

Impacts of COVID-19 on Air Pollution and Strategies for Improvement

Umesh Kulshrestha

School of Environmental Sciences, Jawaharlal Nehru University, New Delhi

1. Introduction

The air pollution data analysis show that in general, the levels of air pollutants have drastically decreased during the COVID-19 lockdown period resulting in an improved air quality worldwide. Emissions of carbon, nitrogen and sulphur are reduced remarkably which had resulted in a significant reduction in PM_{2.5}, PM₁₀, NO_x, BC and OC etc. The lockdown period witnessed lesser road congestion, lesser domestic wastes, noise free atmosphere, lesser road dust, lesser construction dust, haze free air and clear visibility etc. The visibility was so clear that the Himalayan ranges could be seen from Jalandhar, which is almost 200 km far from the Himalayan foothills (CNN, 2020). Even the stratospheric air had rejuvenated because of no aircraft flying, which had reduced huge atmospheric burden. In a way we can say that the lockdown has been an opportunity of rejuvenation of the Earth system.

2. CO₂ at Mauna Loa

During COVID-19 lockdown, major anthropogenic activities such as aircrafts, road transport and industries were shut reducing the consumption of fossil fuel. This resulted in a significant reduction of C, N and S emissions. According to reports, the CO₂ concentration at the Mauna Loa had shown a lowering trend during March 2020 as compared to March 2019 (Fig. 1). Hence, the lockdown was a positive change for atmospheric healing. On the other hand the cleansing of atmosphere has indicated that the major cause of air pollution is the anthropogenic activities. This also confirms the IPCC findings that the major cause of present climate change are anthropogenic activities.



Fig. 1. Comparison of CO₂ levels at Mauna Loa during March 2019 and March 2020.

Source: NOAA (2020)

At local level for example in New Delhi, almost all the criteria pollutants which had their levels very high or above the prescribed limits are showing satisfactory levels which is a good indication for public health.

3. Air Quality in India

As shown in the Fig. 2, all the sites of NCR Delhi showed a positive change in the air quality index (AQI) during March 2020 as compared to the March 2019. The AQI improvement ranged from 52% at Gaziabad to 81% at Bhiwandi. The reason for a significant reduction but

lesser than other sites may be attributed to its population density which allows indoor domestic emissions. However, in case of Khanna site, the reason of lesser improvement (55%) is different from the Khanna site, which was already having better air quality (AQI=75) and the lockdown could contribute a little to the pollution cut at this cleaner site.

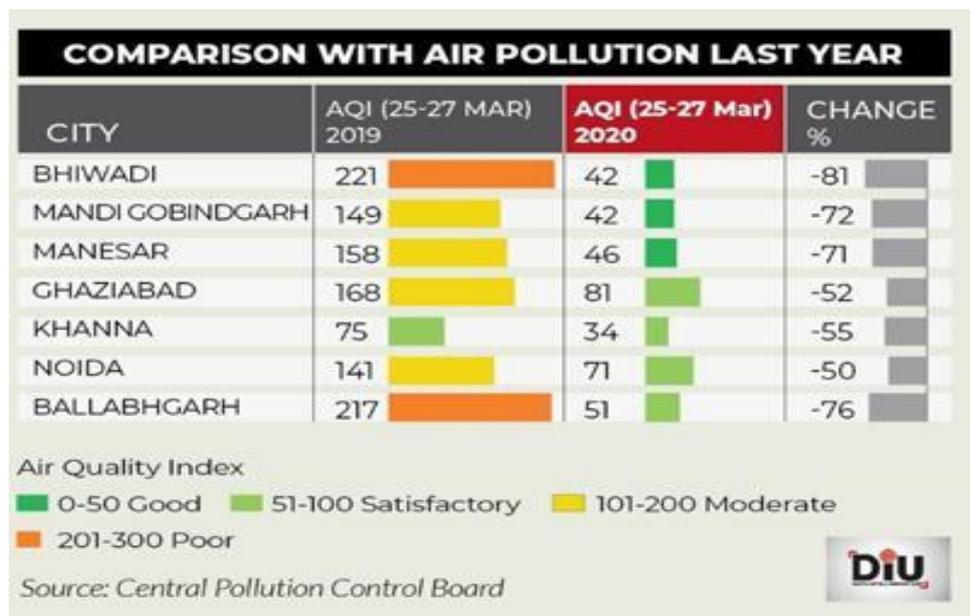


Fig. 2. Air Quality Index (AQI) at selected site in NCR Delhi.

Source: CPCB (2020).

The AQI for PM_{2.5} was 238 at Anand Vihar before the lockdown, which fell down to 97 during the lockdown. Similarly, the AQI of PM_{2.5} was recorded as 101 during the lockdown at the DTU site as compared to 244 before the lockdown.

4. Reactive Nitrogen (Nr) Pollution

NH₃ and NO₂ are the major atmospheric gases, which contribute to a large fraction of Nr species. The air quality index (AQI) for NO₂ was 75 at Anand Vihar site in Delhi before the lockdown, which was recorded as 31 during the lockdown period. Similarly, NO₂ AQI at DTU site in Delhi was 48 before the lockdown, which came down to 18 during the lockdown. The reduction of air pollution is seen across India. Maharashtra too had lower NO₂ levels during lockdown (CBCBENVIS, 2020). Therefore, the COVID-19 lockdown period is revealing the truth that the air pollution problem was largely associated with fossil fuel combustion sources. Around -18% fuel use was recorded during March 2020 as compared to March 2019.

5. Ozone Pollution

According to the reports the ozone hole is healing at Antarctica. That is probably due to the decrease in the ozone quenching precursors. There are reports about increased ozone levels in urban areas in India during COVID-19 lockdown. This is partially due to the decrease in NO_x and VOCs as the automobile transport and industrial emissions are almost negligible. But partially it is also due to lesser plastic burning. In case of Delhi National Capital Region of Delhi, a ban on plastic wastes burning was imposed by the Environmental Pollution Control Authority (EPCA) in 2018 which resulted in reduction in hydrochloric acid and chlorine emissions (Park, 1977). In the absence of chlorine, the ozone destruction is reduced which is seen as spikes in ozone concentrations (Kulshrestha and Mishra, 2019). Also, the closing of illegal factories of pyrolysis oil extracted from old tires, in the north-west NCR also contributed to the reduced air emissions of HCl, chlorine and soot etc. Hence, due to HCl/Cl₂ and NO

limited atmospheric conditions, the ozone concentrations are seen building up in the NCR-Delhi and at other urban locations. In other words, the air of NCR has reached almost the level of air in rural areas where ozone is relatively higher as compared to the urban areas.

It is to be mentioned that the air quality of NCR Delhi started improving after the introduction of Graded Response Action Plan (GRAP). The task force of the GRAP holds emergency meetings and directs the industrial sources shut down according to the meteorology. The GRAP has also been an effective program for tackling the issues of transport of air pollution due to crop residue burning in nearby states.

6. Future actions

- **Defining new limits of criteria pollutants for India:** This is time of defining new normal. The COVID-19 situation has provided us the answer to the violating levels of PM₁₀ and PM_{2.5} in India especially in northern Indian where the dominance of atmospheric dust substantially contributes to the particulate levels. Considering the lockdown values as normal for this region, we need to define new National Ambient Air Quality Standards (NAAQS) values for criteria pollutants, in particular the PM₁₀ and PM_{2.5}.
- **Immediate switching over to cleaner energy:** Since, the major air pollution source category is fossil fuel and hence, as an environmentalist, every professional needs to suggest the policy makers to adopt cleaner fuels in as many sectors as possible. The most alarming situation will be through the automobile emissions, which are based on the diesel and petrol. We need to opt for battery driven vehicles, solar power-driven agricultural tube wells, solar and wind power driven industrial and domestic power supplies etc.
- **Controlled operation of industries:** After the lockdown, the industry should start under controlled emissions. The regulatory bodies must ensure for the sake of the Earth protection that all the necessary pollution control equipment are fit and operated in order. It is a general feeling of the citizens that after the lockdown, manufacturing will be the priority and the pollution control will be a secondary concern. If the pollution control is kept on the back seat, it will be disastrous for the globe. In the long term, more sufferings will be there for the temperate regions through the transport of relatively long lived species. Much more dark side of the direct climate consequences may be experienced. This may hamper the economic growth of the temperate regions. However, the tropical regions are also going to be affected but through indirect consequences of climate change. The air pollution impact of the health of humans, crops and forests might be seen as direct effects of polluted scenario with lesser care for environmental control.

To cite this article:

Kulshrestha U. 2020. Impacts of COVID-19 on Air Pollution and Strategies for Improvement. In COVID-19 & National Lock Down: Impacts & Future Strategies in Agriculture & Environment, Technical Bulletin, Society or Conservation of Nature (SCON), New Delhi, August Special Issue, pp 13-15.

15
