

Observed Effects on the Environment due to the Spread of COVID-19

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ABSTRACT

COVID-19 disease in now became a global pandemic. The countries, including China, Brazil, USA, Italy, Iran, India, and Spain, have implemented the forced lockdown since March 2020 to reduce the speed of its infection. This report aims to discuss the possible impacts of COVID-19 on the atmosphere, mostly in the infected areas. The quality of the air is improved in these countries during COVID-19 lockdowns. The study also discusses the lockdown effects on some environmental parameters such as the surface temperature of the land, river water quality, and particulate matter. When the entire world is worrying about the suitable strategies to reduce environmental contamination, this lockdown measures show a complete way to restore our natural environment at a very rapid rate.

Keywords: COVID-19; Pandemic; Lockdown, Environment, and its Components; Air quality

Abbreviations: WHO: World Health Organization; PHE: Public Health Emergency; MEE: Ministry of Ecology and Environment; AQI: Air Quality Index; BOD: Biochemical Oxygen Demand

Short Communication

The transferrable disease of the coronavirus family was initially observed in the Wuhan city, China, in the month of December 2019, which was later termed as COVID-19 [1]. The World Health Organization (WHO) confirmed its transmission among individuals through a respiratory track in January 2020, and Wuhan city was situated under quarantine on 23rd of January 2020. The Chinese government had implemented forced lockdown for the reduction in infection of COVID-19 and early recovery of the patients. Finally, on 30th January 2020, WHO globally declared this pandemic as a Public Health Emergency (PHE). The transmission of viruses like COVID-19 could have been affected by many parameters like some environmental conditions such as humidity, and temperature, the density of the population, and the quality of medicinal care [2]. Accordingly, it is more important to understand the relationships between the topographical conditions of a particular country and

the infection of viruses like COVID-19. In this way, it is easy for the scientist and researchers to make the best decision for its control and avoid its infection. The air quality was continuously monitored in China during lockdowns via a monitoring network, which covers the four levels like national, municipal, provincial, and county level [3].

The concentrations of various air pollutants like SO₂, NO₂, particulate matter of diameters < 10, and 2.5 μm were measured on an hourly basis with automatic instruments as per the regular protocols of the Ministry of Ecology and Environment of China (MEE). The Air Quality Index (AQI) is used by China, whose measurement was based on the levels of six-monitored environmental contaminants. The air quality index is a sign to show the quality of air, whether it is clear or not. AQI ranging from 0-50, denotes decent air quality with a lower possibility of any human health issue. The

air quality index in the range of 50 to 100 and 100 to 150 (moderate range) can cause some severe health problems. The AQI of 150-200 is unhealthy for any sensitive groups, while some ranges are 200-300: completely unhealthy, > 300 is hazardous. The air quality of Almaty, Kazakhstan (among the most polluted city in the world), was also found to improve during COVID-19 lockdowns [4]. The CO and NO₂ concentrations in the atmospheric air were decreased by 49% and 35%, respectively. Besides, the ozone (O₃) concentration was increased by 15% compared to the earlier 17 days condition before the lockdown. Similar effects of lockdown on the quality of air have also been observed in the city of Rio de Janeiro, Brazil [5].

The O₃ concentration was improved due to a reduction in the level of nitrogen oxide. The tests of humidity and temperature effects on the air quality index-confirmed case association indicate that the comparative risk of COVID-19 infection allied with the air quality index was more in the temperature range of 10°C ≤ T ≤ 20°C. The AQI showed a more substantial impact on an established case of COVID-19 in the relative humidity (RH) range of 10% ≤ RH ≤ 20%. China executed the stringent traffic rules and self-quarantine procedures to control the infection of COVID-19. These arrangements produced significant variations in air pollution. The NO₂ concentrations were decreased by 22.8 µg/m³ and 12.9 µg/m³ in Wuhan city and China, respectively [6]. The social distancing measures have triggered a unique variation in the appearance of sea beaches globally. The beaches, including Acapulco in Mexico, and Barcelona in Spain looks more cleaner with crystal clear water. The noise in the environment is the undesirable noise that can be produced by employing different anthropogenic activities. This noise is a vital source for discomfort to humans and ecology, caused health problems, and can alter the natural circumstances of the ecosystem.

But the peoples are mostly staying at home during lockdowns, and both the public and private sector transportation reduced significantly. These deviations have dropped the noise level to acceptable values. The Dwarka river basin of eastern India is very much famous for the stone cutting and its crushing. Thus, this area is mostly polluted. But lockdown imposed by the Indian government has reduced the values of some environmental components [7]. The obtained results show that the PM¹⁰ concentration was in the range of 189-278 µg/m³ before lockdown, and after the 18 days

of lockdown, it was reduced to 50-60 µg/ m³. The land surface temperature decreased 3-5°C, and the noise level was dropped to <65 dBA, which was > 85 dBA before lockdown. Moreover, the quality of river waters, including the Ganga, Cauvery, Sutlej, and Yamuna, has also been improved during the lockdown situation in India. The dissolved oxygen levels of river Ganga has reached directly above eight ppm. In comparison, biochemical oxygen demand (BOD) levels were < 3 ppm at Kanpur and Varanasi, which was about 6.5 and 4 ppm in the year 2019, respectively [8]. Seriously, COVID-19 is showing an enormous impact on the appearances of anthropological activities, in addition to the economy and the systems of medicinal care [9].

The imposition of the lockdown and quarantine measures by the various governments has led to a decrease in environmental pollution, majorly air, and water pollution. These optimistic and eco-friendly effects are temporary but may assist as the best example for the future.

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