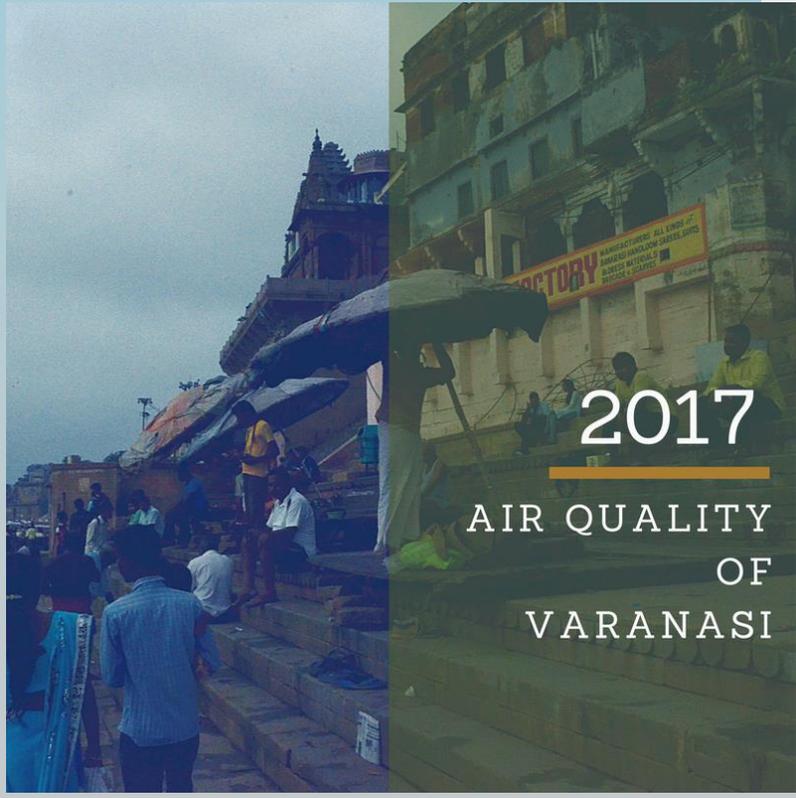


AIR QUALITY BULLETIN FACTSHEET 2017



2017

AIR QUALITY
OF
VARANASI



Highlights

1. In the year 2017, **only 5% (18) days were found under the 'Good air quality' category**. It was observed that maximum number of days (73%) in Varanasi had bad air quality.
2. In 73% of bad air quality days, 53% of the days have relatively high levels of pollution and the air quality was under '**Poor**' to '**Severe+**' category.
3. Among the rest of the total 348 monitored days, 22% were noted under '**Satisfactory**' category.
4. **504¹ µg/m³** is the maximum concentration of particulate matter (PM_{2.5}) observed in Varanasi on **April 24, 2017**, which is 8 times higher than its safe limits.
5. Monthly mean concentration of particulate matter (PM_{2.5}) was recorded to be the **highest in the month of December** (2278 µg/m³), followed by January (230 µg/m³) and November (183 µg/m³), 2017.
6. In five places, **Chandpur** has been found as the most polluted place in Varanasi **where the quality of air is monitored manually**.
7. The annual average concentration of PM_{2.5} in Varanasi was **121 µg/m³** which was 3 times more than the national standard.
8. As an immediate response to the state of the ambient air quality in Varanasi, the Uttar Pradesh Government must formulate a Clean Air Action Plan with each action plan in a time bound manner.
9. The government must inform residents about the air quality and must also issue health advisory for the citizens.

¹ The value is of Continuous air quality monitoring station installed at Ardhali Bazar. Air quality monitored by single monitoring stations will not be representative of city's air quality but this has been used to understand the city's situation.

Background

The purpose of this report is to summarize the ambient air quality of Varanasi in year 2017, and also to investigate the level of exposure of air pollution. The data from Pollution Control Board (CPCB) real time monitoring stations was used and were further analyzed using varied statistical tools and technique.

The particulate matter along with other pollutants is perpetually monitored with Continuous Air Quality Monitoring device installed at Ardhali Bazar in Varanasi. The air quality of Varanasi is also measured using 5 manual monitoring stations installed at 1 industrial (Chandpur), 1 commercial (Sigra) and 3 residential (Jawaharnagar, Saket Nagar and Banaras Hindu University) sites.

The particulate matter has been established as the prominent pollutant for the pollution in Varanasi and all the other monitored pollutants have been found generally under its safe limits. The report therefore also assesses and presents a trend of PM_{2.5} using continuous air quality monitoring station.

I. Good day versus bad days in Varanasi

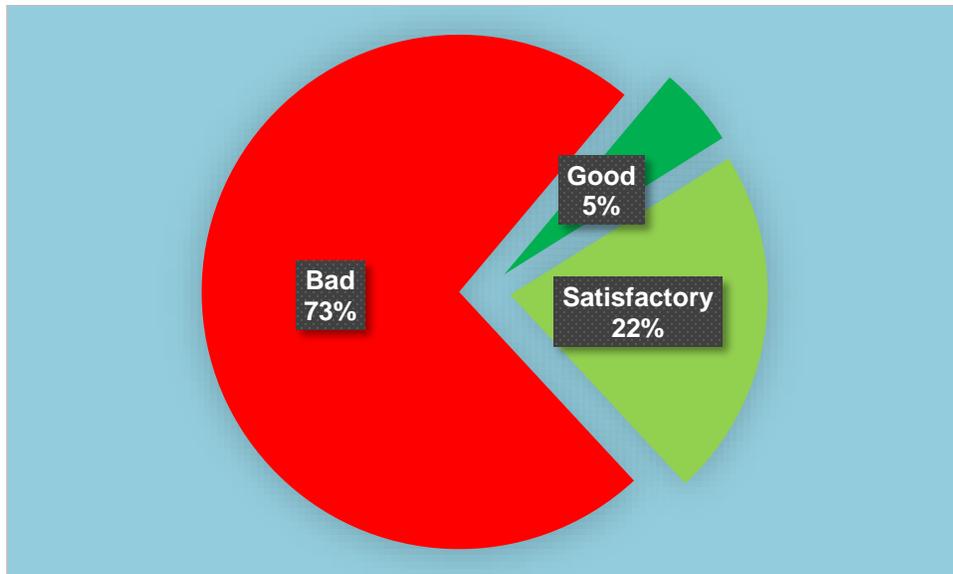
The number of days with varied Air Quality Index² values is elaborated in the graph. The colour-coding of the bar graph is in accordance with CPCB's AQI category.

It was observed that only 5% (18 days) of total monitored days were found under 'Good' category in Varanasi.

In 2017, it was observed that maximum number of days (73%) in Varanasi had bad air quality. Out of these, 53% have relatively high levels of pollution and the air quality was under '**Poor**' to '**Severe+**' category.

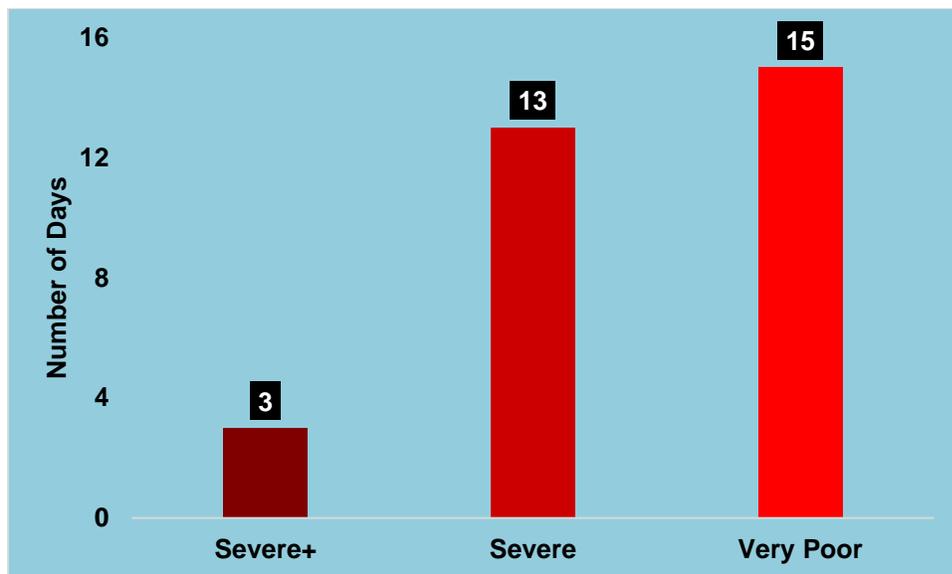
22% of the total days monitored have witnessed '**Satisfactory**' air quality category.

² The AQI is based on the sub index of the three pollutants, which is PM_{2.5}, NO₂, SO₂. AQI has been calculated as per the procedure prescribed by CPCB.



Graph 1: Air Quality in year 2017

In the last month (December), Varanasi's air was not less than toxic smoke and was found in **'Very Poor' to 'Severe+' category for 31 consecutive days.** Almost half (13 days) of the of total days were under Severe category which not only affect individuals suffering from diseases like heart problems, asthma etc but also affects the healthy individuals.

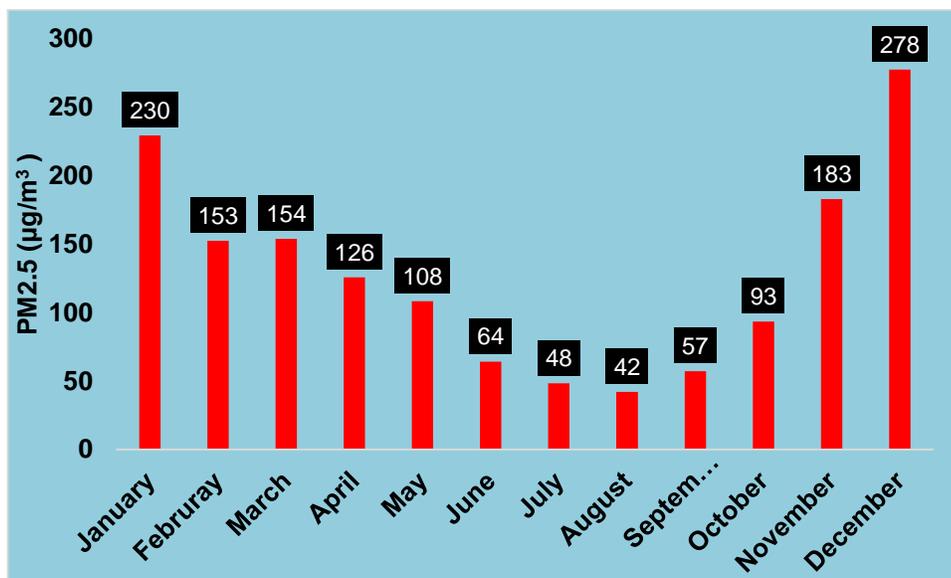


Graph 2: Distribution of December days based on Air Quality noted

I. Most Polluted month

All round the year, the monthly mean concentration of $PM_{2.5}$ was observed to be the highest for December in Varanasi. The average concentration of $PM_{2.5}$ was calculated as $278 \mu\text{g}/\text{m}^3$; while in the month of January and November, the monthly mean concentrations were $230 \mu\text{g}/\text{m}^3$ and $183 \mu\text{g}/\text{m}^3$ respectively.

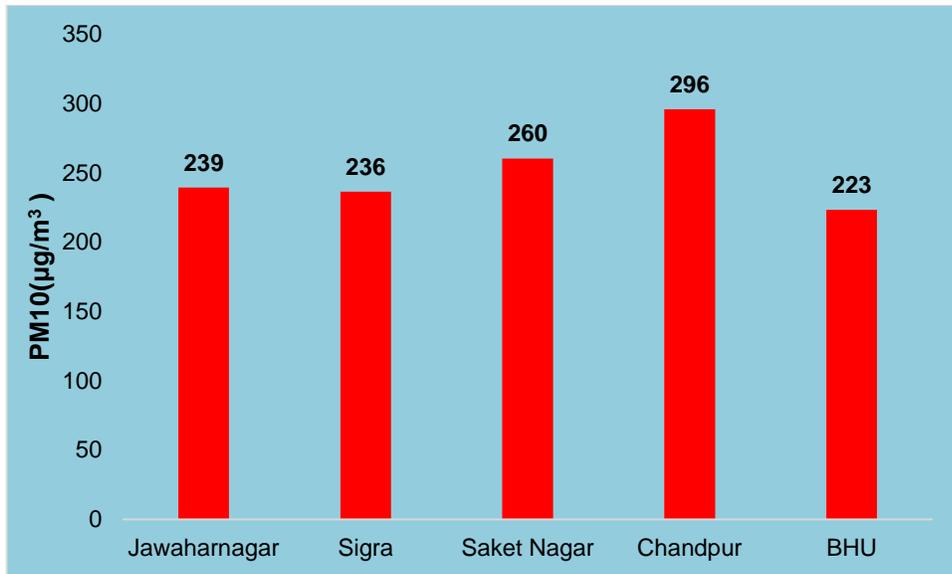
August and July have been the least polluted month, the monthly mean concentration were $42 \mu\text{g}/\text{m}^3$ and $48 \mu\text{g}/\text{m}^3$ respectively



Graph 3: Monthly mean concentration of Particulate matter ($PM_{2.5}$) in 2017

II. Most Polluted Place in Varanasi based on Manual Air Quality Stations

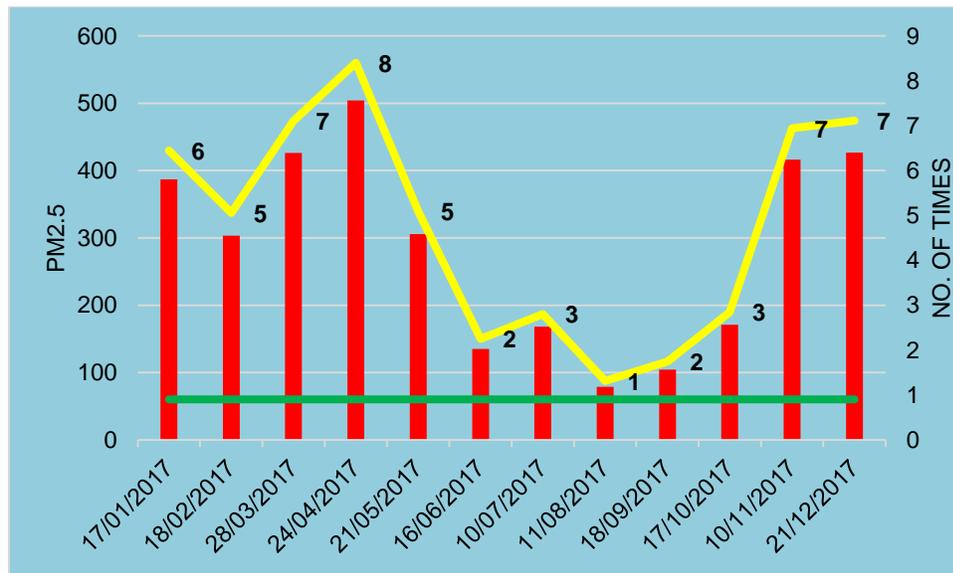
Chandpur has been found as the most polluted place in Varanasi among the five locations where manually air quality data is being monitored. The annual mean **$PM_{2.5}$ concentration was $296 \mu\text{g}/\text{m}^3$ followed by Saket Nagar ($260 \mu\text{g}/\text{m}^3$) and Jawaharnagar ($239 \mu\text{g}/\text{m}^3$).**



Graph 4: Most Polluted based on Manual monitoring stations data

III. The worst days of every month

In the year 2017, Varanasi's air quality was found to be worst on April 24, 2017. The concentration was 504 µg/m³ which is 8 times higher than the safe limits.



Graph 5: Worst days of every Month

The worst recorded day in each month is presented below in the table.

Date	Concentration	No. of times
17/01/2017	387	6
18/02/2017	303	5
28/03/2017	426	7
24/04/2017	504	8
21/05/2017	306	5
16/06/2017	135	2
10/07/2017	168	3
11/08/2017	79	1
18/09/2017	105	2
17/10/2017	171	3
10/11/2017	416	7
21/12/2017	427	7

Table: The Worst days of Every Month

V. Comparison of the air quality of last two years

In the last year, there is no major improvement in the air quality of Varanasi. However the air quality of the year 2017 is slightly better than that of year 2016. The annual average concentration of PM_{2.5} in Varanasi was slightly better at 121 µg/m³ compared to previous year (2016) when it was 138.2 µg/m³, however, it was still 3 times more than the national standard limits.

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About CEED

Centre for Environment and Energy development (CEED) is a solution-driven non-profit organization that works towards creating inspiring solutions to maintain a healthy, rich and diverse environment. CEED is dedicated to finding solutions for climate and energy, hazardous free future and for clean and safe water.

The idea of CEED was conceived by a group of young professionals with vast amount of experience in the field of environment. CEED was registered in November 2012 as non profit organization under section 25, Companies Act, 1956.

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