iFOREST

INTERNATIONAL
FORUM
FOR ENVIRONMENT,
SUSTAINABILITY
& TECHNOLOGY

Know your city and what you breathe

Air Pollution - What it Looks Like?

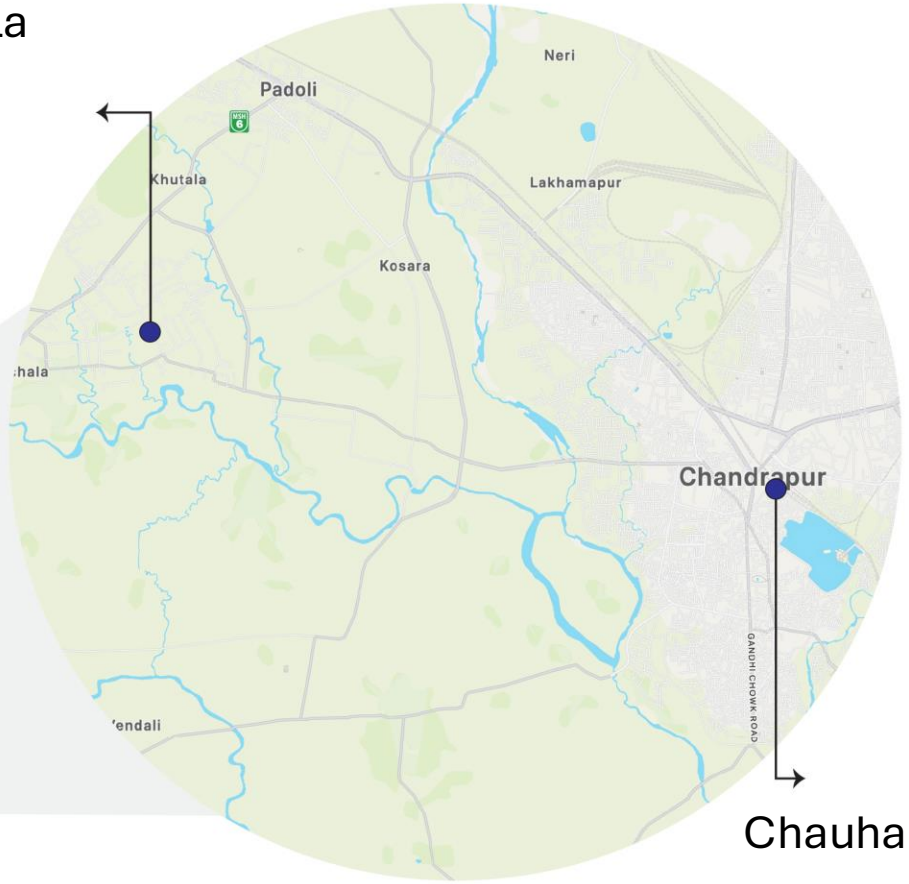
Source:

1) The Hindu
2) https://www.aqi.in/in/dashboard/india/maharashtra/

Study Area

Maharashtra

MIDC Khutala



Chauhan Colony

Chandrapur District

Chandrapur

Contd.

City Demographics

70 KM²

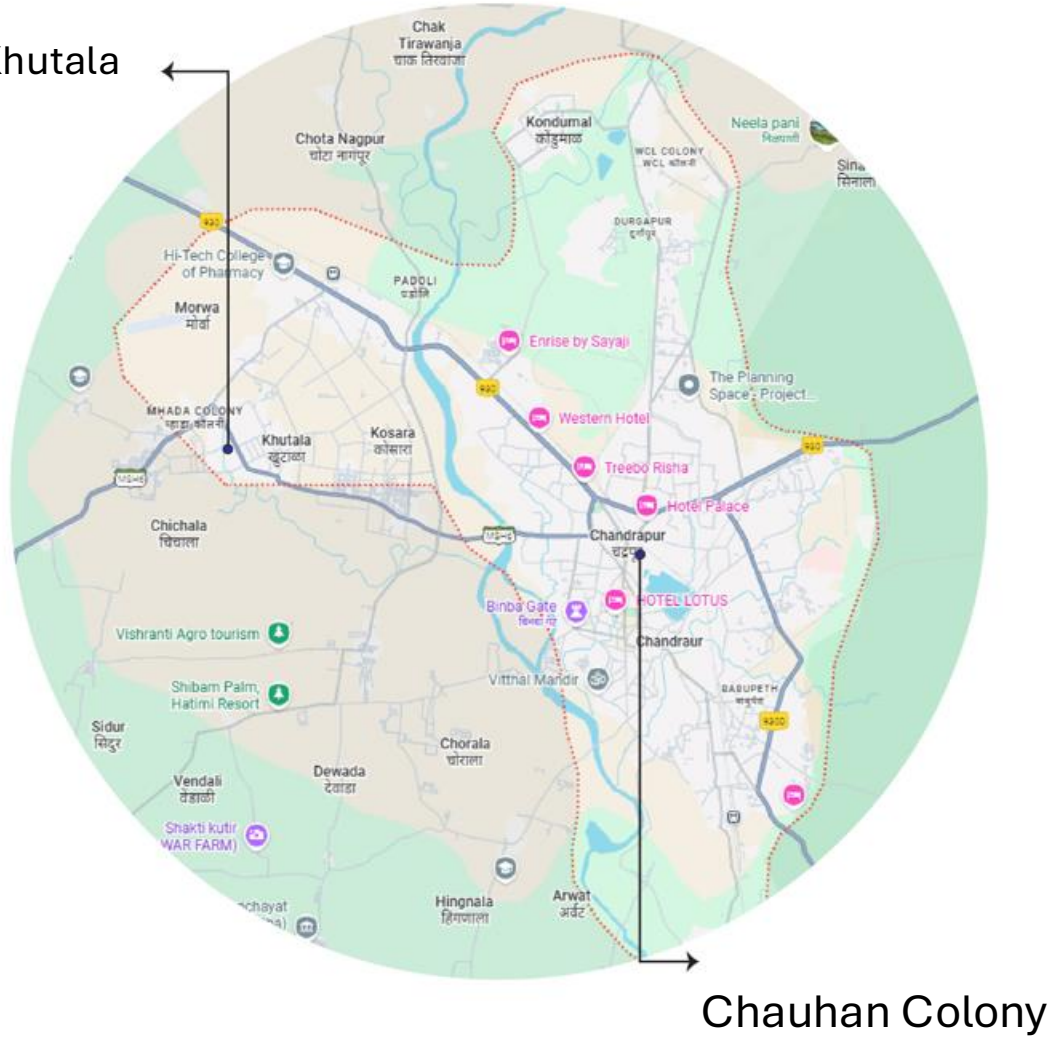
Total Area

4.6 Lakhs

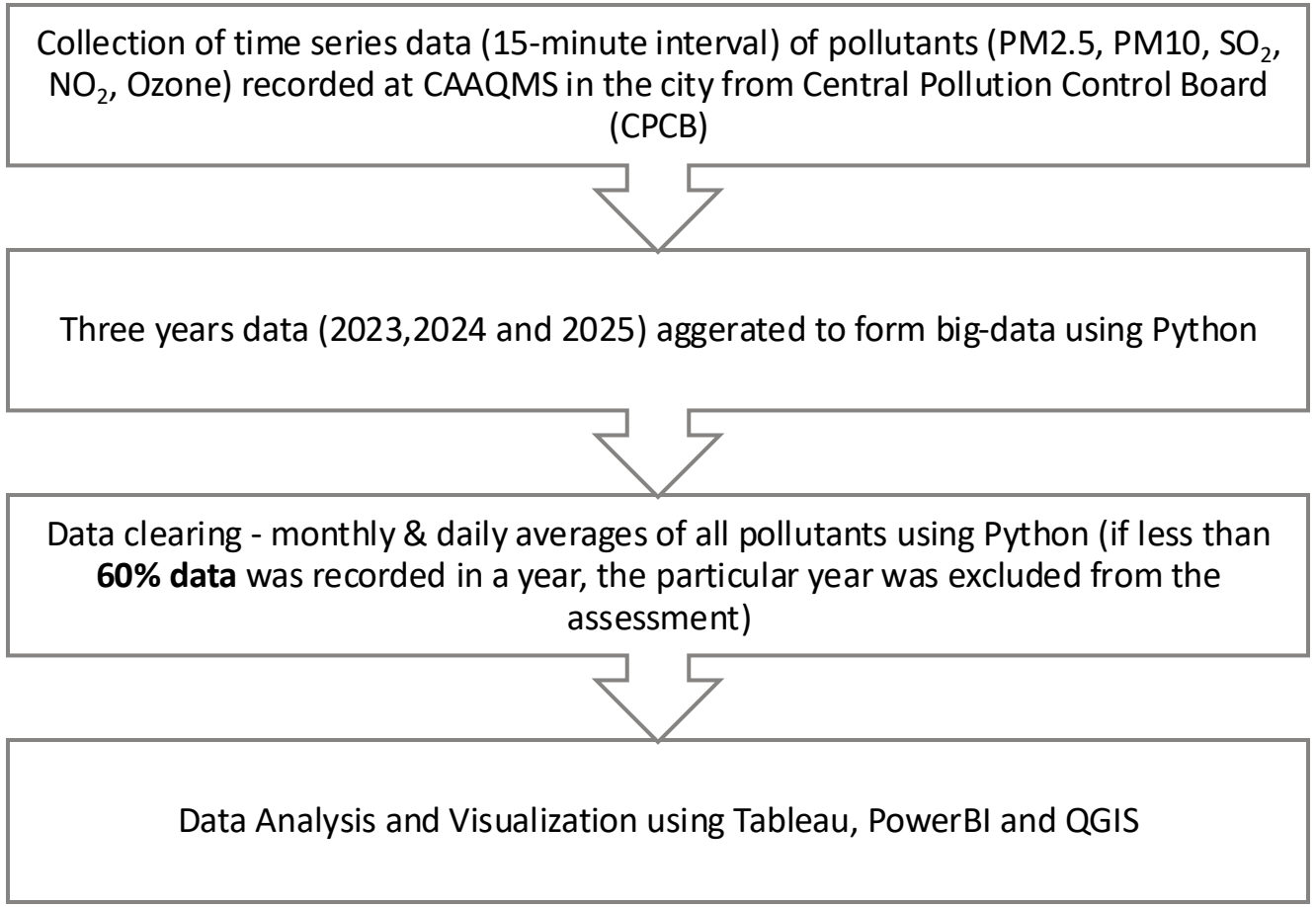
Total Population

Required no of stations

	CAAQMS	Manual	Total
Available	2	6	8
Required	1	3	4



Approach - Data Cleaning



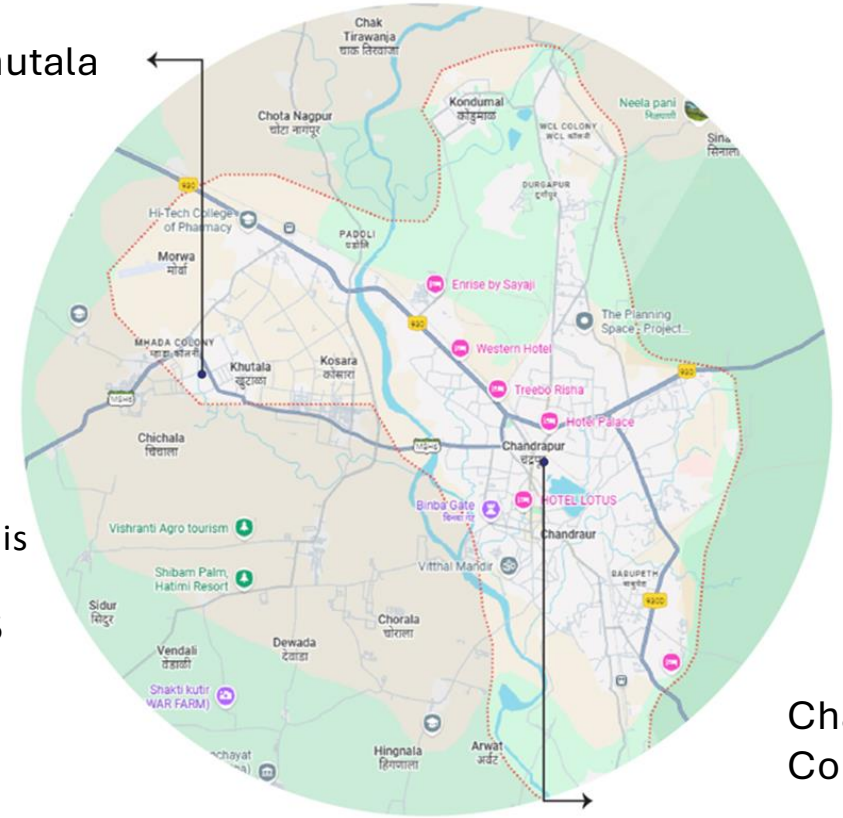
Results – Annual Average

2021 (latest year with reliable data)
PM10 - 101 µg/m³
PM2.5 - 38 µg/m³

2025 (provisional)
PM10 – 74 µg/m³
PM2.5 – 25µg/m³

Note: Data for January and November are insufficient, and December data collection is still ongoing. Since these are peak winter months, the final annual averages for 2025 are likely to increase.

MIDC Khutala



Chauhan Colony

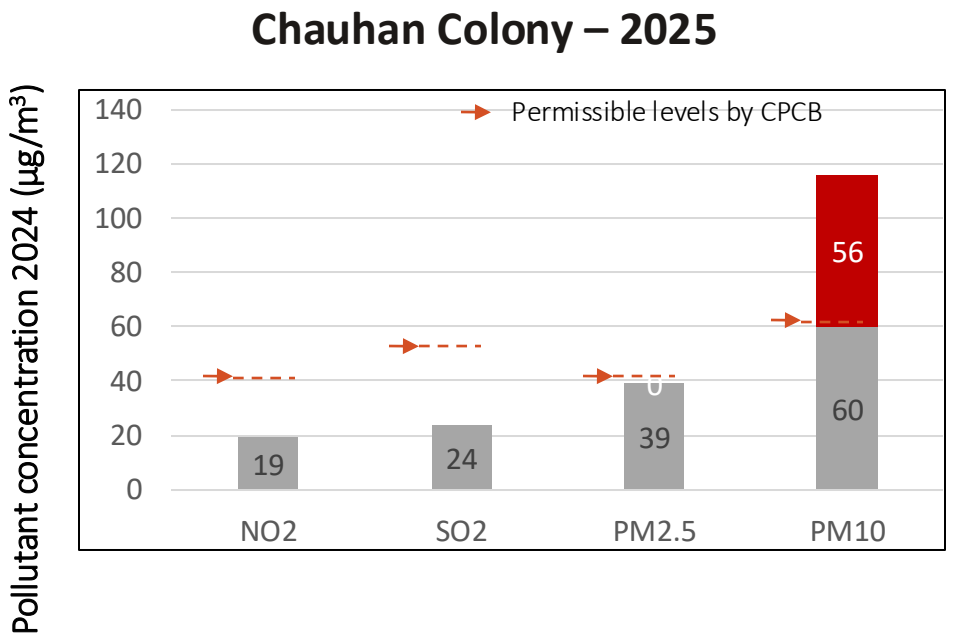
2024 (latest year with reliable data)

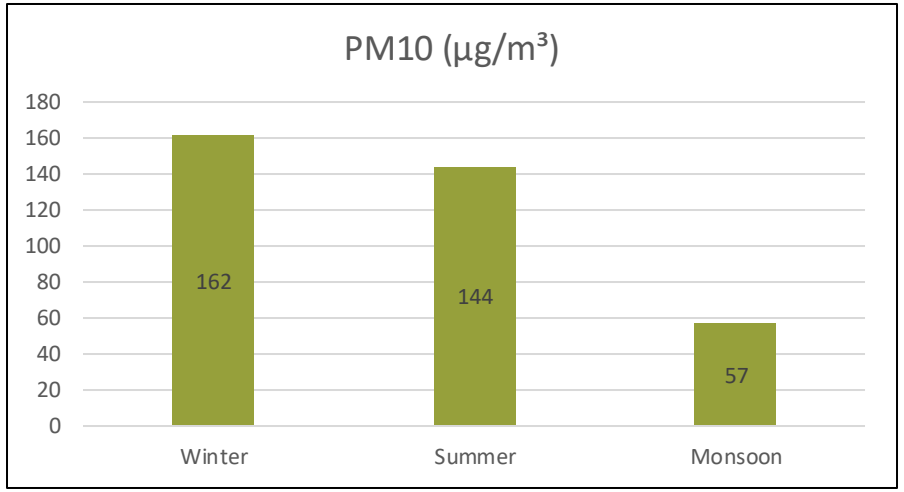
PM10 - 83 µg/m³
PM2.5 - 44 µg/m³

2025 (provisional)
PM10 – 39 µg/m³
PM2.5 – 116 µg/m³

Note: Insufficient values in June and no values for ongoing December

Annual Avg Concentration (2025)



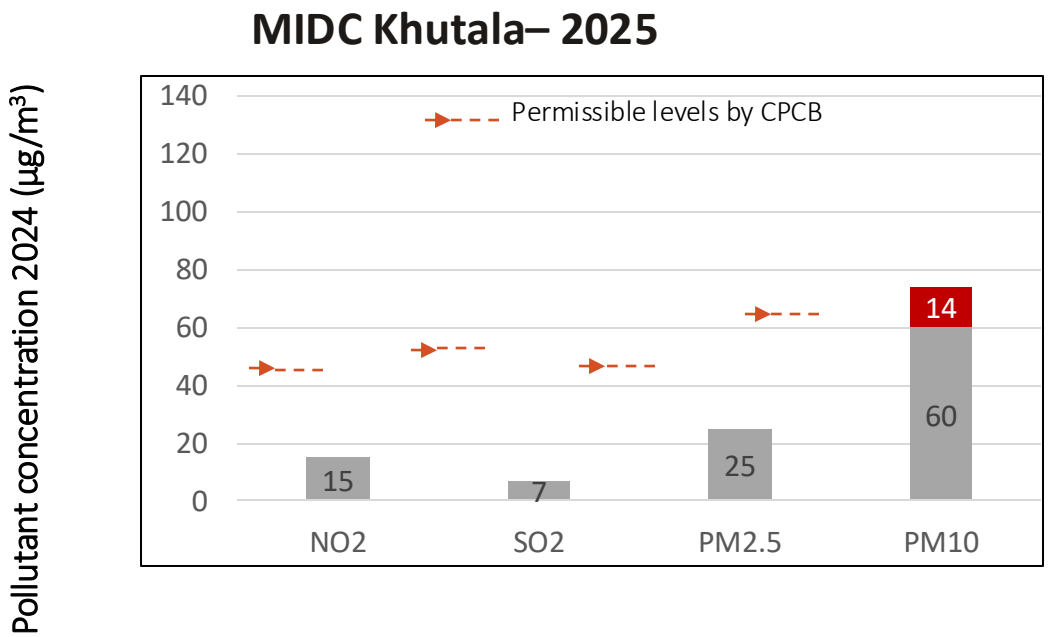


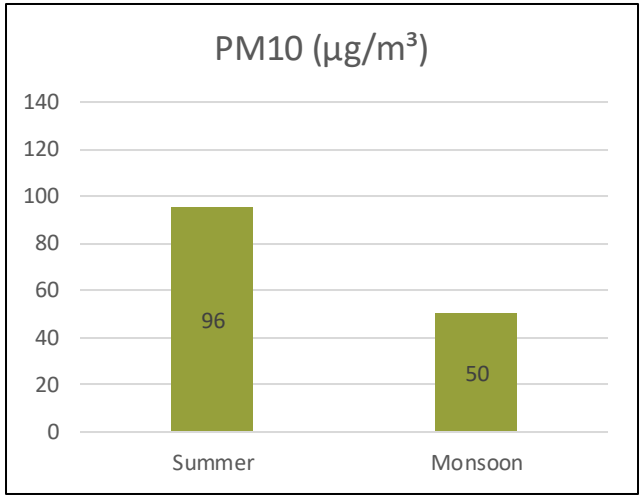
The annual PM_{10} (116 µg/m³) was found to be 1.93 times above the CPCB standard

NO_2 (19 µg/m³) and SO_2 (24 µg/m³) remained well within the prescribed standards

PM10 levels exceeded the NAAQS by roughly 2.7 times in winter and about 2.4 times in summer.

Annual Avg Concentration (2025)





Note: For the MIDC station, data for January and November is not available, and December data collection is still underway. As these are peak winter months, the final annual averages for 2025 are likely to be higher.

For the Chauhan station, June data is insufficient.

The annual PM_{10} (74 µg/m³) was found to be 1.23 times above the CPCB standard

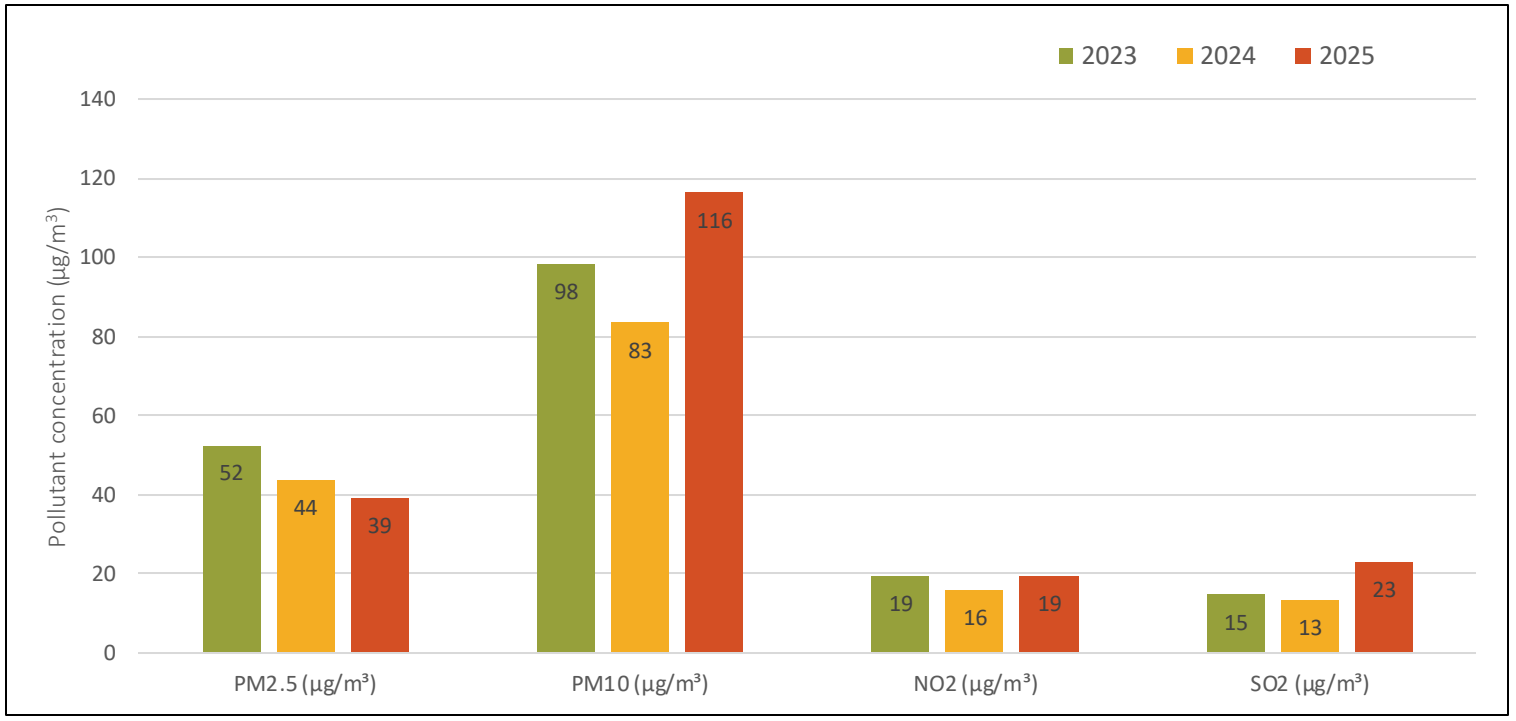
NO_2 (15 µg/m³) and SO_2 (7 µg/m³) remained well within the prescribed standards

PM10 levels exceeded the NAAQS by roughly 1.6 times in summer.

Yearly Annual Trend

Chauhan Colony

Pollutant **concentration 2023 vs 2024 vs 2025** (µg/m^3)



PM_{10} levels in 2025 shows a substantial increase of around 18% compared to 2023

58% Increase in SO_2 in 2025 values compared to 2023

Yearly Annual Trend

MIDC Khutala

Pollutant concentration **2018 vs 2019 vs 2021** (µg/m^3)

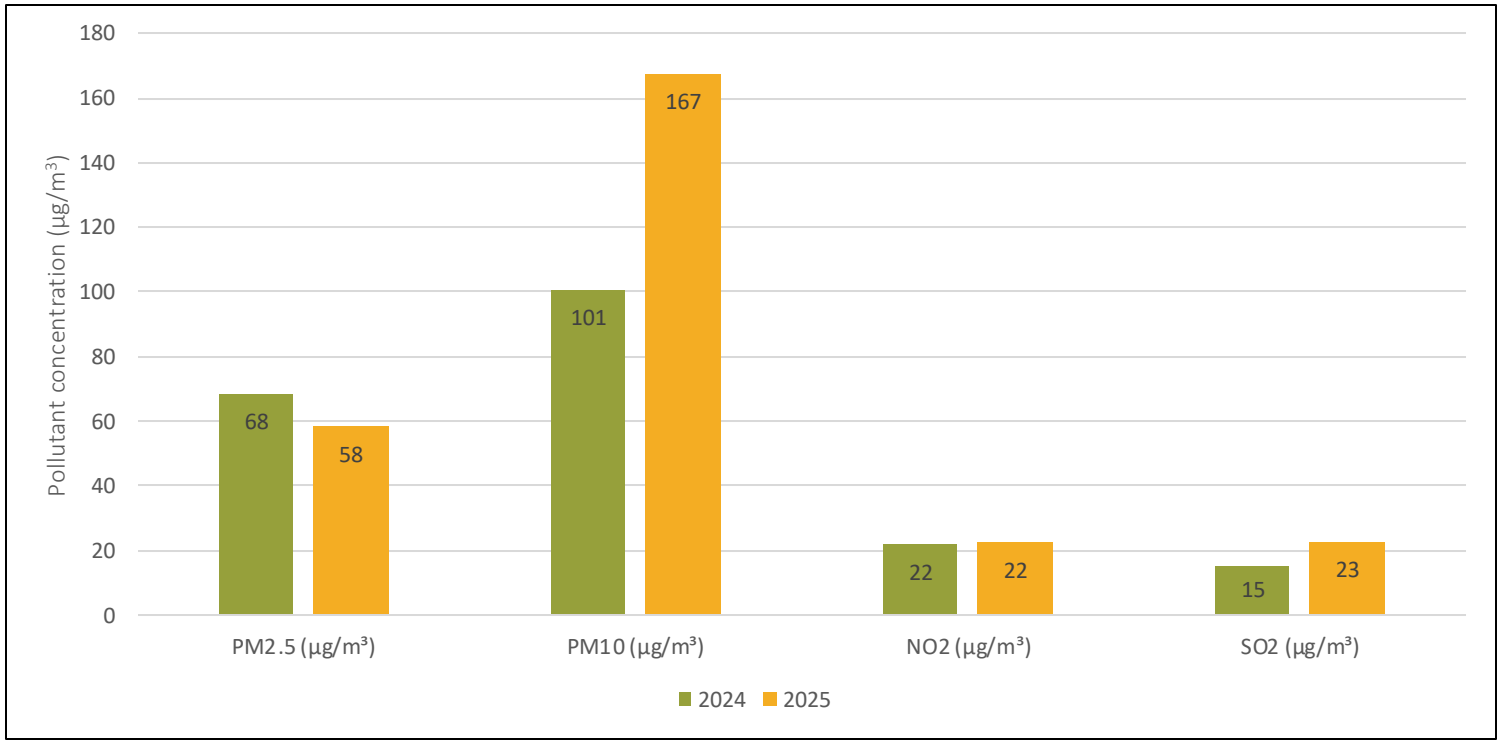
PM2.5 and PM_{10} levels in 2021 shows a substantial increase of around 39% and 34% respectively compared to 2019

89% Increase in SO_2 levels in 2021 compared to 2019

33% Increase in NO_2 in 2021 values compared to 2019

Winter Season Comparison (Jan - Feb)

Chauhan Colony - Average Winter pollutant concentration **2024 vs 2025**(µg/m³)



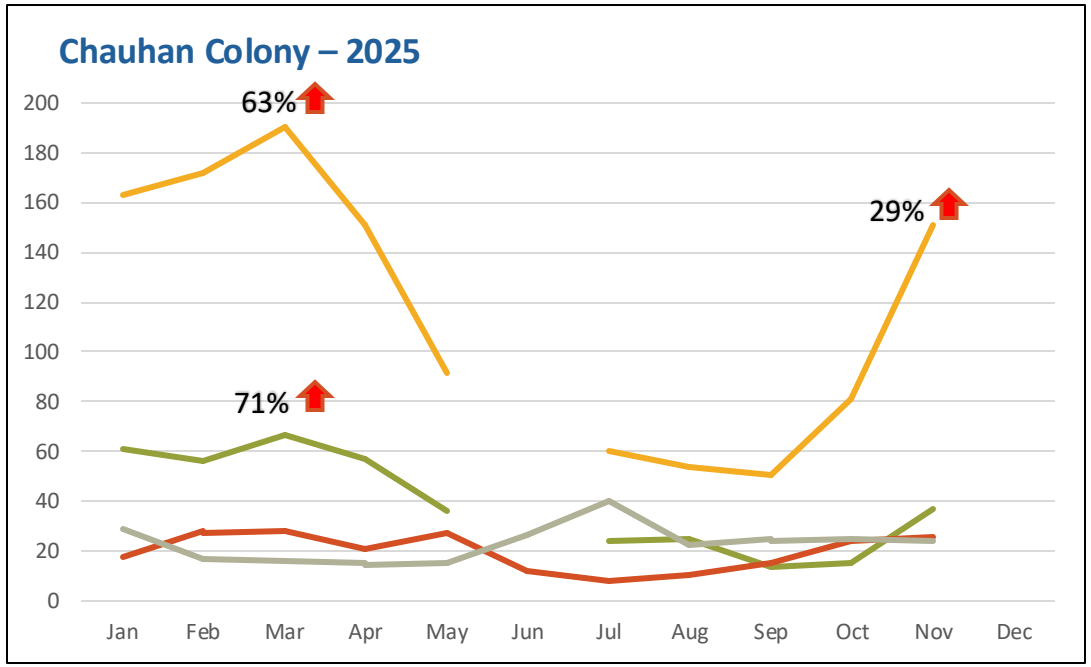
$PM_{2.5}$ declined by ~15% in 2025, while PM_{10} rose sharply by ~65%, indicating a shift from fine-particle pollution toward dust-dominated conditions.

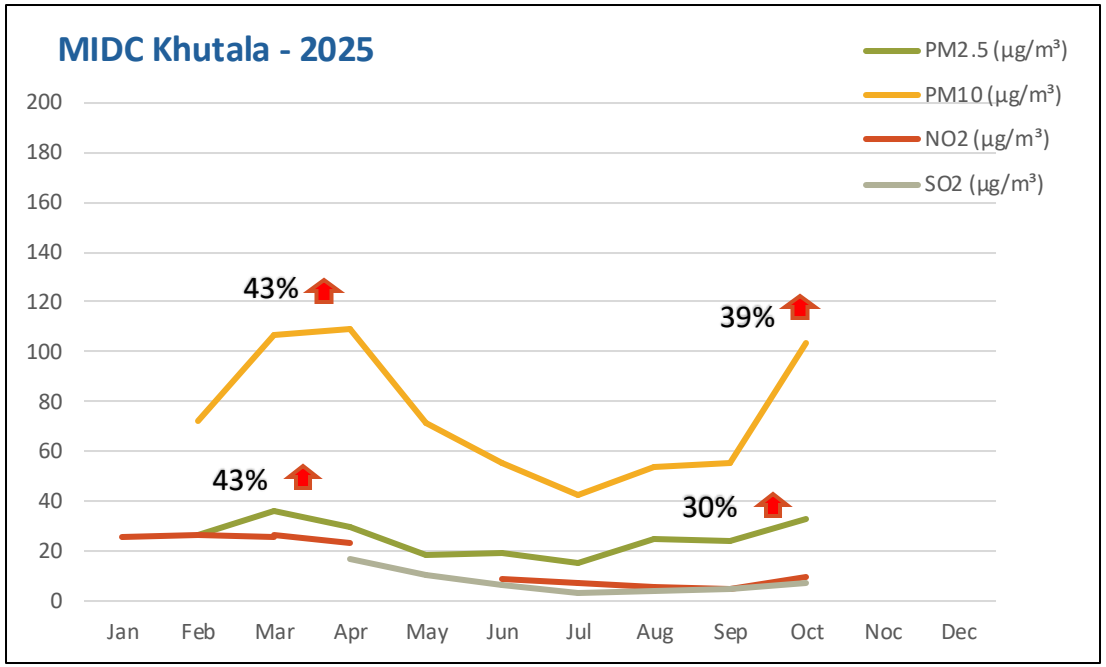
$PM_{2.5}/PM_{10}$ ratio dropped (0.67 → 0.35), confirming a shift from combustion to dust dominance.

SO_2 increased by ~53% (15 → 23 µg/m³), pointing to **greater sulphur-related fuel use** or increased industrial/backup fuel combustion during winter 2025.

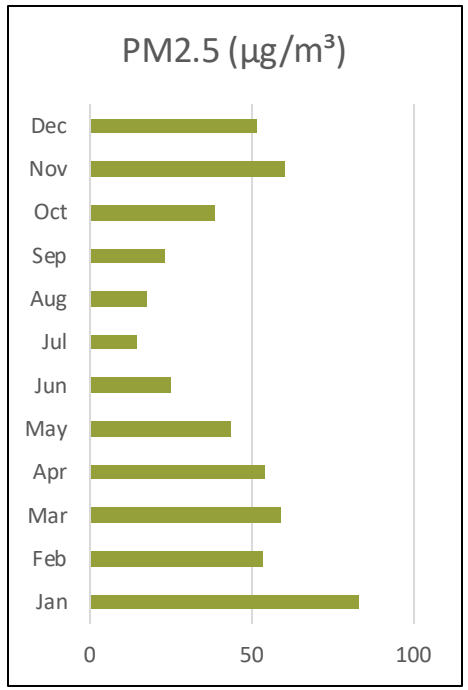
Monthly Average Trends – Station Wise

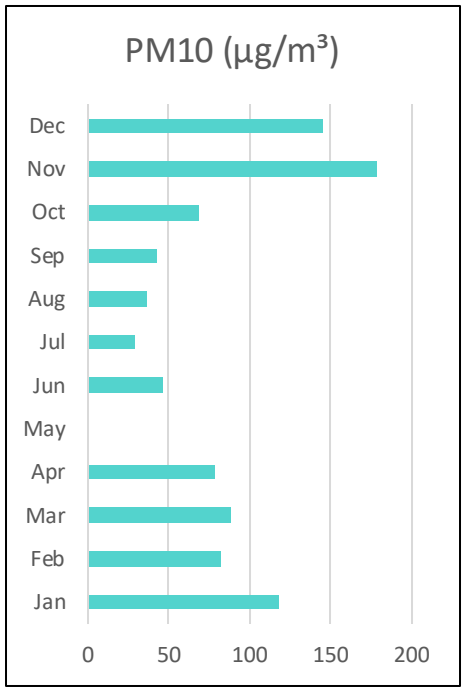
Pollutant concentration (µg/m³)

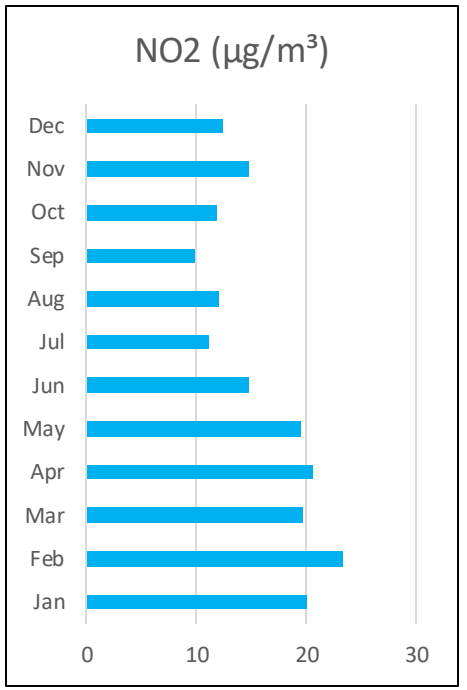


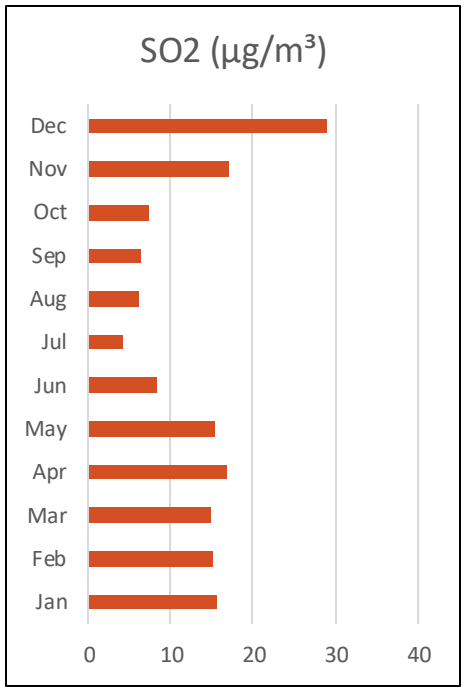


Monthly Trends (2024) – Pollutant wise









Concentration (µg/m³)

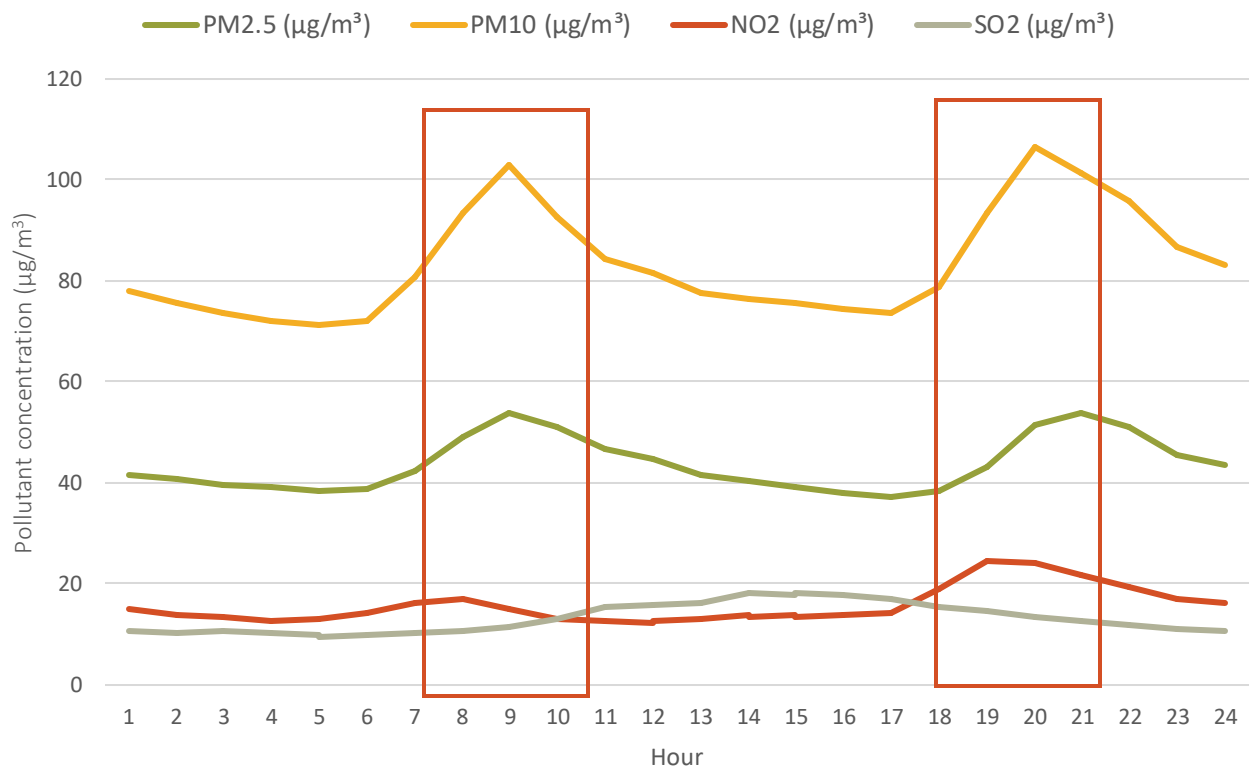
Winter months (November – February) experience highest PM10 and PM2.5 concentration

Average winter concentration was observed to be around **131 µg/m³ for PM10 and 62 µg/m³ for PM2.5**

During the monsoon season, PM2.5 levels **dropped** by **56%** compared to the annual average concentration

Winter season saw PM2.5 **increased by 42%** compared to the annual average concentration

Hourly Trends



Data shows sharp peak in PM2.5 and PM10 concentrations in the late evening between **07 to 08 PM**.

Morning peaks were observed for PM10 **9 to 10 AM** is observed

SO_2 levels stay low through most of the day.

NO_2 stays low for most of the day but rises a bit **between 6 PM and 8 PM, indicating vehicular movement**

Data Quality

MIDC Khutala

MIDC Khutala - 2023				
	PM2.5	PM10	NO2	SO2
Jan	82%	92%	89%	68%
Feb	14%	12%	44%	32%
Mar	12%	7%	38%	33%
Apr	24%	17%	34%	23%
May	16%	9%	45%	37%
Jun	41%	46%	44%	35%
Jul	43%	43%	33%	33%
Aug	29%	24%	28%	50%
Sep	35%	46%	52%	52%
Oct	14%	53%	53%	53%
Nov	6%	26%	51%	52%
Dec	12%	3%	27%	34%

MIDC Khutala - 2024				
	PM2.5	PM10	NO2	SO2
Jan	11%	0%	16%	50%
Feb	7%	13%	53%	53%
Mar	58%	67%	67%	74%
Apr	61%	59%	67%	71%
May	37%	34%	43%	37%
Jun	43%	48%	66%	44%
Jul	51%	41%	53%	40%
Aug	27%	56%	52%	44%
Sep	0%	51%	52%	38%
Oct	0%	26%	52%	39%
Nov	0%	0%	53%	43%
Dec	0%	5%	10%	6%

MIDC Khutala - 2025				
	PM2.5	PM10	NO2	SO2
Jan	58%	38%	77%	5%
Feb	70%	64%	94%	5%
Mar	79%	79%	94%	53%
Apr	83%	95%	91%	70%
May	78%	90%	60%	73%
Jun	64%	88%	80%	74%
Jul	67%	80%	83%	85%
Aug	86%	91%	95%	94%
Sep	75%	86%	89%	85%
Oct	81%	82%	87%	90%
Nov	45%	44%	50%	50%
Dec				

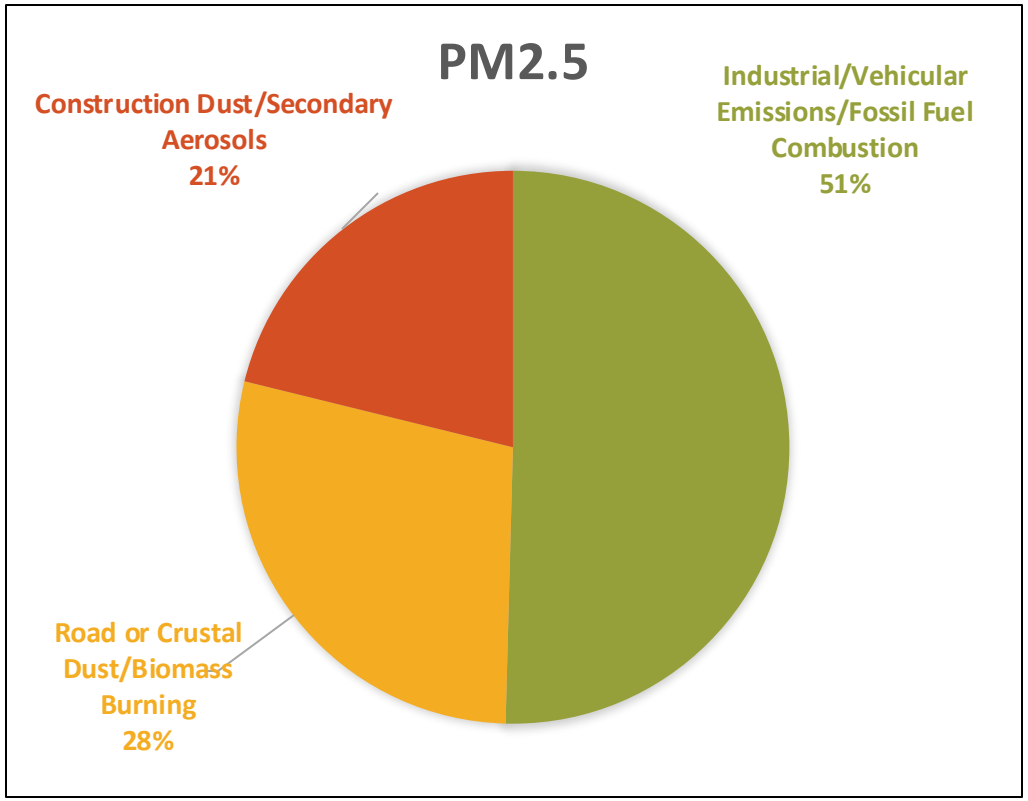
Chauhan Colony

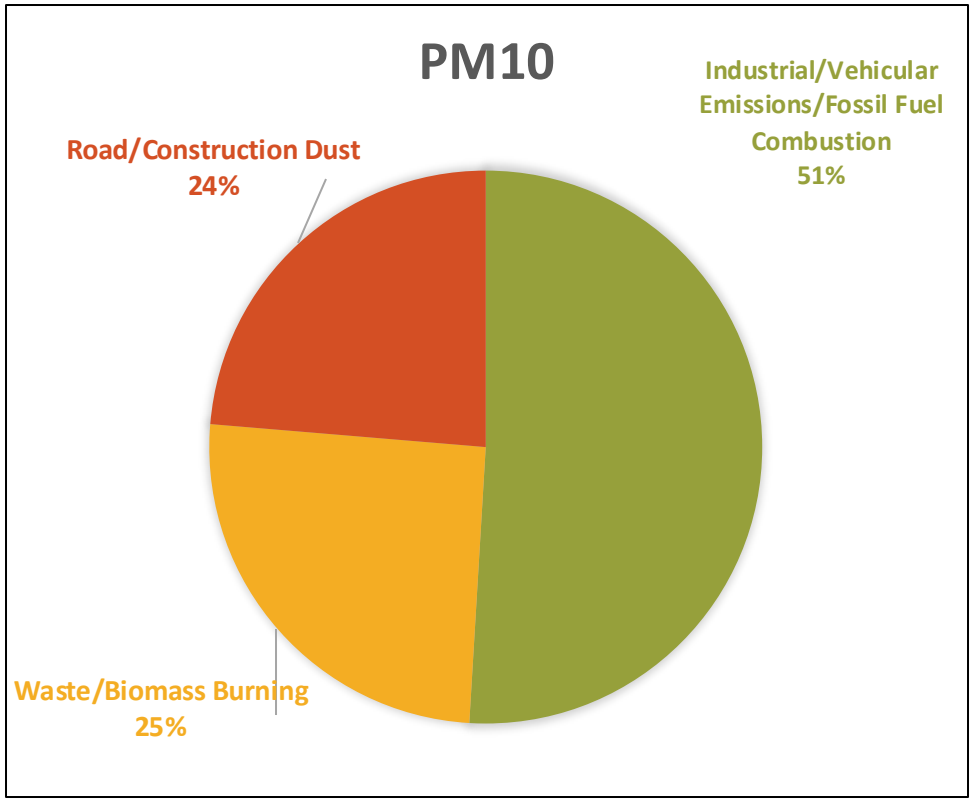
Chauhan Colony - 2023				
	PM2.5	PM10	NO2	SO2
Jan	92%	92%	93%	92%
Feb	91%	91%	92%	91%
Mar	89%	88%	94%	93%
Apr	88%	87%	89%	88%
May	81%	80%	85%	81%
Jun	81%	82%	93%	91%
Jul	81%	85%	81%	89%
Aug	91%	89%	94%	94%
Sep	93%	67%	95%	94%
Oct	92%	90%	94%	93%
Nov	93%	91%	94%	93%
Dec	83%	87%	93%	93%

Chauhan Colony - 2024				
	PM2.5	PM10	NO2	SO2
Jan	87%	88%	94%	93%
Feb	90%	85%	96%	94%
Mar	90%	84%	94%	93%
Apr	91%	91%	92%	91%
May	86%	54%	93%	91%
Jun	86%	88%	86%	85%
Jul	81%	82%	88%	85%
Aug	93%	93%	93%	92%
Sep	91%	91%	94%	93%
Oct	85%	85%	94%	94%
Nov	84%	84%	89%	89%
Dec	85%	89%	93%	92%

Chauhan Colony - 2025				
	PM2.5	PM10	NO2	SO2
Jan	81%	89%	89%	91%
Feb	80%	89%	94%	94%
Mar	84%	90%	94%	94%
Apr	77%	84%	91%	90%
May	65%	64%	75%	75%
Jun	57%	59%	67%	64%
Jul	79%	81%	91%	82%
Aug	74%	78%	89%	90%
Sep	76%	80%	89%	90%
Oct	82%	86%	97%	97%
Nov	91%	91%	98%	99%
Dec				

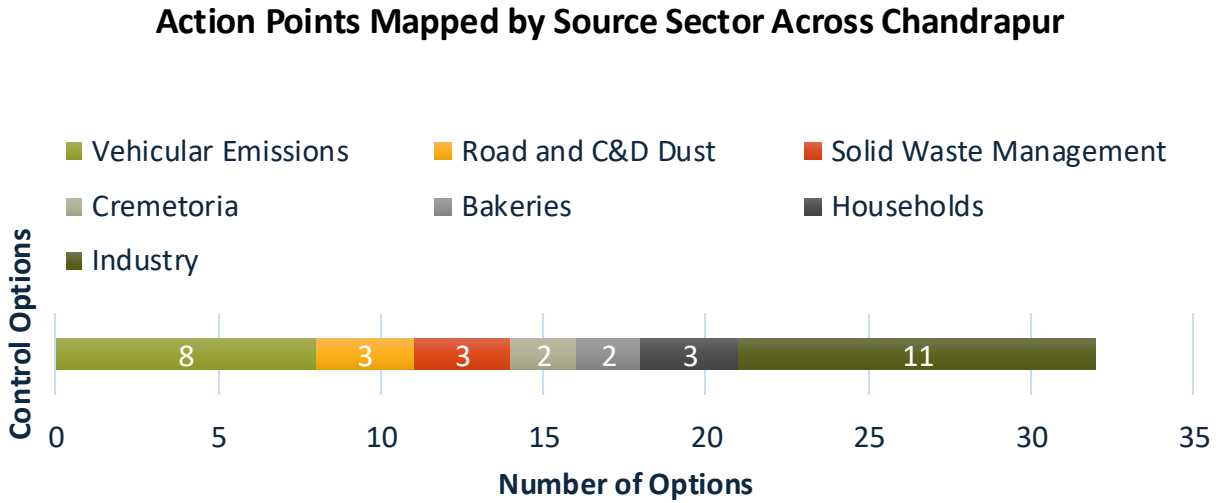
Particulate Matter - Source Categories (EI)

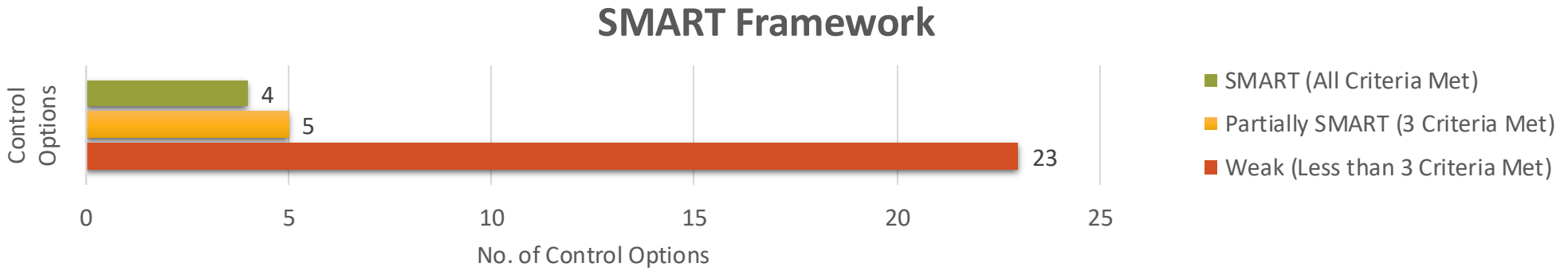




Source: IIT Bombay. (2022). *Air quality monitoring, emission inventory and source apportionment studies for ten cities in the state of Maharashtra.*

SMART Analysis – Chandrapur CAAP





Key Highlights

- **Monitoring station coverage:** Only 2 CAAQMS, No station in the northern/southern part of the city
- **Data Availability:** Notable data gaps such as missing months and absent PM2.5 values in some years. This restricts long-term trend analysis and weakens evidence-based planning.
- **Pollution Levels:** In 2024, PM10 levels in Chauhan colony was 83 µg/m³, and PM2.5 levels was 44 µg/m³, both above the annual NAAQS limits
- PM2.5 and PM10 peaks in the night, between 7 to 8 PM
- Winter concentrations indicate a mild rise in both PM10 and PM2.5
- Only 12.5 % control measures follow SMART framework (abide > 3 criteria's) and around 72 % are weak in following SMART framework