

**Air Quality Analysis Report**

**Summary:** This report presents an analysis of air quality data for New Delhi and Chennai from January 1 to January 3, 2025, focusing on PM2.5 for Chennai and NO2, O3, SO2 for New Delhi. The analysis explores trends, calculates average pollutant levels, and examines potential correlations with historical weather data, which indicate consistent temperatures and no precipitation across both cities.

**Detailed Analysis:**

**1. Air Quality Data Overview:**

**Chennai (PM2.5):**

January 1, 2025: PM2.5 concentration = 45 µg/m³

January 2, 2025: PM2.5 concentration = 50 µg/m³

January 3, 2025: PM2.5 concentration = 48 µg/m³

**Average PM2.5 for Chennai** = 47.67 µg/m³

**New Delhi (NO2, O3, SO2):**

January 1, 2025:

NO2 = 38 µg/m³

O3 = 70 µg/m³

SO2 = 15 µg/m³

January 2, 2025:

NO2 = 42 µg/m³

O3 = 65 µg/m³

SO2 = 14 µg/m³

January 3, 2025:

NO2 = 40 µg/m³

O3 = 68 µg/m³

SO2 = 16 µg/m³

**Average NO2** = 40 µg/m³

**Average O3** = 67.67 µg/m³

**Average SO2** = 15 µg/m³

**2. Trends and Observations:**

In Chennai, PM2.5 levels show a slight increase from January 1 to January 2, followed by a marginal decrease on January 3, indicating a relatively stable trend but still above the recommended safe levels (25 µg/m³ for PM2.5). In New Delhi, NO2 levels peaked on January 2, suggesting increased vehicular emissions or industrial activity. O3 levels fluctuated slightly but remained stable, while SO2 levels showed low variability.

**3. Weather Influence:**

Consistent temperatures and no precipitation suggest stagnant air conditions, potentially exacerbating pollution levels as no natural cleansing occurs.

Wind speed consistency may influence pollutant dispersion or accumulation. In urban areas like New Delhi, prevailing winds could either help disperse pollutants or trap them in the atmosphere, especially in low wind conditions.

The consistency in temperature indicates that weather was not a significant factor in the variation of air quality across the analyzed days; however, temperature inversions can trap pollutants close to the surface, particularly in winter months.

#### **4. Conclusion:**

The analysis indicates concerning PM<sub>2.5</sub> levels in Chennai consistently above safe limits, while New Delhi shows variability in NO<sub>2</sub> and SO<sub>2</sub> levels, reflecting local pollution sources. The lack of precipitation and consistent temperatures likely contributed to the stability of these trends. Continuous monitoring of air quality and weather conditions is essential for understanding and mitigating pollution sources in these urban environments.