

## COVID-19 outbreak : Study of its impact on global environment

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#### ABSTRACT

The coronavirus disease 2019 is an infectious viral disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV2). It is characterized by cough, fever, breathlessness, and sore throat. In the present scenario, more than 220 regions and countries have widely been struck by this pandemic, along with an increased death rate. The SARS-CoV-2 virus has badly influenced each and every country on this planet. Since every coin has two perceptions and in this regard to this pandemic, it has also proved the same. It has quickly spread all over the world causing the deleterious effect on health, environment, and economy. In the latest research studies, the positive influence of SARS-CoV-2 on the environment has been analyzed and interpreted. The experts of the climate studies revealed that there is a decrease in the percentage emissions of greenhouse gases which were minimized to  $22.9 \mu\text{g}/\text{m}^3$  and  $12.10 \mu\text{g}/\text{m}^3$  in Wuhan and China respectively, significant minimization in noise pollution was also notable, improved water quality due to lack of human interference, the carbon emission is being reduced to 17 percent globally. This could lead to a decrease in annual carbon emissions up to 7 percent. Because of the COVID-19 outbreak, many countries are incomplete lockdown stage. Even seafood and wildlife markets are completely shattered, as a result of which the rate of hunting and poaching of animals has also reduced to some extent. Along with the positive impact on the environment, there are many negative outcomes of COVID-19 on the environment such as increased rate of production of waste, reduction in waste recycling etc. As per the latest reports of the European Centre for Medium-Range Weather Forecasts (ECMWF), there is a worldwide reduction in aircraft flights because of the spread of coronavirus, this eventually results in decreased accuracy of weather forecasting and commercial airlines citing. Therefore, the article summarizes the significant positive and negative outcomes of COVID-19 on the global environment.

### INTRODUCTION

The coronavirus disease which is declared as a pandemic is solemnly affecting the health and wealth of the public all over the world. In the present scenario, more than 220 regions and countries have widely been struck by this pandemic, along with the increase in death rate. The COVID-19 has negatively affected the economic growth of the whole nation and there is a significant impact on environmental health also<sup>[1]</sup>. This pandemic has created an unprecedented impact on the world. The SARS-CoV-2 virus has badly influenced each and every country on this planet (213 approximately). It is widely spread amongst 2.5 million people with 130,000 deaths<sup>[2]</sup>. As per the current situation, different countries are trying their level best to design and implement the effective diagnostic therapeutics that can help us to overcome COVID-19. Not only the environment is affected but the economic rate of society is also depleted. In the latest research studies, the positive influence of SARS-CoV-2 on the environment has been analyzed and interpreted. According to the climate experts, there is a significant drop in the percentage of Green-House Gases (GHG) emissions, and such a significant drop in the emission was not seen before since World War II<sup>[3]</sup>. This positive outcome is mainly because of various policies of social distancing which is being adopted by the governments due to the spread of further infection among the individuals. Many efficient power plants and industries have shattered their production. This pandemic has created an unprecedented impact on the world. Currently, many countries are in a race to cope up with this pandemic by opting

for various measures like-social distancing, above all the people's health, is most important. In one of the regions of China (Hubei), because of the social distancing phenomena, a significant effect on their economic activities have been reported. As its outcome, the facilities of industries power plants along with their products have been come to rest. On the other hand, the vehicular emission is also decreased <sup>[4]</sup>. This ultimately results in the minimization of particulate matter along with nitrogen dioxide concentration (2.5  $\mu\text{m}$  or PM). As per another report, in Europe, the rate of air pollution has been decreased significantly amidst lockdown due to this pandemic. The percentage of greenhouse gases have also minimized up to some extent. There is a positive remarkable effect on noise pollution too because of decreased usage of transportation <sup>[5]</sup>.

## **POSITIVE OUTCOMES OF COVID-19 ON THE ENVIRONMENT**

### **Effect on Wildlife**

Because of the COVID-19 outbreak, many countries are incomplete lockdown stage. Even seafood and wildlife markets are completely shattered, as a result of which the rate of hunting and poaching of animals has reduced to some extent. In China many animals like cats, bats, pangolin, etc. are seized in small cages for the selling purpose <sup>[6]</sup>. According to the latest research, about 62% of diseases originate from various animals like bats. So, it is high time to completely restrict such selling and seizing of animals for the human purpose to prevent the progression of the viruses. The scientists have taken the initiative to request various countries to completely stop the hunting and poaching of animals. Such an initiative will help to check the prognosis of this malady <sup>[7]</sup>. Because of the lockdown, people are staying at home, some animals were spotted in various cities due to lack of human interference. Sea turtles were spotted near beaches of the Bay of Bengal and were laying eggs as there was a fresh habitat for them to reside. Many Siberian birds are also migrating to various other parts of the world from Rajasthan because of a pollution-free environment. A new experience of a massive surge in bushmeat poaching is expected in African countries by many conservationists <sup>[8]</sup>.

### **Management of Growth of Human Population**

The control of the human population is a completely rebellious task especially in China where the rate of population growth is much higher. Such an increase in population growth will lead to starvation, unemployment, excessive hunting, and poaching of animals to satisfy human greed, deforestation, etc. <sup>[9]</sup>. Therefore, during this corona outbreak, the population has been controlled up to some extent to prevent the spread of infection among individuals. The different countries are taking the best and appropriate measures to check the population rate such that to avoid community infection <sup>[10]</sup>.

### **Reduction in Emission of NO<sub>2</sub>**

The reduction in air pollution will affect both changes in climate and risk of COVID-19. According to the Centre for Research on Energy and Clean Air, methods such as quarantines and travel bans result in approximately 26 percent reduction in nitrogen and carbon emission in China <sup>[11]</sup>. It is being reported that in the first month of lockdown, China has produced approximately 300 million lesser metric tons of nitrogen dioxide and carbon dioxide than the same period in 2019. Such kind of significant change is due to the reduction in vehicular pollution, oil refining, and lesser consumption of coal. NASA and ESA are constantly monitoring about the various dropdown in the harmful gases such as nitrogen dioxide gases have significantly dropped during the initial phase of the spread of this pandemic in China <sup>[12]</sup>. Due to a drastic drop down in the levels of pollution in cities like Wuhan, China by 26%-40%, there was much fresher air than before. By the use of the Ozone Monitoring Instrument (OMI) by NASA, they were able to analyze and observe the depletion of the ozone layer and the factors that contribute towards it like NO<sub>2</sub>, aerosols, and other harmful gases <sup>[13]</sup>. They study every parameter that can deplete the ozone. The results which were obtained by the instrument used by the NASA helped them in the processing of the data which is coming out during lockdown worldwide and then interpreting it for the human welfare <sup>[14]</sup>. The quality index of purified air is a very important parameter which is essential for the survival of all living organisms. According to the latest WHO report, about 93% of the world's population resides in the places which are having very poor air quality index and there are not aware of this fact also. As a result, this has affected the mortality rate of an individual <sup>[15]</sup>. The widely affected countries by this are Africa, Asia and part of Europe China is tremendously implementing the harsh rules of traffic and measures of quarantine to check and control the further progression of the SARS-CoV2 virus. These restrictions have positively affected the rate of air pollution. As a result, the concentration of NO<sub>2</sub> was minimized by 22.9  $\mu\text{g}/\text{m}^3$  and 12.10  $\mu\text{g}/\text{m}^3$  in Wuhan and China respectively. The value of particulate matter is reduced from 2.5 to 1.4  $\mu\text{g}/\text{m}^3$  in Wuhan <sup>[16]</sup>. In India also the outcomes were pretty similar too. On March 22 when the Janata Curfew was announced, from that day only there was a significant drop down in the level of air pollution because of the shattered human activities like transportation, oil refining, etc. The metropolitan cities like Delhi, Mumbai, Kolkata, and Chennai observed their saw average AQI which remained within two digits <sup>[17]</sup>. Another most prominent example of fresher and cleaner air was noticed when on April 3<sup>rd</sup>, the residents of Jalandhar city of Punjab when woke up with a clearer view of the mountain range known as Dhauladhar. Earlier due to the enormous rate of air pollution they could not have such pleasure of seeing this beauty.

### **Significant Minimization in Noise Pollution**

The noise pollution is continuing to play the deleterious effect on the environment affecting the health of people resulting in the various types of hearing impairment. Due to the anthropogenic activities, harsh sounds generated by the industrial machine,

the sounds of horns of vehicles ultimately lead to Environmental noise pollution affecting the ecosystem and human health badly<sup>[18]</sup>. Because of lockdown all over the globe, there is a decrease in transportation also which is ultimately affecting the decrease in the rate of noise pollution all over the world. The quarrying and crushing of the stones generate a lot of stone dust which ultimately deteriorates the health of an individual leading to diseases like bronchitis and other severe pulmonary infections. Apart from this, the dust also affects the environment by causing the inhibition of growth, clogging of the pores of the stomata and this will eventually lead to the disturbance in the ecosystem. Even the hazardous noise which is generated by the crushing and grinding of stones via machines is posing a deleterious effect on human health but due to the lockdown announced such industries have shattered and results in a decrease in the rate of noise pollution<sup>[19]</sup>. Due to this pandemic, there has been no echoing, honking, and whirring of loudspeakers, vehicular engines, and machinery in factories. Now Delhiites are waking up to the melodious chirping of birds, which eventually relaxing the minds and health of the people.

#### **Effect on Water Quality**

We are provided with one of the natural assets in the form of beautiful beaches. They are found near coastal areas. They are the center of attraction for the tourist all over the globe. This natural beauty has to be protected from human exploitation<sup>[20]</sup>. Because of the announced lockdown, the tourist is not able to visit these beaches and this significantly results in the clean and beautified beach during this pandemic. The beaches of Mexico, Barcelona, and Ecuador are cleaner like crystal than before lockdown, the water in the canals of Venice are cleared and experienced greater water flow than before. Such kind of clarity in the water bodies is due to the settling of sediments that is usually totally disturbed by boat traffic. The water bodies have cleared up too much extent and the Yamuna and Ganga rivers have shown tremendous improvement in the water quality since the lockdown has been announced. As per the data interpretation by real-time water monitoring of the Central Pollution Control Board (CPCB), the recent water quality of the Ganga is approximately 27.2 points which can now be suitable for human activities like-bathing and even for propagating wildlife and fisheries<sup>[21]</sup>.

#### **Effect on Vegetation**

Due to the shattering and lack of interference of anthropogenic activities like-transportation and industrialization which usually generates lots of litter and sludge in the water bodies and ultimately clogged the rivers and seas but now the significant drop in the land pollution was reported. As a result, the plants are now growing in much better and healthier soil than before with cleaner and fresher water. Even there is a tremendous drop in the litter generation due to the lockdown, the less litter definitely will lead to the non-clogging of water bodies, thus it helps in establishing a sustainable environment for the future generation<sup>[22]</sup>.

#### **The Integrative Action of the Communities for Solving the Problem of Climate Issue**

No-one indeed wanted to take the initiative to lower the emissions of greenhouse gases like carbon dioxide, methane, nitrous oxide, and other fluorinated gases in any way. So, nature has taken itself an initiative to reduce the emission in this way. The outbreak of COVID-19 is widely affecting all spheres of life like health, wealth, jobs, services, environment, etc. In today's scenario, everyone around the world has come up together to provide the solution to get out of this pandemic and also to have control over the climatic issues like- ozone depletion, global warming, deforestation, etc. too. Such an integrative approach will help us to combat this disease and to establish a sustainable environment for a future generation<sup>[23]</sup>.

#### **Decreased Rate of Carbon Emission**

According to the researchers, the carbon emission is being reduced to 17 percent globally. This could lead to a decrease in annual carbon emissions up to 7 percent. This can be considered a remarkable drop since World War II. Because of the lockdown announced all over the globe, the transportation services are also halted which is significantly playing a vital role in decreasing carbon emissions. The minimization in the rate of carbon emission ultimately helps in reducing air pollution and thereby maintaining the quality of air<sup>[24]</sup>. To prevent the spread of corona infection, people are more relying on telecommunication facilities like- virtual conference technology to perform the business work or educational work, this ultimately leads to a decrease in the carbon emission as one can perform his official work now from home too. According to the reports of the London-based think tank known as Carbon Tracker, there is a major terminal decline in fossil fuel because the lockdown announced there is a decrease in the demands for oil and gas<sup>[25]</sup>. On the other hand, the government is aiming to accelerate the concept of clean energy. Thus, it can be concluded that this pandemic is one of the worst possible ways to reduce all kinds of greenhouse gases emission.

## **NEGATIVE OUTCOMES OF COVID-19 ON THE ENVIRONMENT**

#### **Increased Rate of Production of Waste**

The production of inorganic and organic wastes is directly associated with the issues of an environment. Some of the major issues are air and water pollution, deforestation, soil erosion, etc. Amidst the lockdown, people are completely relied on online shopping to avoid social distancing. As a result, the percentage of household organic waste has significantly increased because the food and clothing items are packed in polythene bags during shipping<sup>[25]</sup>. The waste generated by the hospitals had also increased. According to one of the reports, Wuhan hospitals are producing medical waste on an average of 242 metric tons per

day during this pandemic. Earlier their average was 50 tons per day. In the USA, it is being reported that due to the manufacturing of masks and gloves, the rate of production of waste has increased tremendously <sup>[26]</sup>. Due to an increase in the disposing and discarding of masks directly into the natural environment, its consequence leads to an increase in the plastic wasteland ultimately leading to land pollution. In many countries, the demand for plastic has increased because the medical usage has increased considerably.

### **Reduction in Waste Recycling**

The phenomena of recycling of waste have always been a major issue of environmental concern for all countries. Waste recycling is an important and eminent process to decrease the rate of pollution along with its progression rate. Because of the spread of COVID-19, many countries like the USA have completely stopped the process of waste to prevent the spread of the infection during this pandemic for the sake of human welfare. Italy has completely restricted the system of waste management during this current scenario <sup>[27]</sup>.

### **Effect on Forecasting of Weather**

As per the latest reports of the European Centre for Medium-Range Weather Forecasts (ECMWF), there is a worldwide reduction in aircraft flights because of the spread of coronavirus, this eventually results in the decrease in the accuracy of weather forecasting and commercial airlines citing <sup>[28]</sup>. This eventually disturbs the use of Aircraft Meteorological Data Relay (AMDAR) which is an integral part of depicting the accuracy of weather forecasting. The prediction made by ECMWF says that there is a decrease in the AMDAR coverage by 66% or more because of the dropdown in commercial flights.

### **Harmful Effects of Chlorine in the Drinking Water**

China has inquired and asked the management of wastewater treatment plants to implement and pay emphasis on the routes of disinfection by enhancing the amount of chlorine in the water to check the progression and spread of COVID-19 via the system of wastewater. Even though chlorine is an excellent disinfectant but if the appropriate amount is not taken into consideration, it can result in various toxicities into humans. It is being reported that because of the excess amount of chlorine in the water the health of the humans is being consecutively affected resulting in different infirmities <sup>[29]</sup>.

### **More Chances of Ecosystems at Risk**

The natural ecosystems like wildlife sanctuaries and wildlife parks are at risk due to this pandemic because in many countries the workers associated with the environmental protection at national parks and wildlife sanctuaries are advised to stay at home to prevent the spread of infection among the individuals during this lockdown. Due to their absence, a significant increase in the rise of illegal fishing, deforestation, and hunting of wildlife was observed because now there is no hold on such activities. Even the shattering of activities of ecotourism has also left the ecosystem at more risk than before <sup>[29]</sup>.

## **CONCLUSION**

It is well narrated that every concept has two perceptions and it is also in the case of this pandemic. The coronavirus disease has positively and negatively affected the environment. Its positive effect on the world's air quality has been reported. The emission of greenhouse gases like methane, carbon dioxide, etc. has significantly reduced. Also, the decrease in energy consumption of the globe has been reported during this pandemic. There is also a significant drop in the percentage of particulate matter being reported in this current scenario. The decreased in the concentration of oxides of nitrogen in the atmosphere was also notable in Wuhan due to the implementation of strict rules during the corona outbreak. Eventually, the regions that are adopting the strict measures during this quarantine are experiencing an improvement in the quality of air. This ultimately appears to play a very close coexistence amongst the economy and pollution of the environment. From wildlife to biodiversity it has affected all dimensions of an environment. The chirping of birds to return of penguins, reduction of air to water pollutants is no doubt the beginning of a new vision of environmentalists. Now the major issue is the sustainability of this environment. The normalcy of life will lead to an abnormality of environment and again this balance may not get distracted, Balancing is the most required aspect of life in all areas and the environment is a most essential part of human existence. It is apt to conclude that rather discussions of points implementation is the most important issue for the coming generation for their survival in the best environment. We all need to join hands for eradicating this corona outbreak and restore our economy in its best sustainable way. Also, once the nation came to griped up with this pandemic, more improved implementation regarding the environment, transport, and industry regulations should be kept in mind to ease the detrimental and hazardous effects of anthropogenic activities of humans on the environment.

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