

An invisible threat: Ground-level ozone in summer

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Centre for Science and Environment, New Delhi, 3 June, 2022

Centre for Science and Environment (CSE) has alerted from time to time about the growing problem of ground level ozone in Indian cities. While policy and public attention is nearly fully drawn towards very high level of particulate pollution, the challenge of this emerging toxic gas has not attracted adequate policy attention for mitigation and prevention. Inadequate monitoring, limited data and inappropriate methods of trend analysis have weakened the understanding of this growing toxic risk. This requires early action.

The summer of 2022 one the hottest summers, has witnessed unprecedented spread of ozone exceedance in Delhi-NCR more toxic. While number of stations exceeding the ozone standards have increased, this exceedance has also occurred every day during this summer. Among the six big metros Mumbai is second in order followed by Kolkata, Hyderabad, Chennai and Bangalore. Chennai and Bengaluru have longer duration of exceedance despite lower frequency compared to other metros. This has emerged from the latest air quality analysis by the Centre for Science and Environment on the occasion of the World Environment Day. This analysis is part of the air quality tracker initiative of the Urban Lab at CSE.

Health evidence is also growing stronger. The 2020 State of Global Air report states that age-standardized rates of death attributable to ozone is among the highest in India and the seasonal 8-hour daily maximum concentrations have recorded one of the highest increases in India between 2010 and 2017– about 17 per cent. This requires deeper understanding of what is going on in different cities and regions to inform mitigation.

Due to the very toxic nature of ground-level ozone, the national ambient air quality standard for ozone has been set for only short-term exposures (one-hour and eight-hour averages), and compliance is measured by the number of days that exceed the standards. Compliance requires that the standards are met for 98 per cent of the time of the year. It may exceed the limits on two per cent of the days in a year, but not on two consecutive days of monitoring. In other words, there should not be more than eight days in a year when the ozone standard is breeched, and none of those allowed exceedances can be on two consecutive days.

The standard practice of Central Pollution Control Board to average out the data of all stations in the city to determine daily AQI does not work for ground-level ozone as it is a short-lived and hyper-localised pollutant. A citywide average concentration level over an extended time frame does not indicate the severity of the problem and health implication from local build up and exposure for people living in hotspots.

Global experience shows that there is usually a trade-off. As particulate pollution is reduced the problem of NO_x and ozone increase. Globally, regulators are tightening the regulatory benchmark for ozone to address the toxic threat which – given its complex chemistry, is difficult to address. India should prevent this trap.

Why ozone needs special attention? Complex chemistry of ground-level ozone makes it a difficult pollutant to track and mitigate. Ground level ambient ozone is not directly emitted from any source. It is produced from complex interaction between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are emitted from vehicles, power plants, factories, and other combustion sources and undergo cyclic reactions in the presence of sunlight to generate ground level ozone. VOCs can also be emitted from natural sources, such as plants. Ground-level ozone not only builds up in cities but also drifts long distances to form a regional pollutant that makes both local and regional action necessary.

This highly reactive gas has serious health consequences. Those with respiratory conditions, asthma, chronic obstructive pulmonary disease, and particularly children with premature lungs and older adults are at serious risk. This can inflame and damage airways, make lungs susceptible to infection, aggravate

asthma, emphysema, and chronic bronchitis and increase the frequency of asthma attacks leading to increased hospitalisation.

The investigation: This assessment has traced trends during summer (March-May) between 2019 to 2022 May (upto May 30th). The analysis is based on publicly available granular real time data (15-minute averages) from the CPCB's official online portal Central Control Room for Air Quality Management. The data has been captured from 58 official stations under the Continuous Ambient Air Quality Monitoring System (CAAQMS) spread across Delhi-NCR. Delhi (40), Gurugram (4), Faridabad (4), Noida (4), Ghaziabad (4), and Greater Noida (2) have multiple stations and are covered in the study.

Given the volatile and highly localized nature of ozone pollution build-up and its variability across space, and consistent with the global good practice, this analysis has considered station level trends in terms of number of days exceeding the 8-hour standard over time. As ozone formation depends on complex atmospheric chemistry and on photochemical reaction its level varies across time and space horizon. Meteorological parameters such as sunny and warm weather, stagnant wind patterns etc have bearing on its formation. This analysis tracks exceedances at each station in a city. Breach of the standard by even one station in the city is considered exceedance by the city. Days with multiple stations exceeding the standard indicates the severity of the spatial spread and number of people exposed. Given that the data is capped at $200 \mu\text{g}/\text{m}^3$ by CPCB, it is not possible to determine how high the concentration really goes.

This has considered global good practice and taken on board the USEPA approach of computing eight-hour averages for a day and then checking for the maximum value among them to capture the daily ozone pollution level. USEPA assesses city-wide or regional AQI based on highest value recorded among all city stations. Thus, trends have been calculated in terms of number of days when the daily level has exceeded the 8-hr standard (referred as exceedance days hereafter). A simple city-wide spatial averaging has not been considered for the trend analysis though it has been assessed.

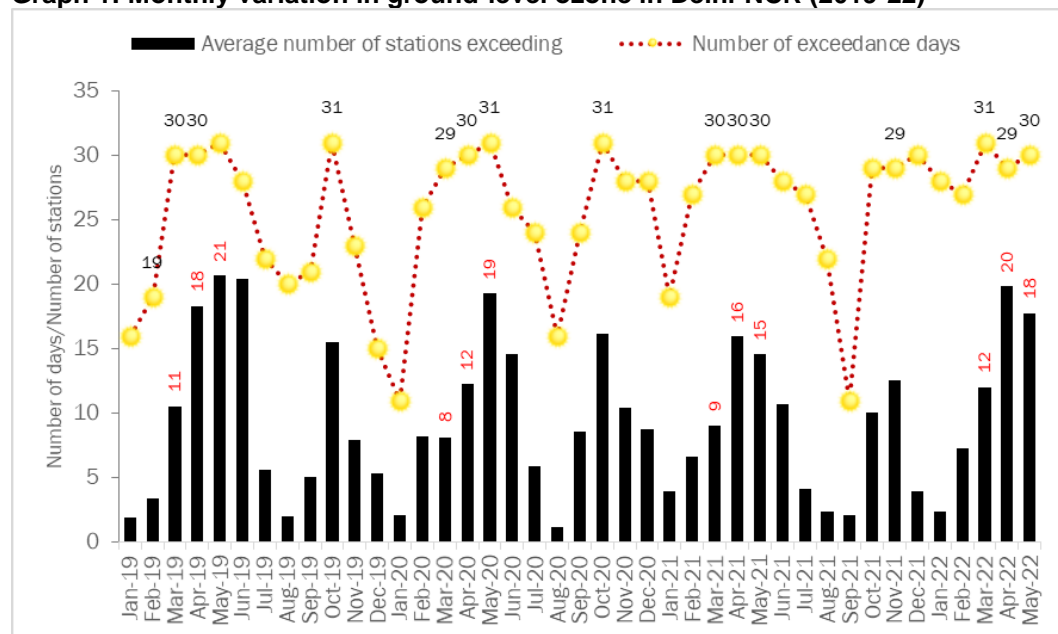
While analysing the data it has also been noted that the ozone data available on CPCB portal never exceeds $200 \mu\text{g}/\text{m}^3$, while data for the corresponding time on Delhi Pollution Control Committee may show higher levels. Therefore, due to this capping of data it is not possible to understand the nature of peaking in the city. This needs to be addressed as there are two sets of standard for ozone – 8-hourly standard of $100 \mu\text{g}/\text{m}^3$ and one hourly standard at $180 \mu\text{g}/\text{m}^3$. Capping has made assessment of one-hourly standard challenging. This study has assessed trends only based on 8-hourly standard.

Key highlights of the analysis for Delhi-NCR

Heatwaves advanced the geographical spread of ground-level ozone: This year due to early onslaught of heatwaves the spatial spread of ground-level ozone started in March itself with April being the worst so far (See *Graph 1: Monthly variation in ground-level ozone in Delhi-NCR (2019-22)*).

The dangerous build-up of ground-level ozone can happen anytime during the year, but it is usually in small pockets. For it to have wider spatial spread hot and sunny weather conditions are needed which are generally present in summer – especially during May. But this year the frequency and spread of ozone exceedance started early - in the month of March.

Graph 1: Monthly variation in ground-level ozone in Delhi-NCR (2019-22)

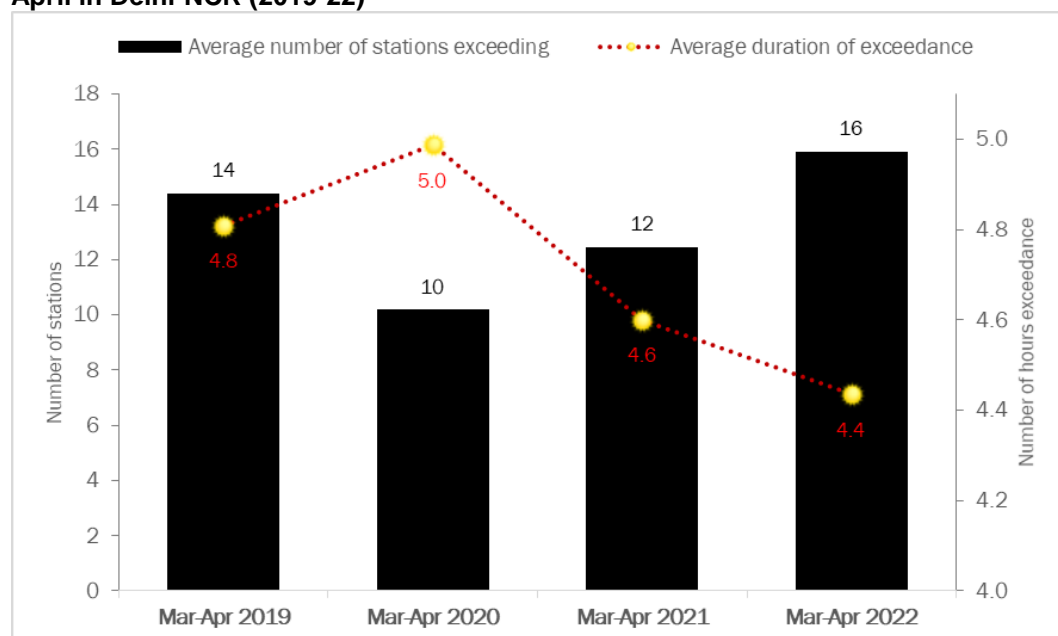


Note: Based on exceedances recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

Geographical spread of ground-level ozone pollution in Delhi-NCR during March-April highest in past 4 years: Ground-level ozone usually exceeds the safety standard on all days of summer in some location in Delhi-NCR every year. But this year the spatial spread (number of stations exceeding the standard across the city) has been much higher this year. On an average 16 stations have exceeded the standard daily this March and April, which is 33 per cent increase from previous year March and April (See *Graph 2: Variation in average duration and spatial spread of daily exceedance during March and April in Delhi-NCR (2019-22)*). During 2020 when lockdowns had reduced the precursor gases needed for formation of ground-level ozone, the number was down to 10 stations daily.

Even though, the spatial spread of ground-level ozone has significantly increased this summer, its duration has reduced slightly. This summer, daily on an average the rolling 8-hr average stayed above standard for 4.4 hours, which is marginally down from 4.6 hours observed last year and 5 hours recorded during 2020 summer. Longer duration during 2020 summer was due to pandemic lockdowns which reduced evening traffic therefore lesser NO_2 in the evening air which is critical for breaking down of ground-level ozone after sunset.

Graph 2: Variation in average duration and spatial spread of daily exceedance during March and April in Delhi-NCR (2019-22)

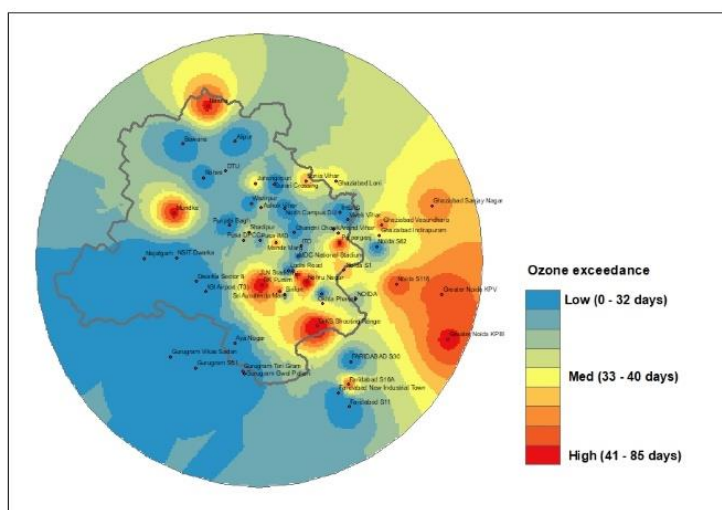


Note: Based on exceedances recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Duration of exceedance is computed as number of hours the rolling 8-hr average was exceeded at a station on a day. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

New Delhi and South Delhi neighborhoods are worst affected by ground-level ozone pollution: Dr KS Shooting Range in south Delhi is the most chronically affected in Delhi-NCR. It has exceeded the standard in this location for 85 days this March-May. It is followed by JLN Stadium, RK Puram and Nehru Nagar in New Delhi as the worst polluted (See *Map 1: Hotspots of ground-level ozone exceedance in Delhi-NCR (March-May 2022)* & *Table 1: List of locations with most chronic ground-level ozone pollution in Delhi-NCR (March-May, 2022)*). Greater Noida is the major hotspot outside Delhi. Faridabad has least instances of ground-level ozone exceedances in the region (See *Table 2: List of locations that recorded lowest intensity of ground-level ozone pollution daily built-up in Delhi-NCR (March-May, 2022)*).

Map 1: Hotspots of ground-level ozone exceedance in Delhi-NCR (March-May 2022)



Note: Based on exceedances recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Table 1: List of locations with most chronic ground-level ozone pollution in Delhi-NCR (March-May, 2022)

S.No.	Station	Number of exceedance days
1	Dr KS Shooting Range, Delhi	85
2	JLN Stadium, Delhi	79
3	RK Puram, Delhi	77
4	Nehru Nagar, Delhi	76
5	Patparganj, Delhi	69
6	Mundka, Delhi	68
7	Narela, Delhi	67
8	Knowledge Park III, Greater Noida	67
9	Knowledge Park V, Greater Noida	64
10	Sector 116, Noida	62

Note: Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 µg/m³. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

Table 2: List of locations that recorded lowest intensity of ground-level ozone pollution daily built-up in Delhi-NCR (March-May, 2022)

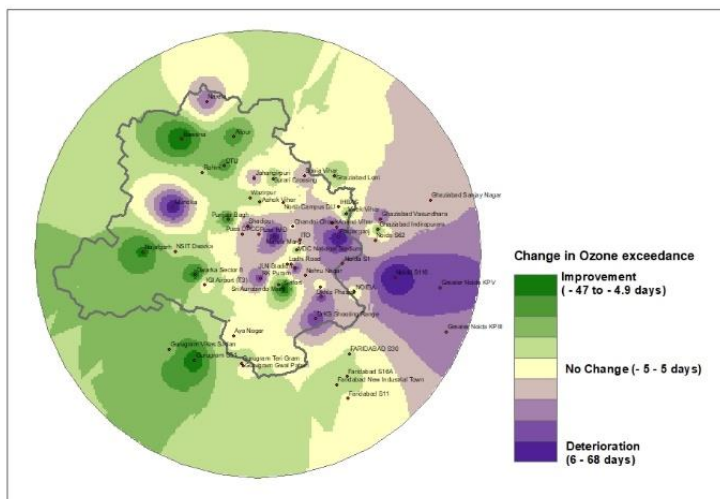
S.No.	Station	Seasonal peak daily 8hr average*
1	Sector 11, Faridabad	10
2	Lodhi Road, Delhi	27
3	New Industrial Town, Faridabad	59
4	IGI Airport T3, Delhi	65
5	Burari Crossing, Delhi	71
6	Teri Gram, Gurugram	79
7	Sector 125, Noida	79
8	NSIT Dwarka, Delhi	84
9	Vivek Vihar, Delhi	86
10	Sector 30, Faridabad	89

Note: Based on daily maximum 8-hr average. * Values are in µg/m³. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

East and Central Delhi are facing worsening trend: Patparganj in East Delhi registered highest increase in number of days exceeding the standard compared to the average of last three years. It registered a dramatic jump of 68 additional days with exceedance. It was followed by Noida Sector 116 and Mandir Marg next to the President Estate (See *Map 2: Change in hotspots of ground-level ozone exceedance in Delhi-NCR (March-May 2022 vs baseline)* & *Table 3: List of locations with most increase in ground-level ozone pollution in Delhi-NCR (March-May, 2022 vs baseline)*).

Sirifort and Bawana in Delhi registered most reduction in frequency of exceedances compared to average of previous three years. Their exceedances were down by over 40 days this year (See *Table 4: List of locations with most decrease in ground-level ozone pollution in Delhi-NCR (March-May, 2022 vs baseline)*). Gurugram Sector 51, Dwarka Sector 8, and Najafgarh were other locations with most improvement.

Map 2: Change in hotspots of ground-level ozone exceedance in Delhi-NCR (March-May 2022 vs baseline)



Note: Based on exceedances recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Baseline is defined as average of 2019, 2020, and 2021. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Table 3: List of locations with most increase in ground-level ozone pollution in Delhi-NCR (March-May, 2022 vs baseline)

S.No.	Station	Change from baseline*
1	Patparganj, Delhi	68
2	Sector 116*, Noida	57
3	Mandir Marg, Delhi	49
4	Mundka, Delhi	44
5	JLN Stadium, Delhi	36
6	Knowledge Park V*, Greater Noida	36
7	Dr KS Shooting Range, Delhi	31
8	Okhla Phase 2, Delhi	30
9	RK Puram, Delhi	28
10	Vasundhara, Ghaziabad	25

Note: Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Baseline is defined as average of 2019, 2020, and 2021. * Values are in days. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Table 4: List of locations with most decrease in ground-level ozone pollution in Delhi-NCR (March-May, 2022 vs baseline)

S.No.	Station	Change from baseline*
1	Sirifort, Delhi	-49
2	Bawana, Delhi	-40
3	Sector 51*, Gurugram	-36
4	Dwarka Sector 8, Delhi	-34
5	Najafgarh, Delhi	-32
6	Punjabi Bagh, Delhi	-27
7	Alipur, Delhi	-25
8	DTU, Delhi	-24
9	Vikas Sadan, Gurugram	-20
10	Indirapuram, Ghaziabad	-19

Note: Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Baseline is defined as average of 2019, 2020, and 2021. * Values are in days. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Ground-level ozone hotspots are located in the areas with low levels of NO₂ and PM_{2.5}: The spatial distribution of ground-level ozone is inverse of the NO₂ and PM_{2.5} (See *Map 3: Spatial relationship among hotspots for key pollutants in Delhi-NCR (March-May 2022)*). Nehru Nagar and JLN Stadium in New Delhi are exception to this phenomena as both stations report high NO₂ and ground-level ozone (See *Table 5: List of locations that recorded highest intensity of NO₂ daily built-up in Delhi-NCR (March-May, 2022)*). Likewise, industrial areas of Mundaka and Burari Crossing report concurrent high PM_{2.5} and ground-level ozone (See *Table 6: List of locations that recorded highest intensity of PM_{2.5} daily built-up in Delhi-NCR (March-May, 2022)*). This bears out the fact that while ozone is created in polluted areas with nitrogen oxide being the catalyst, it also gets mopped up in high NO₂ areas as it further reacts. But the ozone that escapes to cleaner areas with less NO₂ builds up faster as it cannot react further with NO₂ adequately to dissipate.

Table 5: List of locations that recorded highest intensity of NO₂ daily built-up in Delhi-NCR (March-May, 2022)

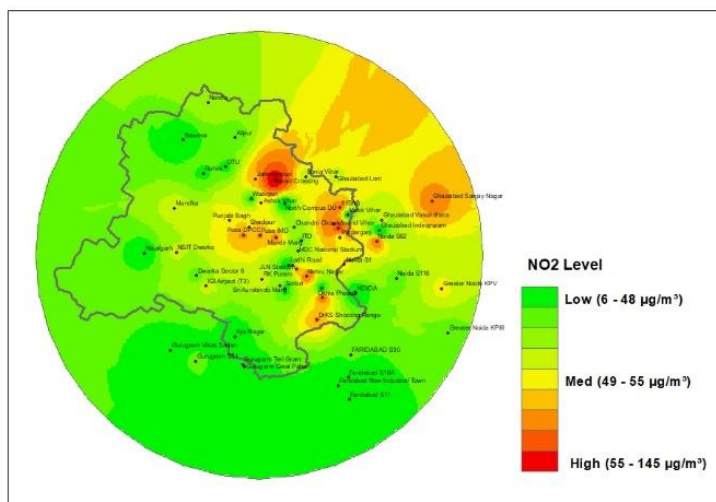
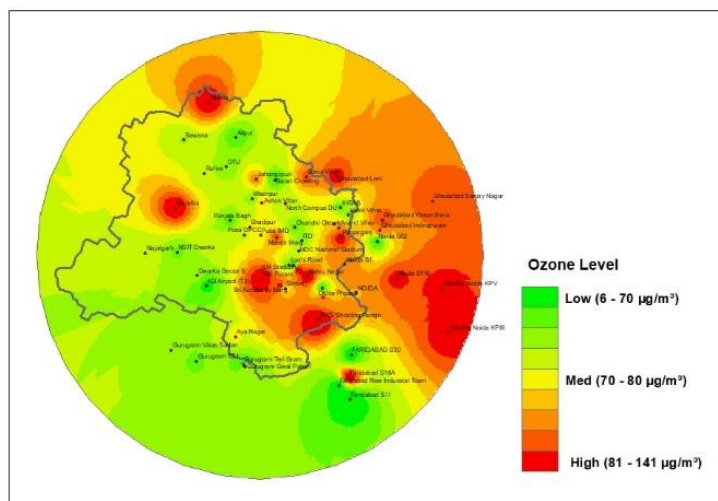
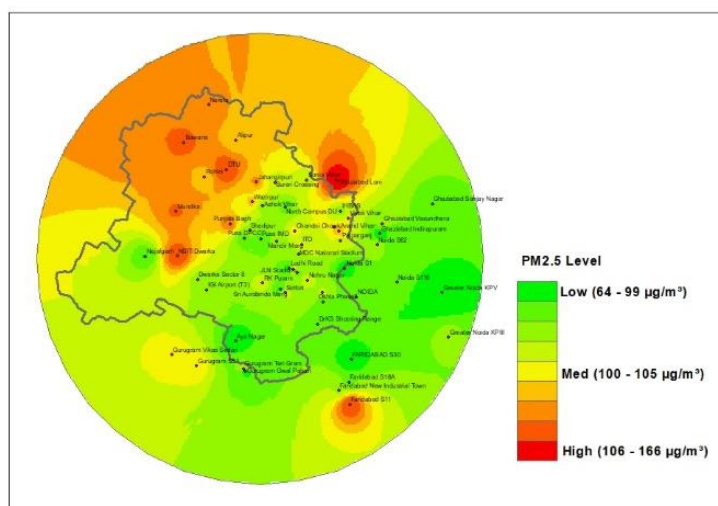
S.No.	Station	Seasonal NO ₂ average*
1	Burari Crossing, Delhi	145
2	Anand Vihar, Delhi	98
3	East Arjun Nagar, Delhi	75
4	Nehru Nagar, Delhi	74
5	Sector 125, Noida	73
6	IHBAS Dilshad Garden, Delhi	72
7	Okhla Phase 2, Delhi	72
8	Sanjay Nagar, Ghaziabad	68
9	JLN Stadium, Delhi	66
10	Mandir Marg, Delhi	66

Note: Seasonal average computed as mean of monthly averages based on daily 24-hr average. * Values are in µg/m³. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

Table 6: List of locations that recorded highest intensity of PM_{2.5} daily built-up in Delhi-NCR (March-May, 2022)

S.No.	Station	Seasonal PM _{2.5} average*
1	Loni, Ghaziabad	166
2	Sector 11, Faridabad	136
3	DTU, Delhi	134
4	NSIT Dwarka, Delhi	132
5	Bawana, Delhi	123
6	Mundka, Delhi	121
7	Punjabi Bagh, Delhi	120
8	Narela, Delhi	114
9	Jahangirpuri, Delhi	114
10	AnandVihar, Delhi	112

Note: Seasonal average computed as mean of monthly averages based on daily 24-hr average. * Values are in µg/m³. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

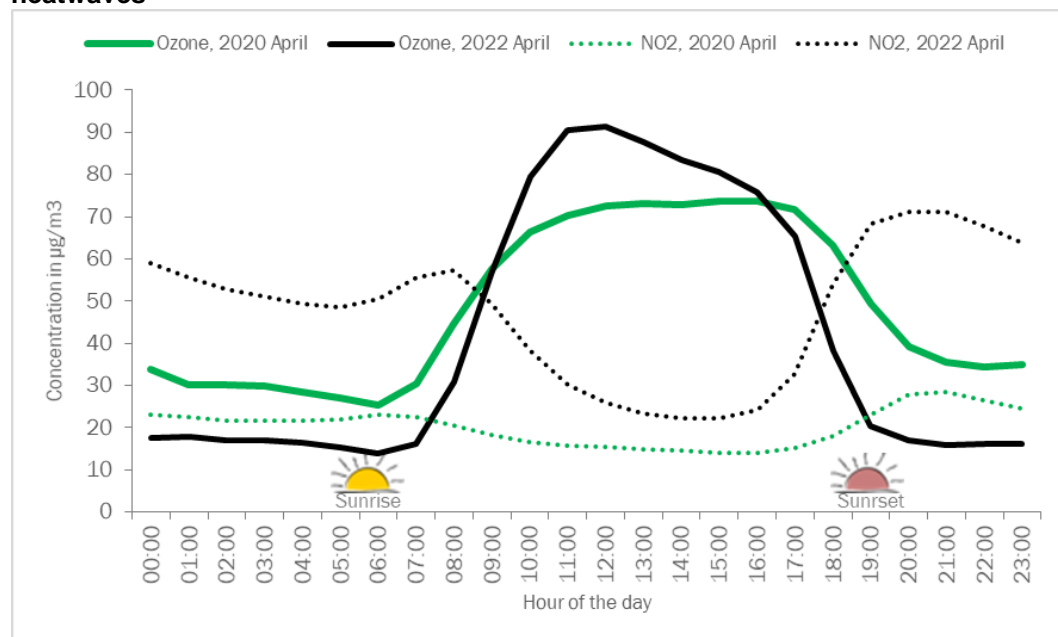
Map 3: Spatial relationship among hotspots for key pollutants in Delhi-NCR (March-May 2022)**a) NO2 hotspots****b) Ozone hotspots****c) PM2.5 hotspots**

Note: Seasonal average computed as mean of monthly averages based on daily 24-hr average for PM2.5 and NO2, while daily maximum 8-hr average is used for ground-level ozone. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Hourly ozone peak level are up by 23 per cent compared to lockdown times: Compared to summer of 2020 ground-level ozone is not lingering in the air post sunset but the hourly peak this year is on an average 23 per cent higher (See *Graph 3: Hourly cycle of ground level ozone and NO₂ in Delhi-NCR – 2020 lockdowns v/s 2022 heatwaves*). The re-emergence of morning and evening rush-hour traffic is helping in neutralising ground-level ozone at sunrise and sunset as increased NO₂ levels cannibalise it. But presence of higher concentration of NO₂ is leading to higher ozone concentration during the afternoon. 8-hour average at Knowledge Park III in Greater Noida and Nehru Nagar in Delhi recorded close to 190 µg/m³ (See *Table 7: List of locations that recorded highest intensity of ground-level ozone pollution daily built-up in Delhi-NCR (March-May, 2022)*).

Graph 3: Hourly cycle of ground level ozone and NO₂ in Delhi-NCR – 2020 lockdowns v/s 2022 heatwaves



Note: 24-hr profile is based on mean hourly concentration of ground-level ozone and NO₂ recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida for month of April in 2020 AND 2022. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Table 7: List of locations that recorded highest intensity of ground-level ozone pollution daily built-up in Delhi-NCR (March-May, 2022)

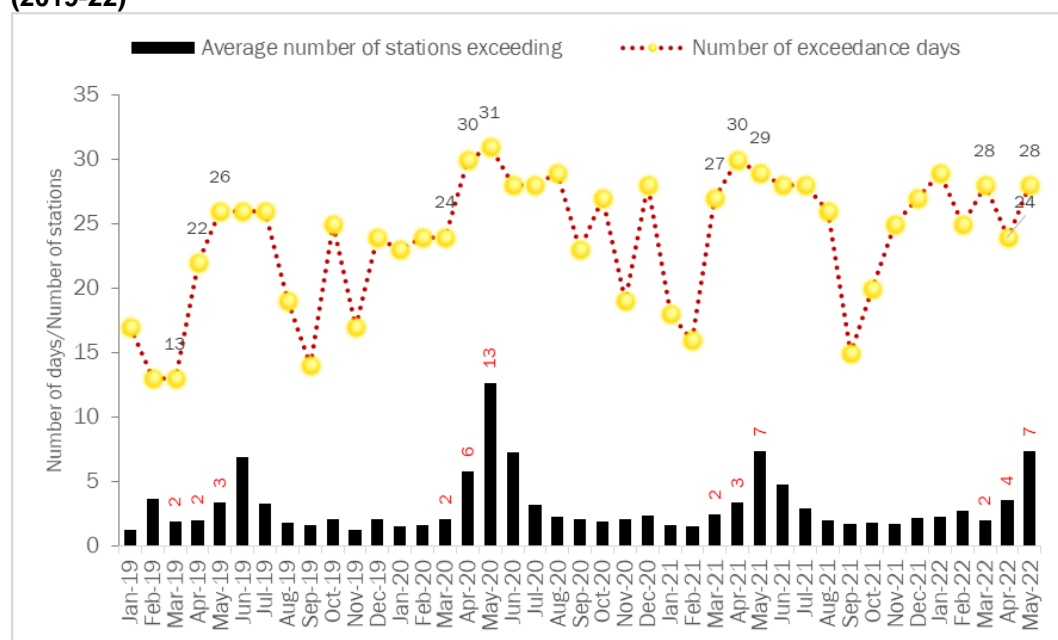
S.No.	Station	Seasonal peak daily 8hr average*
1	Knowledge Park III, Greater Noida	191
2	Nehru Nagar, Delhi	189
3	Sector 16A, Faridabad	187
4	RK Puram, Delhi	187
5	Dr KS Shooting Range, Delhi	186
6	JLN Stadium, Delhi	185
7	Knowledge Park V*, Greater Noida	185
8	Indirapuram, Ghaziabad	184
9	Mundka, Delhi	183
10	Narela, Delhi	182

Note: Based on daily maximum 8-hr average. * Values are in µg/m³. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Night-time ground-level ozone continues to persist: Ground-level ozone should ideally become negligible in the night air but Delhi-NCR has been witnessing a rare phenomenon where ozone levels remain elevated hours after sunset. This was found to be very wide-spread during the lockdowns of 2020 summers and it continues to linger this summer as well. This May night-time ozone was noted on 28 days with 7 stations on average reporting it (See *Graph 4: Monthly variation in occurrence of high night-time ground-level ozone in Delhi-NCR (2019-22)*). Night-time ozone has been considered when hourly concentration has exceeded the level 100 $\mu\text{g}/\text{m}^3$ between 10PM and 2AM at any station. Night-time ozone is mostly found in industrial areas which generally do not report high day-time ozone. Mundka in Delhi, Loni and Vasundhara in Ghaziabad and Knowledge Park III in Greater Noida have reported most instances of night-time ozone (See *Table 8: List of locations with most chronic night-time ground-level ozone pollution in Delhi-NCR (March-May, 2022)*).

Graph 4: Monthly variation in occurrence of high night-time ground-level ozone in Delhi-NCR (2019-22)



Note: Based on high hourly concentration of ground-level ozone recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida during night-time. High hourly concentration is taken as 100 $\mu\text{g}/\text{m}^3$ or more. Night-time is taken as 10PM to 2AM. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Table 8: List of locations with most chronic night-time ground-level ozone pollution in Delhi-NCR (March-May, 2022)

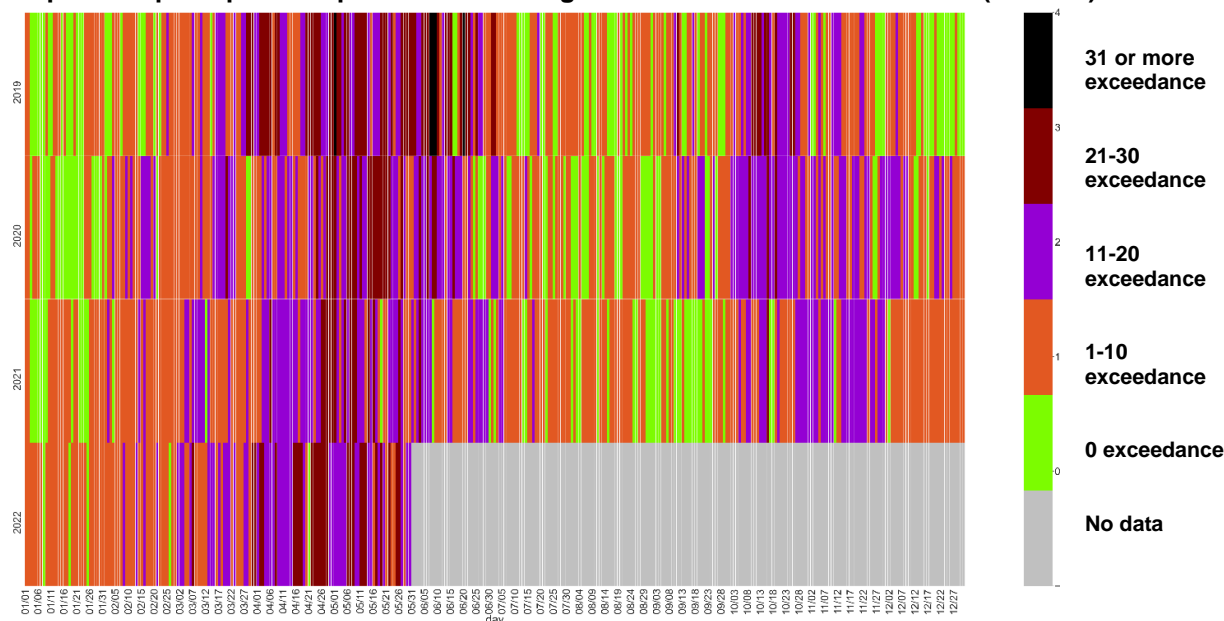
S.No.	Station	Number of nights
1	Mundka, Delhi	23
2	Loni, Ghaziabad	23
3	Vasundhara, Ghaziabad	23
4	Knowledge Park III, Greater Noida	20
5	Anand Vihar, Delhi	17
6	Dr KS Shooting Range, Delhi	17
7	Vikas Sadan, Gurugram	16
8	Patparganj, Delhi	15
9	Sector 16A, Faridabad	15
10	Indirapuram, Ghaziabad	15

Note: Based on high hourly concentration of ground-level ozone recorded during night-time. High hourly concentration is taken as 100 $\mu\text{g}/\text{m}^3$ or more. Night-time is taken as 10PM to 2AM. Data till 30 May 2022.

Source: CSE analysis of CPCB realtime data.

Ground-level ozone has become a yearlong problem: Even though the ozone exceedance is seen to worsen during summer months, it remains a year-long problem as at least few locations continue to record exceedance throughout the year. There have been only six days this year so far that have registered no exceedance among any air quality monitoring stations of Delhi-NCR. There were 15 days of no exceedance last year during the same period (Jan-May). Similarly, 2020 and 2019 had 24 days and 24 days of no exceedance respectively (See *Graph 5: Map of spatiotemporal variation in ground-level ozone in Delhi-NCR (2019-22)*). Foggy and cold conditions of January conventionally inhibit formation of ground-level ozone but ozone was found to be exceeding at multiple stations on 28 days this January. It is up from 11 days and 19 days recorded in January of 2020 and 2021 respectively. Even the months of monsoon records exceedance in some locations.

Graph 5: Map of spatiotemporal variation in ground-level ozone in Delhi-NCR (2019-22)



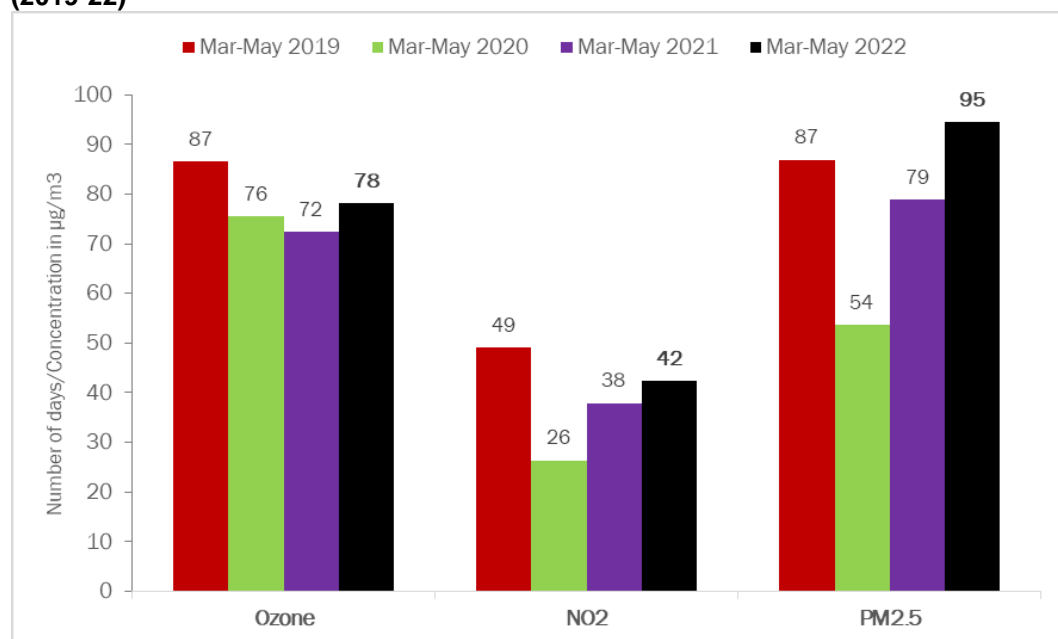
Note: Based on exceedances recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Exceedance is computed as daily maximum 8-hr average crossing the ground-level ozone 8-hr standard, i.e. 100 $\mu\text{g}/\text{m}^3$. Data till 30 May 2022.

Colour coding: Green = 0 exceedance; Orange = 1-10 stations exceed the standard; Violet = 11-20 stations exceed the standard; Maroon = 21-30 stations exceed the standard; Black = 31 or more stations exceed the standard; Grey = No data.

Source: CSE analysis of CPCB realtime data.

During the summer of 2022 all key pollutants have increased in Delhi-NCR: It is not just ground-level ozone pollution that has increased this summer compared to previous summers, significant increase has been noted in PM_{2.5} and NO₂ as well. Compared to summer of 2020, NO₂ is up by 61 per cent and PM_{2.5} by 76 per cent (See *Graph 6: Seasonal levels of key pollutants (PM_{2.5}, NO₂, and ground-level ozone) in Delhi-NCR (2019-22)*).

Graph 6: Seasonal levels of key pollutants (PM_{2.5}, NO₂, and ground-level ozone) in Delhi-NCR (2019-22)



Note: Based on mean of seasonal average recorded at the monitoring stations at Delhi, Gurugram, Faridabad, Ghaziabad, Noida and Greater Noida. Daily value for PM_{2.5} and NO₂ is based on 24-hr average while daily value for ground-level ozone is based on maximum 8-hr average recorded on the given day. All values are in µg/m³. Data till 30 May 2022.
Source: CSE analysis of CPCB realtime data.

Act now

Ground-level ozone mitigation demands stringent control of gases from all combustion sources including vehicles, industry, power plants and open burning in the entire region. It is therefore necessary that while designing mitigation of particulate matter the key focus of action strategy today, is also calibrated for reduction of ground-level ozone precursor gases.

Immediately, refine the action strategy for combined control of particulate pollution, ground-level ozone and its precursor gases like NO_x to maximise the co-benefits of the action plan.

Simultaneously develop a robust public information and dissemination system to alert public about ground-level ozone exceedance wherever its build up is happening for exposure management. This will require refining the current Air Quality Index.