB as per the AAQ data from the year 2011 to 2015. The Member Secretary, Telangana State Pollution Control Baord (TSPCB) has therefore, requested the Government for constitution of the Air Quality Monitoring Committee (AQMC) at the earliest for reviewing and fine tuning of the existing action plan for Hyderabad and Patancheruvu with the latest developments has to be taken up along with the preparation of action plan for Nalgonda City, to enable the state to comply with the directions of the Hon'ble NGT in their orders 1st read above.

2. Accordingly, Government have constituted the Air Quality Monitoring Committee with six members vide G.O. 3rd read above.

3. The Member Secretary, Telangana State Pollution Control Board in his letter 5th read above as per the minutes of the 2nd AQMC meeting held on 23.1.2019 has requested the Government to constitute the District Level Monitoring committee in the GHMC area headed by the District Magistrates and with senior officers from the Department concerned to in put the progress and to ensure smooth implementation of the play for Air Quality Management.

P.T.O

4. Accordingly, Government herewith constitute the District Level Monitoring Committee for Air Quality Management the following members for the Districts Hyderabad, Medchal, Rangarddy, Sangareddy, Medak, Yadadri and Siddipet Districts and Nalgonda District with the following Members:

| | | |
|---|---|---|
| 1. | The District Collector, Magistrate of the District Concerned. | Chairman |
| 2. | Nominee of the Regional RTA of the District Concerned. | Member |
| 3 | Nominee of the officer of the traffic police Department of the district concerned. | Member |
| 4. | Nominee of the civil supplies department of the district concerned . | Member |
| 5. | Nominee from the Industries Department of the district concerned. | Member |
| 6. | Nominees of the GHMC to the District concerned falling within jurisdiction of the GHMC . | Member |
| 7. | Nominees of the HMDA to the District concerned falling within jurisdiction of the HMDA. | Member |
| 8. | Nominees of the CDMA to the District concerned falling within jurisdiction of the CDMA . | Member |
| 9. | Representative from the Legal Metrology of the Concerned District | Member |
| 10 | Representative from state level oil co-coordinator. | Member |
| 11 | Representative from Bhagyanagar Gas Limited. | Member |
| 12 | The Regional Officer, TSPCB of the District Concerned. | Member Convenor |

5. The above District Level Monitoring Committee shall ensure the implementation of the Action Plan and Air Quality at District Level.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

AJAY MISRA
SPECIAL CHIEF SECRETARY TO GOVERNMENT (FAC)

To
The Member Secretary, Telangana State Pollution Control Board, Hyderabad.
The District Collector, Magistrate of the District Concerned.
The Regional RTA of the District Concerned.
The Commissioner, Transport, Hyderabad.
The Director General of Police and Superintendent of Polices of the District Concerned (Traffic Police),
The Commissioner, & E.O. Secretary, Consumer Affairs, Food & Civil Supplies Department, Govt. of Telangana.
The Commissioner, Greater Hyderabad Municipal Corporation (GHMC), Hyderabad.
The Metropolitan Commissioner, Hyderabad Metropolitan Development Authority (HMDA), Hyderabad.
The Commissioner & Director, Municipal Administration (CDMA), 640, AC Gudards, Masab Tank, Opp. RTI Building, Hyderabad.
The Addl. DGP & Controller, Legal Metrology, 209, P.W.D.Buildings, Gandhinagar, Hyderabad.
The State Level Co-ordinator for Oil Industry Telangana State, C/o HPCL, 4th Floor, Sebastian Street-5, sarojinidevi Road, PB No.5, Secunderabad-500003.
The Managing Director, M/s. Bhagyanagar Gas Ltd., Parisram Bhavan, APIDC Building, Basheerbagh, Hyderabad.

through M.S., TSPCB, Hyderabad

// FORWARDED :: BY ORDER //

SECTION OFFICER

-True Copy-

ANNEXURER-7/5

GOVERNMENT OF TELANGANA
ABSTRACT

EFS&T Department - Constitution of Steering Committee for effective implementation of Air Quality in certain cities of Telangana State – Orders-Issued.

ENVIRONMENT, FORESTS, SCIENCE & TECHNOLOGY (FOR.III) DEPARTMENT

G.O.Rt.No. 84 Dated: 07-06-2019

Read the following:-

1) G.O.Rt.No.182, EFS&T (For.III) Deptt., dated:20.11.2018.
2) G.O.Rt.No.143, EFS&T (For.III) Deptt., dated:14.3.2019.
3) From the M.S., TSPCB, Hyd., Lr.No.93 /TSPCB /LAB/EPCA /2019-339, dated: 14.5.2019.

*****

**O R D E R:**

In the G.O.1st read above, the Air Quality Monitoring Committee (AQMC) for preparation and implementation of Action Plan for attaining Ambient Air Quality(AAQ) for lowering of Air Pollution places of Hyderabad, Patancheru and Nalgonda. In the G.O.2nd read above, the District Level Monitoring Committee was also constituted for implementation of the Action Plan in HMDA Area and Nalgonda District.

2. The Member Secretary, Telangana State Pollution Control Board, Hyderabad in his letter 3rd read above, with reference to the discussions held between the Chairman, Telangana State Pollution Control Board (TSPCB) and the Chairman, Central Pollution Control Board (CPCB), the Member Secretary, TSPCB has requested for the following actions:

i) A steering committee headed by the Chief Secretary has to be constituted

ii) The overall in-charge for implementation of the action plan in city has to be designated.

iii) To nominate a suitable officer as the nodal officer for this programme at the state level who would co-ordinate with MoEF&CC and CPCB on the one hand and the city level committee on the other.

3. Government after careful consideration of request of the Member Secretary, Telangana State Pollution Control Board hereby constitute the Steering Committee with the following members:

1) Chief Secretary to Govt. - Chairman
2) Spl.C.S./ Pr.Secy/Secy., EFS&T Deptt., - Member
3) SPl.C.S.,/Pr.Secy/Secy., MA&UD Deptt., -Member
4) SPl.C.S.,/Pr.Secy/Secy., TR&B Deptt., -Member
5) SPl.C.S.,/Pr.Secy/Secy., I&C Deptt., -Member
6 Municipal Commissioner - GHMC
7) The Member Secretary, TSPCB., Hyderabad. - Member Convener

(P.T.O)

4. The Commissioner of Greater Hyderabad Municipal Corporation is herewith nominated as head for overall implementation of the Action Plan in the city at GHMC area.

5. The Member Secretary, Telangana State Pollution Control Board is nominated as nodal officer at the state level to co-ordinate with the Ministry of Environment Forest & Climate Change (MoEF&CC) and Central Polluition Control Board.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

AJAY MISRA
SPECIAL CHIEF SECRETARY TO GOVERNMENT (FAC)

To
The Member Secretary, Telangana State Pollution Control Board, Hyderabad.
The Director General, Environment Protection Training and Research Institute, Hyderabad.
The Commissioner / Director of Transport, Hyderabad.
The Commissioner/Director of Industries, Hyderabad.
The Commissioner/Director of Urban Development, Hyderabad.
The Commissioner/Director, of Agriculture, Hyderabad.
Copy to:
The Transport, Roads & Buildings Department Telangana State, Secretariat, Hyderabad.
The Industries & Commerce Department Telangana State, Secretariat, Hyderabad.
The Municipal Administration &Urban Development Department , Telangana State, Secretariat, Hyderabad.
The Agriculture & Cooperation Department, Telangana State, Secretariat, Hyderabad.
The Central Pollution Control Board, Regional Directorate of (South)
"Nisarga Bhawan", 1st Floor, Thimmaiah Road, 7th 'D' Cross,
Shivanagar, Bengaluru- 560079.
The P.S to C.S.,
The P.S to Spl. C.S., EFS&T Department.
Sf /Sc.

// FORWARDED :: BY ORDER //

SECTION OFFICER

-True Copy-

# ANNEXURE R-7/6

**Locations of the Ambient Air Quality Monitoring Stations in and around Hyderabad**

| Ambient Air Quality Monitoring | Details of the Monitoring Locations |
|---|---|
| Continuous Ambient Air Quality Monitoring Stations | Zoopark |
| | ECIL |
| | Nacharam |
| | Malakpet louis |
| | Khairthabad RTA |
| | Komaplly |
| | Kokapet |
| | Sympony Park |
| | Sanath Nagar |
| | Hyderabad Central University |
| | Bollarum |
| | ICRISAT |
| | Pashamylaram |
| | IIT Kandhi |
| Manual Ambient Air Quality Monitoring Stations | Balanagar , CITD office |
| | Charminar, TSRTC bus station |
| | Jeedimetla, Industrial Association building |
| | Jubilee Hills, Police station |
| | Paradise, HMWS &SB Pump house |
| | Abids, Police station |
| | Buddha Purnima Project office |
| | Chikkadapally, Lepakshi Emporium |
| | KBRN Park, DFO office |
| | Langar House, Police Station |
| | MGBS, Bus stand |
| | Nacharam, Police station |
| | Sainikpuri, MRO office |

**Note on the Emission Inventory, Source Apportionment and Carrying Capacity Study of the air pollution in GHMC area carried out by the IIT, Kanpur**

I. Back ground:

- Telangana State Pollution Control Board awarded a study, "**Emission Inventory, Source Apportionment and Carrying Capacity Study**" to IIT, Kanpur with a cost of Rs.1.03 Crores. The study area is GHMC and with an objective to strengthen the existing action plan based on the scientific evidence for improving the air quality.

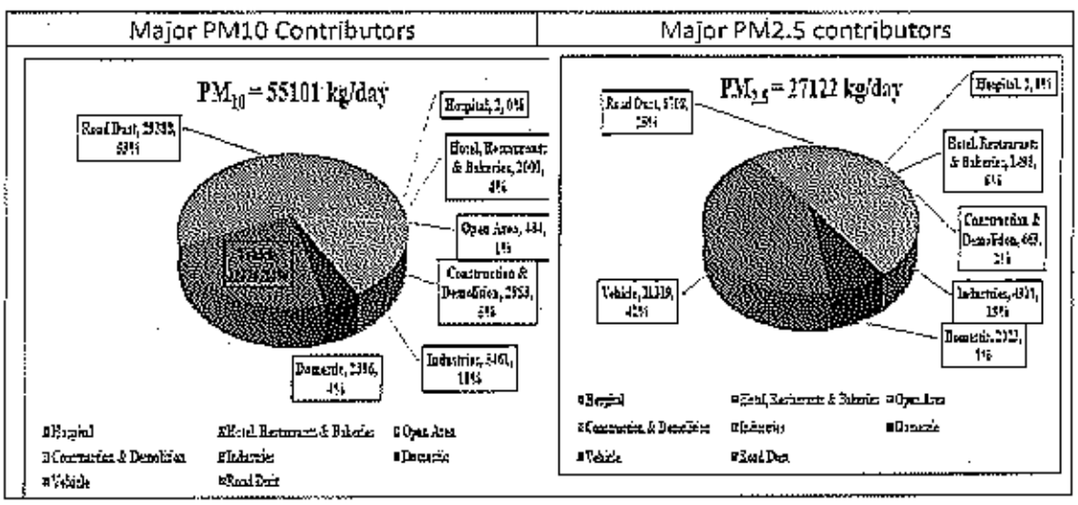
- The study was funded by Ministry of Environment, Forest and Climate Change (MoEF&CC, GoI) under the National Clean Air Program(NCAP).

- Central Pollution Control Board (CPCB) has identified 132 Non-Attainment Cities (NAC) cities where $PM_{10}$ concentrations are exceeding the annual average of 60 micrograms/cubic meter continuously for five years. Telangana State has four NACs: (1) Hyderabad (including 2.Patancheruvu), 3. Nalgonda and 4. Sangareddy.

II. Gist of the Study :

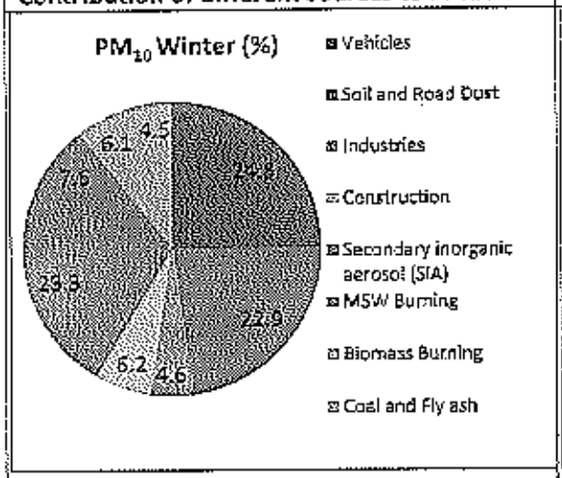
a. **Emission Inventory:** developed in 2/2KM grid

- The grid wise sources of pollution are captured.
- The parameters include PM10, PM2.5, SO2, NOx, CO, VOC and BaP.
- The overall EI for Hyderabad City is developed for the base year 2021.
- The major sources that contribute for emissions

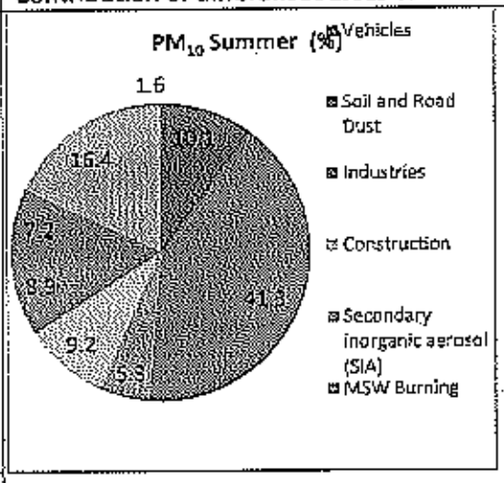



b. **Source Apportionment:** The study involves the sampling at different locations and analysing the constituents for matching with different sources. The contribution for different sectors is as follows:

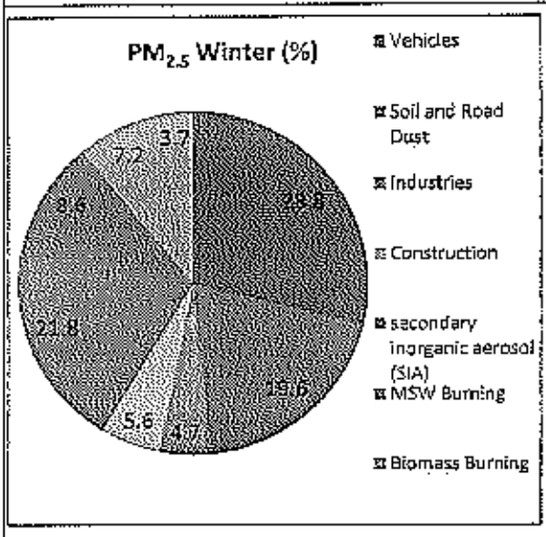
Contribution of different sources to PM10



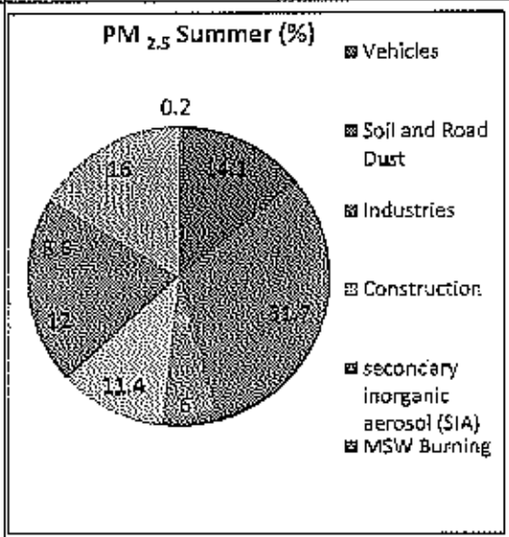

Contribution of different sources to PM10




Contribution of different sources to PM2.5




Contribution of different sources to PM2.5




The major sources of Particulate Matter(PM10) are varying with seasons. The vehicles and road dust are predominant. Secondary inorganic aerosol formation is 3rd highest.

c. **Carrying Capacity: Its the capacity of atmosphere for saturation with respect to standards**

- The caring capacity (CC) is variable (15064 - 33108 kg/d) depending on meteorology.
- CC is the lowest in winter months and highest in April to July months.
- CC<total emissions of $PM_{2.5}$ (43598 kg/d), thus, significant emission reduction is required. An overall reduction of 24685 kg/d is required to achieve the air quality standards in the city.

- **Ventilation coefficient (VC)** :During the summer season, the ventilation coefficient was observed higher than 8000-10000 $m^2$ /s for 12:00-18:00 hours which denotes low pollution potential during the summer season.

d. **Hotspot Areas identified: The areas with highest probability of air pollution**

- Kavadiguda, Khairatabad, Gandhi Nagar, Jawahar Nagar, Abids, Himayat Nagar, Narayanguda, Chikkadpally; Kacheguda, Chaderghat; IDPL, Balanagar mandal; Sundar Rao Nagar, Dayanand Nagar, Dundigal; Uskabavi, Vandana Puri, Raghvendra colony, Bramrambika colony, Ameenpur mandal.
- The highest 24-Hr average was 163 µg/$m^3$ (January 23, 2021), the monthly average $PM_{2.5}$ Levels for critical month (December) was 90 µg/$m^3$ and the annual average was 48 µg/$m^3$.

e. **Mitigation Factors for Top 4 Source Contributors:**

Road Dust:

- The silt load in Hyderabad varies from 1.9 to 12.5 g/m2. The silt load on each road should be reduced to under 3 gm/m2. Regular vacuum sweeping should be done on the road having a silt load above 2 gm/m2.
- End to end pavement and Greenery Cover development.

Vehicles :

- Diesel vehicles with Diesel Particulate Filter (DPF)will reduce 40% in emissions including Industries vehicles for the transportation of raw and finished products.
- Restriction on plying and phasing out of 10 years old commercial diesel-driven vehicles.
- Introduction of cleaner fuels (CNG/ LPG) for all vehicles (other than 2-W).
- Electric/Hybrid Vehicles should be encouraged with adequate charging stations.
- Vehicle scrappage infrastructure should be developed in the next 3 years with EPR facility.
- Strengthening of Public transport and Mobile App based ticketing is developed.

Industries and DG Sets :Ensuring emission standards in industries and shifting of polluting industries.

- Strict action to stop waste burning, unscientific disposal HW and should be treated only in TSDF.
- Area and road in front of the industry should be the responsibility of the industry.
- Category A Industries replace dirty fuels with clean fuels and electricity with proper control APdevices.

Category B Industries (Induction Furnace) - Recommended Fume gas capturing hood followed by Baghouse should be used to control air pollution.

- Efficient recovery system for solvents in chemical industries: The technologies suggest 95% recovery of VOCs is feasible and same may be adopted.

**ANNEXURE R-7/8**

| City | Amount received year wise | | Total amount received | Expenditure incurred | %of utilization |
|---|---|---|---|---|---|
| Hyderabad& Patancheru | 2020-21: | 234.0 | **603.54** | 427.86 | 70.89% |
| | 2021-22: | 118.0 | | | |
| | 2022-23: | 91.5 | | | |
| | 2023-24 | 160.04 | | | |
| **Allocated fund for FY 2024-25 Rs. 112.36 Crores (102.75 cr.+ 9.61 cr. incentive)** | | | | | |
| **Fund received under NCAP (Rs. in Crores):** | | | | | |
| Hyderabad | 2019-20: | 10.8 | 10.8 | 9.75 | 90.27% |
| | 2020-21: | Nil | | | |
| | 2021-22: | Nil | | | |
| Nalgonda | 2019-20: | 0.10 | 5.29 | 2.76 | 52.17 % |
| | 2020-21: | 0.38 | | | |
| | 2021-22: | 0.468 | | | |
| | 2022-23: | 0.76 | | | |
| | 2023-24 | 3.582 | | | |
| **Allocated fund for FY 2024-25 Rs.2.01 Crores** | | | | | |
| Patancheru | 2019-20: | 0.10 | 0.48 | 0.48 | 100% |
| | 2020-21: | 0.38 | | | |
| | 2021-22: | Nil | | | |
| Sangareddy | 2019-20: | Nil | 3.465 | 2.99 | 86.29% |
| | 2020-21: | 2.0 | | | |
| | 2021-22: | 0.315 | | | |
| | 2022-23: | 0.70 | | | |
| | 2023-24 | 0.45 | | | |
| **Allocated fund for FY 2024-25 Rs. 1.47 Cr.** | | | | | |

-True Copy-

Gmail

Tilak Singh <tilak@dbaijallaw.in>

# Service in OA No. 1228 of 2024 on News Item titled "Lancet study links alarming mortality rates to poor air quality 12 Strategies to combat country's air pollution crises" appearing in the Indian Express dated 13.09.2024

1 message

**Tilak Singh** <tilak@dbaijallaw.in> 4 November 2024 at 12:50
To: secy-moef@nic.in, cb.cpcb@nic.in, membersecretarygpcb@gmail.com, ms-gpcb@gujarat.gov.in, ms@kspcb.gov.in, msdpcc@nic.in, net.wbpcb-wb@bangla.gov.in, ms@mpcb.gov.in, mspcb-hp@nic.in, ms@uppcb.in
Cc: Dhananjay Baijal <dhananjay@dbaijallaw.in>

Dear Sir/Madam,

Please find the attached Status Report on behalf of Respondent No. 7-
Telangana Pollution Control Board, in the captioned matter, filed by Mr Dhananjay Baijal, Advocate for Respondent Telangana Pollution Control Board.

--
Regards,
--
Tilak Singh
Registered clerk of Mr. Dhananjay Baijal, AoR
+917982588954
2/20 B Jangpura A,
Lower Gr. Floor,
New Delhi - 110014

**Report-1.pdf**
11188K