POSITIVE EFFECTS OF COVID-19 TO ENVIRONMENT BASED ON CORROBORATION AND STATISTICS: A REVIEW

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Received 26th April 2020; accepted 29th April 2020

ABSTRACT
The outbreak of Novel Coronavirus (COVID-19) is currently undergoing almost in all the continents. The first case was reported from Wuhan, China and leading its way all to the major countries. This viral outbreak on the other hand has made some significant improvements in the environment across the regions. Based on current evidences, we epitomize the data, statistics and the studies to indicate the positive approach to look towards viral outbreak. Oil is the biggest source of carbon explosion and its use has decreased markedly that decreased air pollution globally. This review will be helpful to carry out summarization of environmental changes during an outbreak and will serve as a reference for further analysis.

Keywords: COVID-19, environment, current evidences, viral outbreak.

INTRODUCTION
On December 2019 Cluster of unknown pneumonia like cases reported at Wuhan, Hubei province of China. Within following days, the cases seen surge in Wuhan city and ultimately the Government of China imposed lockdown in Wuhan [1]. That measure on the other hand had a relieving impact on environment [2]. The pollution levels around the Chinese east coast showed a slant decrease within days. This is perfect example for studying impact of preventive measures of outbreak benefitting the environment to revive and thrive [3]. During these periods the nature is booming and animals are reclaiming their old habitats. Dolphins were seen on the coast of the Mumbai after decades [11]. Wildlife around over the various regions reclaimed their natural habitats which were occupied by human activities. We will review a lot of more alike examples on global scale [5]. Noise and air pollution also getting decreased because peoples are at their home and not used to go outside. It gives benefits to nature [10] (Fig. 1-13).

Fig. 1. TROPOMI data shows the NO2 levels in China in the beginning of 2020[2]
Environmental Lookout

Since the outbreak and measures to tackle it came in action the industrial activities reduced significantly. The carbon emissions from major countries like China reduced by quarter but on temporarily. The data given by carbonbrief indicates that largest annual fall in \( \text{CO}_2 \) emissions will occur during COVID-19 outbreak [4].

In Indian Capital Delhi the levels of PM\(_{10}\) and PM\(_{2.5}\) were reduced by 35-40%. This data is according to survey of Central Pollution Control Board (CPCB). The waterways in Venice finally got rid from the polluted water. With such improvements in the environment there is a hope for meeting the ‘Paris Climate Accord Goals’. The lockdown measures in many countries will help them to meet the Paris climate accord goals. The herd of goats was seen in the streets of North Wales. In Thailand Monkeys mob was seen on the streets of the city Lopburi. Several such photos and videos went viral on internet [4].
Fig. 7. Two peacocks in the Spanish city of Ronda on 3rd April [8].

Fig. 8. Herd of fallow deer in east London on 4th April [8].

Fig. 9. Monkeys in India’s capital New Delhi on 2nd April [8].

Fig. 10. A gaggle of geese in the Turkish city of Adana on 31st March [8].

Fig. 11. A puma on the street of Chile’s capital Santiago on 24th March [8].

Fig. 12. A peacock in Dubai on 1st April [8].
Statistical Evidences

China, Italy, India and Bangladesh were among the first few nations to implement lockdown measures. According to the past Air Quality Index (AQI) by aqicn.org these major cities showed reduction in the PM$_{2.5}$ levels during period of January 2020 to March 2020[7].

The above figure shows the reduced PM$_{2.5}$ levels in the major cities from countries which implemented nationwide lockdown (Fig.14). This data indicated that the lockdown measures which include industry closures and particularly polluting industries can improve air quality significantly. The vehicular traffic is reduced in many regions of the world that will lead to decrease in the Vehicular emissions of gases like H2S, SO2, etc. [7].

Since the outbreak and measures to tackle it came in action the industrial activities reduced significantly. The carbon emissions from major countries like China reduced by quarter but on temporarily (Fig. 15). The data given by carbonbrief indicates that largest annual fall in CO2 emissions will occurs during COVID-19 outbreak [7].

According to Citymapper app, number of journeys in the London has fallen more than 90% after coronavirus lockdown was imposed (Fig. 16). This will have good impact on air around the city as the pollutants are no longer constantly released in the atmosphere. Citymapper app revealed mobility across the 39 cities globally. During second week of March when the coronavirus outbreak epicenter was in Europe the major cities of Europe saw significant decline in mobility in and around the city as people preferred to stay home [6].
According to Bloomberg quint report, the health of Ganga River has improved during period of lockdown in India. Surprisingly projects worth 4 billion $ are sanctioned to clean Ganga River but the measure of lockdown worked in favor of improvement in Ganga waters. This is due to improvement of water quality of the Ganga tributaries like Yamuna. Parameters such as Dissolved Oxygen, Biochemical Oxygen Demand, Total Coliform levels and pH range showed improvements in last months. Dr. P. K. Mishra, Professor At Chemical Engineering and Technology, IIT-BHU told ANI that “There has been 40-50 percent improvement in the quality of water in Ganga”[6].

The, “one of the largest drops in pollution levels could be seen over the city of Wuhan, in central China, which was put under a strict lockdown in late January. The city of 11 million people serves as a major transportation hub and is home to hundreds of factories supplying car parts and other hardware to global supply chains. According to NASA, Nitrogen dioxide levels across eastern and central China have been 10-30% lower than normal”[3].

A report in Carbon Brief indicated that industries from China were operating at much less levels during the quarantine. Average coal consumption at power plants also reached a multiyear low (Fig. 17). Due to it, carbon dioxide emissions now stand at least 25 percent lower in the period of the Lunar New Year compared to 2019[4].

The European Space Agency ESA released the video animation showing the reduction in NO$_2$ emissions across Europe [3]. ESA observed sharp reduction in nitrogen dioxide levels released by vehicles, industries and power plants. “Although there could be slight variations in the data due to cloud cover and changing weather, we are very confident that the reduction in emissions coincides with the lockdown in Italy causing less traffic and industrial activities,” Said Claus Zehner, ESA’s Copernicus Sentinel-5P satellite mission [3] (Fig. 18)
Benefits of Lockdown
From strict enforcement of lock-down the world might get economic disadvantage but the lockdown measures will prove beneficial for controlling pandemic and also to control other communicable diseases like Tuberculosis. The social distancing will be helpful to reduces cases of diseases like HIV and Tuberculosis which kills millions around the world. The mass sanitization movements across the major cities in the world will be helpful to fight against the vector carried diseases like Malaria, Dengue, Cholera, etc. (Fig. 19). Mass sanitization movements were carried out in almost all of the major cities around the globe to control the coronavirus this in return will kill other pathogenic germs as well as the vectors that transmit vector borne diseases [8].

Fig. 19. Extensive sanitization program in the major municipalities in Italy, Australia, India, Russia [8].
Assumed Benefits of Outbreak

- The coronavirus pandemic has forced the governments around the world to shift focus to health-related issues in country.
- The number of patients with other Communicable diseases like Tuberculosis will decrease too due to lockdown measures.
- The Pandemic will force industries to apply more nature friendly ways of manufacturing.
- We will now be able to see actual enforcement of Personal protection equipment.

The current scenario seems to be temporary but measure how much long-lasting impact it will have on environment that is unclear by now [9].

Satellite Images

Satellite images shows that emission drops over European cities due to corona virus lockdown (Fig. 20). Satellite images also shows nitrogen dioxide concentration compared to the last year. Nitrogen dioxide concentration emission data was provided by Descartes lab, a geospatial analysis group [12].

Fig. 20. Nitrogen dioxide concentration in Moscow compared to the last year [12].

Pollutant Levels in Different Countries

The level of pollutants has decreased in the lockdown period in March (Fig. 21,22). We had studied the level of pollutants in different countries like India, Spain, France, and Italy. In all the countries the level of pollutants has decreased [13].

Fig. 21. Pollutant level in France and India [13].
Fig. 22. Pollutant level in Italy and Spain [13].

**Mortality rate due to Communicable Diseases in India**
Death rate has increased in recent weeks due to coronavirus but in some parts of our country there is decreased rate of mortality, it shows that infection rate and mortality rate due to communicable diseases is decreased. [15]. The mortality rate due to communicable diseases in India is decreased due to lockdown, compared to 2018. [14].

**COVID-19 Outbreak**

Controlling Measures (Lockdown)

- Reduced Air Pollution → Good Air Quality Index (AQI)
- Reduced Water Pollution
- Environment
- Reduced Oil consumption → Less Carbon emission
- Reduced vehicular traffic → Less Gaseous Emissions $\text{SO}_2, \text{CO}_2$
CONCLUSION
By reviewing all the statistics on the benefits of outbreak on the environment, it seems the current scenario seems to be temporary but measure how much long lasting impact it will have on environment is unclear by now. The strict enforcement of lockdown in major part of the world helped significantly to improve the environment by reviving the nature. During these periods, it has been observed that the nature is reclaiming itself and the disastrous activities by humans on the earth have declined. It is getting reflected as reduction in levels of pollutions of Water and Air primarily. The positive aspect of outbreak measures is working in favor of environment and giving us results which were not achievable even after spending billions of dollars on major environment protection projects. It is clearly indicated from the above statistical corroborations provided in the article. Major indicators around the world like Air Quality Index indicate that the lockdown surely worked in favor of reducing pollution.

Fig. 23. Positive effects of corona virus lockdown.

Fig. 24. Benefits of corona virus to nature.
REFERENCES

[3] http://www.esa.int/ESA_Multimedia/Videos/2020/03/Coronavirus_nitrogen_dioxide_emissions_drop_over_Italy