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COVID-19 Era: What's Impact of the Lockdown on India's Environment?

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ABSTRACT

Background: The Novel coronavirus (COVID-19), which started in Wuhan (China) during December 2019, has spread to the rest of the world until now (July 2020). COVID-19 infections are more prevalent in developed countries rather than in the fast-developing, and underdeveloped countries. Now novel COVID-19 infection is a global health problem. In a fast-developing country like India, the incidence of coronavirus infections is increasing day by day. The fifth phase of lockdown has started in India to reduce the incidence of infection.

Purpose: The purpose of this study of the impact of lockdown on the India's environment, according to the literature survey from various research papers, news, social networking, government data (websites), etc., indicates that the lockdown helping to reduce transit in India and at the same time has a great impact on reduced pollution such as air pollution, water pollution, land pollution, etc., thus improving the balance of the environment after March 2020 onwards.

Methods: In this work, we have used an online method using various online sources, which has mainly surveyed some important cities in India, have also studied the factors such as air pollution, river pollution, land pollution, etc. and its impact on Indian environment.

Results: According to an online survey, lockdown has had a significant impact on the Indian environment, reducing the number of vehicles on the road that improving air quality, reducing river pollution, and having a positive impact on various fields. Lockdown has been very beneficial to the environment.

Conclusions: The observations from various parts of the sources show that reduced pollution has also reduced the number of patients in hospitals, mainly jaundice (yellow fever), chikungunya, typhoid, respiratory diseases, etc. This review article explains the brief analysis of the impact of COVID-19 lockdown on India's environment.

1. Introduction

The novel coronavirus (COVID-19) has become a global health issue, with each country trying its best to stop the spread of the coronavirus, yet its critical condition has been created (Anjum, 2020). The effects of the coronavirus are felt more in developed countries than in the fast-developing, and underdeveloped countries. In the fast-developing country, India, coronavirus infections are on the continuously rising and according to the epidemic trend of COVID-19 transmission during the lockdown (Mahajan & Kaushal, 2020), which could lead to a catastrophic situation will be shortly (Kachroo, 2020). No complete information is available about what is affecting it and why it is happening. Coronavirus is spread mainly by close contact with people, as well as by coughing, sneezing, or speaking drops. These small droplets can also be spread on the surface of the ground or by inhalation when exposed to air, do not touch contaminated surfaces, as well as areas where a person has had a corona infection, and do not touch other parts of the body, wash your hands frequently with water, and clean your hands with a sanitizer when you come out (Gautam, 2020; Guan et al., 2020). The World Health Organization (WHO report, 2020) declared the outbreak of coronavirus infection public health emergency on January 30, 2020, and March 11, 2020, it was declared an epidemic (Shrestha et al., 2020). The following guidelines have been issued by the

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Government of India, namely, safe distancing, stay at home, do not go out for no reason, avoid traveling, work from home and social distancingmeans lockdown (Wu & McGoogan, 2020). Lockdown has been carried out across the country to prevent the spread of coronavirus, now the fifth phase of lockdown has started, many companies, factories are closed due to the lockdown across the country (Chakraborty & Maity, 2020; Kumar et al., 2020). Due to the lockdown in the country, factories, cars, buses, trucks, trains, flights, educational sectorswere completely shut down. This has a big impact on the weather.According to the Centre for Air Quality and Weather Forecasting And Research (SAFAR), the lockdown has led to significant improvements in air pollution levels and significant changes in the weather. This is preventing the spread of the virus, but since people or vehicles are not on the road, the environment is also experiencing good changes, and the level of air pollution has decreased (Anjum, 2020; Contini & Costabile, 2020; Gautam, 2020). The picture is indicated that the pollution problem in India, the US space agency (NASA) has revealed by sharing a satellite image on twitter, importantly, NASA has released satellite imagery showing that pollution levels in North India have decreased over the last 20 years (Earth Observatory NASA gov, 2020). The lockdown has been going on in India since March 17 and about 1.4 billion people living in the country are currently at home. According to satellite data from NASA, the level of airborne particles in North India has dropped significantly since the lockdown began (Earth Observatory NASA gov, 2020).According to the Universities Space Research Association, the impact of the lockdown will be felt shortly, which will be very positive for the environment. Lockdown due to COVID-19 has been giving negative impact to various sectors (Sumner, Hoy & Ortiz-Juarez, 2020; Sarla, 2020; Jadhav et al., 2020). Pollution levels of nitrogen oxides (NO_x), which can increase the risk to respiration, have also been reduced. Nitrogen oxide pollution is mainly caused by motor vehicle traffic where traffic is heavy, nitrogen oxides are reduced by about 45 percent. Many other gases such as $CO_{2(g)}$, $SO_{x(g)}$, $NO_{x(g)}$, etc. amount has also reduced due to lockdown effect (Dutheil, Baker & Navel, 2020; Ramasamy, 2020; Sharma, Zhang, Gao, Zhang & Kota, 2020) here due to the low amount of $CO_{2(g)}$ the acidity level of water in many reservoirs also affected. Many businesses are closed due to the lockdown. So, people are at home, many are work from home. So, there is less traffic on the roads (Isaifan, 2020; Jain & Sharma, 2020). Transportation for the supply of raw materials is also closed as many companies are closed. Due to the closure of traffic, the smoke and dust of the vehicles have also reduced, even that the government yearly spends lots of money on a clean environment. Many major commercial cities like Mumbai, Delhi (Srivastava et al., 2020), Pune, Ahmadabad, which have never stopped, have been affected due to corona, which has affected air pollution, which has not breathed a sigh of relief in the last several years, seem to have calmed down and breathed a sigh of relief due to the lockdown (Chauhan & Singh, 2020; Mahato, Pal & Ghosh, 2020). In March 2019, the air AQI in Mumbai was approx. 153. But now, in June 2020, the air purity in Mumbai has been recorded at around 66, the same effect has been observed in Karnataka (Bangalore) (Kambalagere, 2020). Lockdown has improved people's health and reduced the number of people going to the hospital (Guan et al., 2020; Paital, Das & Parida, 2020). River and Nala water issues are experiencing a drastic reduction in pollution and also inland pollution (Patni & Jindal, 2020). Noise pollution was reduced due to a lack of vehicles as well as other noise-making devices. Lockdown has not only been used to reduce the spread of the coronavirus, but it has also reduced pollution and improved the environment.

2. Methodology

Lockdown has been going on from February 2020 to July 2020 to prevent the spread of the coronavirus in almost all countries, but the world has been plagued by many diseases in the past, such as the Spanish flu, swine flu, bird flu, etc. But for the first time in history, a deadly disease like the coronavirus (COVID-19) did not exist, the highest number of deaths and nothing can be said about how much will happen in the future. India has never had the largest lockdown but due to coronavirus infection, it has been. The study of the impact of lockdown on the environment in India has a literature survey from various research papers, news channels, social networking, etc., and collected information on those issues, mainly from government data. According to the survey, the lockdown has been shown to have a positive impact on the environment, which in turn has had a positive impact on the quality of life and well-being of these people. This article provides a comparative study and analysis of the ideas of various research papers in research publications, newspapers, social networking, and various television channels. Articles and surveys show how this situation can help us to overcome other major international issues such as pollution, global warming, etc.

3. Result and Discussion

On March 17, 2020, the Government of India placed 140 million people under lockdown to reduce the

spread of coronavirus (COVID-19). Nationwide orders shut down all industries and reduced car, bus, truck, air traffic, etc. The following some factors that more affecting environmental conditions have explained briefly following various sources which are mentioned in the above methodology point.

3.1. Aerosol Level

As a result of all these factors, just a week later, NASA's satellite sensors reported that aerosol levels in northern India have reached a 20-year low, as illustrated in Figures 1 and 2. Every year, the level of air pollution in many Indian cities was increasing day by day due to man-made industries.From man-made industries, aerosols are small solid, and liquid particles released into the air, they reduce visibility, affect the human lungs and heart, some aerosols are also formed from natural sources such as dust storms, volcanic eruptions, and forest fires.

The scale maps of aerosol optical in India from 2016 to 2020 have been displayed, mainly measuring the period from March to April. A study of all the above maps shows that by 2020, the level of pollution has decreased significantly compared to 2016 to 2019. Here, the aerosol is an effect of how light is absorbed or reflected by aerated particles as it travels through the optical chamber atmosphere.

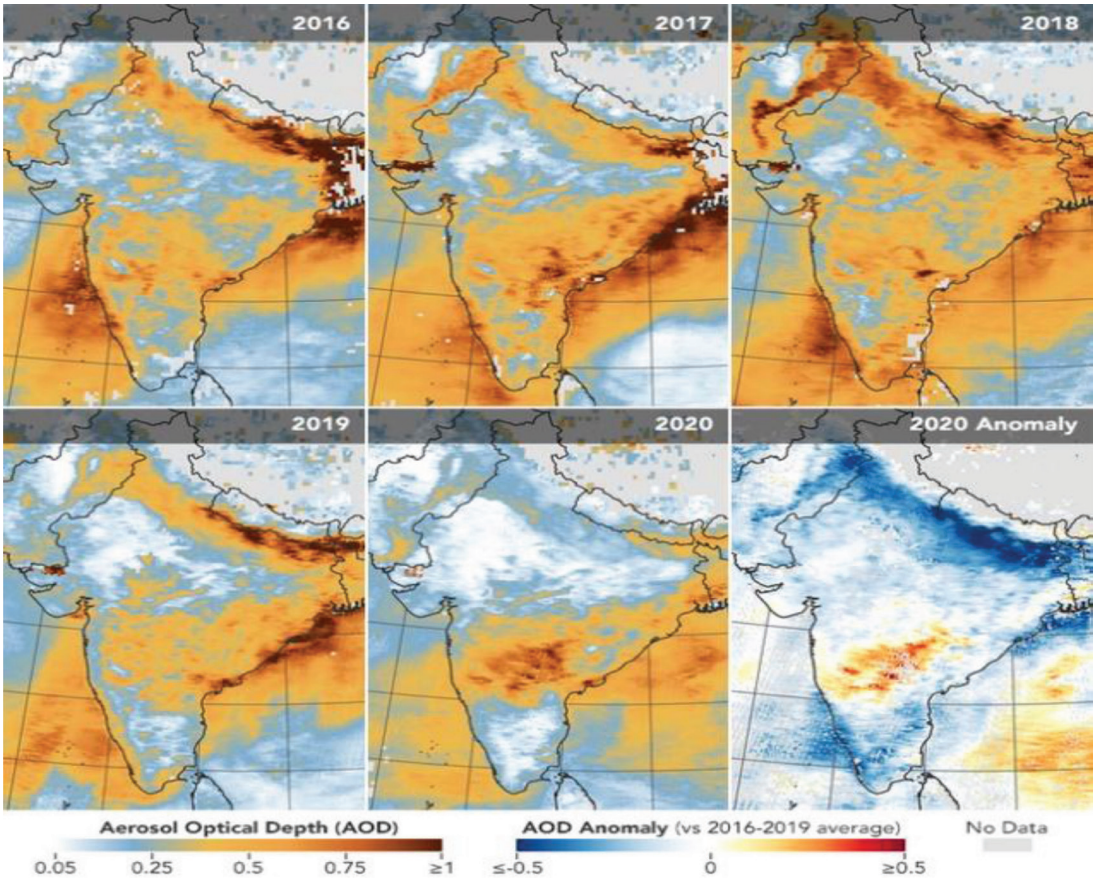

Figure 1: Aerosol Optical image of India.
(*Source:* NASA earth observatory).

3.2. Carbon dioxide level (CO_2(g))

According to a study by the Literature Survey, global carbon emissions fell by 17 % in early April due to a lockdown to stop corona infections compared to 2019, India's carbon dioxide emissions have dropped by 2%. According to an international journal published in the UK's journal National Climate Change, the only reason for the sharp decline in carbon and carbon dioxide emissions after March 2020 compared to 2019 is due to the planned lockdown. Lockdown in India has led to a reduction in atmospheric carbon dioxide emissions due to the closure of man-made industries and all the factors that cause carbon dioxide emissions. The difference between last year's carbon

dioxide levels and the 2020 levels is generally very large, all indicating that the lockdown has a very positive effect on India's environment.

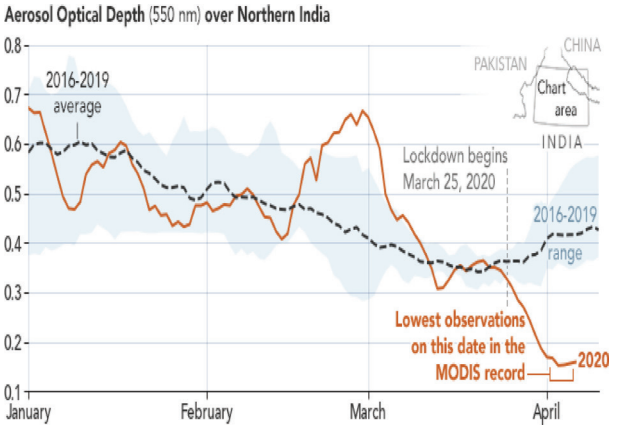

Figure 2: Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite.

Using coal, oil and gas consumption and considering the figure 3, it is concluded that by the end of March, carbon dioxide emissions fell by 30 million tons of carbon dioxide (MTCO2, 1.4%), the first annual decline in four decades.

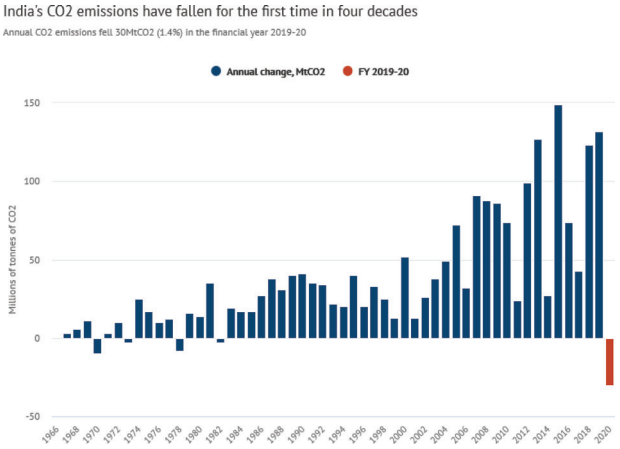

Figure 3: Annual emissions from fossil fuel use in India, millions of tonnes of CO_2, 1965 to 2020.
(*Source*: Analysis of Indian government data for this article and BP Statistical Review of World Energy).

3.3. Nitrogen Oxides (NO_x), Sulphur oxides (SO_x) and Carbon monoxide (CO) Level

According to the Central Pollution Control Board (CPCB), a study of 115 cities in India during the lockdown period used to prevent coronavirus (COVID-19) infections revealed that particulate matter (PM), nitrogen oxides (NO_x), sulphur oxides (SO_x) and carbon monoxide (CO), their emissions have reduced dramatically the main reason behind that all manmade activities are closed such as Industrial activities, vehicles, etc. that are responsible to increase the air pollution or air pollutant. CPCB surveyed of some cities between March 1 and April 1, 2020, and found that 78 percent of the cities had "good" and "satisfactory" air quality (AQI), compared to 44 percent in the previous phase of lockdown, during this period no any city is recorded "poor" AQI, it means that lockdown gave a positive impact on India's environment.

3.4. Water Quality Index Level:

The water quality of major rivers in some cities in India has improved significantly during the lockdown period. However, some rivers were more polluted before the pre-lockdown than during the same period last year. Central Pollution control board (CPCB) has measured the pollution levels of the Water Quality Index (WQI), which provides grades on the total water quality of river water with location and specific time and is based on specific parameters. 38 or less is ' bad to very bad' or more polluted (red), 38-50 is 'bad' or polluted (orange); 50-63 if it is 'medium to good' or non-polluted (yellow); And if it's 63-100, it's 'good to excellent' (green).

For example, the water samples from Mithi River in Maharashtra, in which Juhu point, Nariman Point, Gate of India and others before lockdown were examined, the level of water pollution was red category issues (25.7 and 37.4), during the lockdown period improved water level to the yellow category "non-polluted" (51 and 58), There are many such examples of highly polluted rivers in India, which show that lockdown has also helped a lot in improving the water quality, which has been made possible by the closure of all man-made activities.

3.5. Land Pollution:

According to the news survey, the main contributors to soil pollution are declining soil fertility conditions, some of the factors that contribute to reduced soil fertility are found to be under-utilized during lockdown period issues. For example, the use of chemical fertilizers, bio-pesticides (pesticides, insecticides, and medicinal plants), polluted liquids released from factories, solid waste in urban and industrial areas, deforestation, etc.

Conclusion

According to our study, mainly from various research papers, newspapers, social networking, government websites, and other sources, it is evident that the lockdown to prevent the spread of COVID-19 has a huge impact on India's economic situation but gave good impact on India's environmental issues. An analysis of many things from

the photographs displayed by NASA can be found here. A good change appears to have taken placebefore lockdown, air pollution and water pollution were very high in some cities in India, endangering human health, causing many diseases, some disability, increasing government mortality, but these lockdown issues Satisfactory results have been obtained here.

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