SWAY OF ENVIRONS AFORE AND AFTER COVID – 19

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Abstract

In the late 2019, a novel infectious disease with human to human transmission popularly known as COVID-19 was identified in Wuhan, China, which is now a global pandemic. Countries all over the world have imposed certain lockdown conditions in order to control the spread of the virus, in order to mitigate it. This lockdown has had a drastic effect on social and economic fronts. There have been certain changes in the environment during the pandemic. The worldwide disruption caused by the COVID 19 has resulted in numerous impacts on the environment and climate. The decline in planned travel has reduced air pollution by 30 per cent. Due to forced restrictions in India, there has been a reduction of pollution levels drastically in few days after the implementation. Delhi is considered among the most populated megacities of the globe on environment performance index by the WHO, 2016. The benefits of this lockdown, many found it heartening during the initial days, from clearer sky to bird songs and planes went quiet. But, when there was a gradual ease towards the lockdown, generally it began to dissipate. The experts believe that this situation will get way worse than before and it will happen faster than we know it. In early April, with the lockdown there had been a reduction of carbon emissions by 17 percent, but by June, there has been only a reduction of 5 percent. Lack of Environmental Planning in expanding our economy and is going to come back in a much worse form unless its seriousness is accepted and communicated to the various stakeholders. In this article, the study is compiled with the environmental data released by NASA and ESA before and after the pandemic and doing a comparative study on the same. The paper also focuses on the lessons that the society has learnt from the pandemic on reduction of environmental pollution and the approaches to be emulated and adopted to contain the same. We need to also ponder into what a growing economy needs to respect the carrying capacity of nature.

Key words: *COVID 19, Pandemic, Particle meter, NASA, ESA, WHO, carbon emissions, environmental pollution, CPCB, UN*

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"Look deep into nature, and then you will understand everything better"

-Albert Einstein

INTRODUCTION

Coronaviruses are a group of viruses which affects human beings through zoonotic transmission. This is the third time in past two decades that novel virus has created pandemic condition, after Severe Acute Respiratory Syndrome (SARS) in 2003 and Middle East Respiratory syndrome corona virus (MERSCoV) in 2012. Pertaining to the Corona virus (2019), it was on December 31, 2019 wherein first case was reported to WHO Country Office in Wuhan, China with symptoms of unexplained low respiratory infections. On January 12, 2020, WHO found that Corona virus was the reason of this infection in Wuhan and later on 11th February, WHO Director-General announced this as novel 'COVID-19' which is an acronym of 'Corona virus disease 2019'. The major causes of concern for Covid-19 includes its global scale transmission, repeated emergence, significant number of deaths, infection and mortality to care providers and multiplicative effect in vulnerable or susceptible groups of people.

In India the first confirmed positive case was reported on 30th January in a student from Thrissur district of Kerala who had returned home for a vacation from Wuhan University in China followed by two other cases on February 2 and 3 again in Kerala having the same history. The death rate as of April 2020 has been on top.

During past two decades, India has witnessed an expeditious industrial growth which has certainly improved the standard of living of its people and it is also evident from the rising vehicular fleet on roads. But we have paid a heavy cost for this development in terms of poisoning the air we breathe. As per press release of World Health Organization (2nd May 2018), around 7 million people die every year from exposure to fine particles in polluted air.

State of India's Environment (SoE) report, 2019 have declared that 12.5% of all deaths in India are due to Air Pollution. The environment in India was extremely degraded and all the pollutant levels and Air quality index left the limits way behind. Observing the increasing rate of corona cases in India and subsequent looming crisis, honourable prime minister of India, Shri Narendra Modi on March 24, 2020 declared a complete lockdown of 21 days for entire country during his live address to the nation, which was further extended for 19 days on April 14, 2020 in II phase followed by 14 days till 17th May in III phase and more 14 days in Phase IV. Various restrictions posed by GOI and subsequent lockdown, anthropogenic activities like industrial projects, vehicular movement, construction projects, tourism other common transportation activities witnessed a 'never before' stagnant phase. In India, apart from taking necessary administrative measures such as restriction on social gathering events, travel restrictions, containment of corona suspects and their treatment, Government of India (GOI) has directed the citizens to maintain adequate social distancing and to use personal protective equipment like masks. However, the COVID-19 has created a catastrophic situation for all and it would have adverse effect on Indian economy too, there is positive side of the coin also which may alleviate the woeful facts of COVID-19. As many of the countries are observing self-quarantine and social distancing for a more than two months now, it has given the nature a "healing time" with reduced human interference in natural environment. Major impact of lockdown due to COVID-19 can be observed on air quality, which is being experienced by everyone and recorded in various official reports. Smog has given way to blue skies in cities like Delhi, marine life is seeing increased activity, pollution levels have dropped in almost all the metro cities and animals as well as birds are moving around on their own accord. It was also observed that in metro cities like Delhi, as the energy foot print was high, the lockdown has improved the air quality at higher scale in their studies on air quality of the four selected stone crushing clusters at Dwarka river basin of Eastern India noticed reduction of PM_{10} concentration from 189–278 $\mu g/m^3$ to 50–60 $\mu g/m^3$ after 18 days of commencement of lockdown.

The impact of air pollution on Indian population and their health was extensively studied in past by several researchers. The Urban air quality management strategies were planned which concentrated on emission inventory, control strategies, monitoring network and participation of public. A general comparison between the major air pollutants was also studied and the impact of industrialization, transportation and other anthropogenic activities were analysed. In this paper information from several government and non-government agencies have been collected and analysed to understand the change in quality of various environmental factors such as air and water quality due to lockdown caused by Covid-19. Different tools like satellite images and Air Quality index (AQI) have been used to study the indirect effect of COVID-19 in Indian context. Outcomes of the study will help the policy makers to define the Post-Covid strategy for the country, as the pollution level which we were not able to achieve during last decade (even after applying all sort of technological

advancement) have become a real thing due to lockdown. This study can also be used as a baseline study to analyse the health impact (specifically on sensitive receptors) due to reduction in air pollution.

IMPACT ON AIR QUALITY

In a recent study that was conducted air pollution in Bengaluru has dropped by 28% during the Indian megacity's coronavirus lockdown.

The analysis of air quality data by the Centre for Research on Energy and Clean Air (CREA), collected by Bengaluru's Healthy Air Coalition, shows that air pollution during the Covid-19 lockdown period, measured as PM2.5, was reduced by an average of 28%. Additional analysis of satellite data confirms the downward trend in emissions during lockdown.

This analysis was completed by CREA on behalf of the Health and Environment Alliance (HEAL) and the Global Climate and Health Alliance (GHCA). GCHA and HEAL support Healthy Air Coalition Bengaluru, as part of a global health sector initiative for clean air in cities in 2030. The Healthy Air Coalition has set up a network of 30 air quality monitors across the city (in places frequented by groups most at risk from air pollution) in order to provide publicly accessible data to assess the health burden of air pollution in Bengaluru and drive measures for improving air quality.

Bengaluru is a city of 11 million people, making it the third most populous city in India. Emissions from vehicular pollution are a key contributor to air pollution in Bengaluru, which is the most traffic-congested city in India. Cases of child asthma, upper respiratory infections, chronic pulmonary disease, as well as heart attacks in young people are reported to be on the increase. Doctors and health professionals point to chronic exposure to air pollution as a possible cause in the rise of ill-health to air pollution – prompting the 2019 launch of the Healthy Air Coalition, which installed a network of air quality monitors and will be carrying out an analysis of health impacts of poor air quality in the city.

The Healthy Air Coalition has spent 12 months collecting data from 26 stationary air quality monitors across the Southern Indian city. Data for a 45-day period before the lockdown (8th February 2020 to 23rd March 2020) was compared with data from a 45-day period during the lockdown (25th March to 8th May 2020) to better understand the impact of reduced economic activity and transport on air quality.

The reduction in pollution levels varied for locations across the city, ranging from the lowest cut of 14% at Halasuru hospital to the greatest cut at Bellandur lake, where pollution dropped by 75%.

Aishwarya Sudhir, Coordinator of the Healthy Air Coalition said, "The Healthy Air Coalition has been monitoring local air quality using a network of monitors across the city for over 12

months. By chance, we have been able to assess the impacts of lockdown on air quality and it appears that pollution from PM2.5 has been cut by more than a quarter on average. In some places air quality has actually met WHO safe levels, possibly for the first time in two decades".

On average, PM 2.5 levels in Bengaluru from all monitoring stations reduced by approximately 28% in the 45day period during the lockdown compared to 45 days before the lockdown.
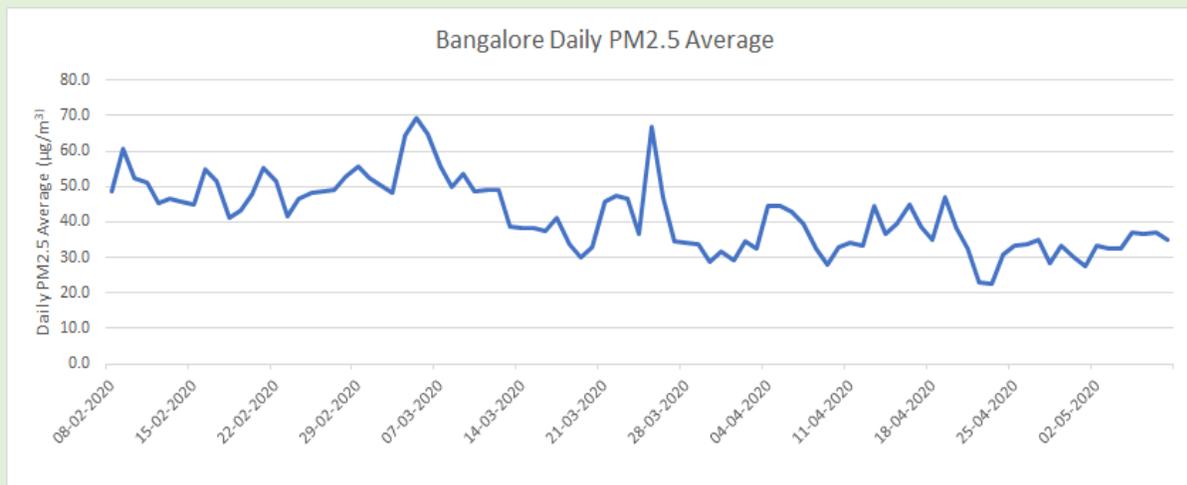

Before COVID-19, pollution from traffic, solid waste burning, residential cooking and heating, and dust from road works and construction that led to constant poor air quality, failing to meet even Indian air quality standards, and substantially out of line with WHO air quality recommendations. Air pollution is associated with increased risk of pneumonia, chronic obstructive pulmonary disease, lung cancer, heart disease and strokes, leading to seven million premature deaths each year globally. According to the Lancet, 12.5% of deaths in India are due to poor air quality, and half of those deaths are people dying below age 70.

Scientists around the world have reported improvements in air quality during lockdown in cities from Beijing to London, Milan to Delhi. While this occurred at enormous social and economic cost, due to the Covid-19 pandemic and the impact of reduced economic activity, it has illustrated the health and environmental benefits of reduced fossil fuel use in transport and energy.

The Healthy Air Coalition has written an open letter to the Mayor of Bengaluru today calling for a Healthy Recovery which builds upon solutions such as the Yulu bikeshare system and electrification of transport. The recovery agenda should include a robust plan to implement active and sustainable transport with dedicated paths for walking and lanes for cycling, promotion of electric vehicles and the necessary infrastructure, a curb on burning of solid waste, and implementation of construction and debris laws.

STUDY OF AIR QUALITY IMPACT WITH SATELLITE IMAGES
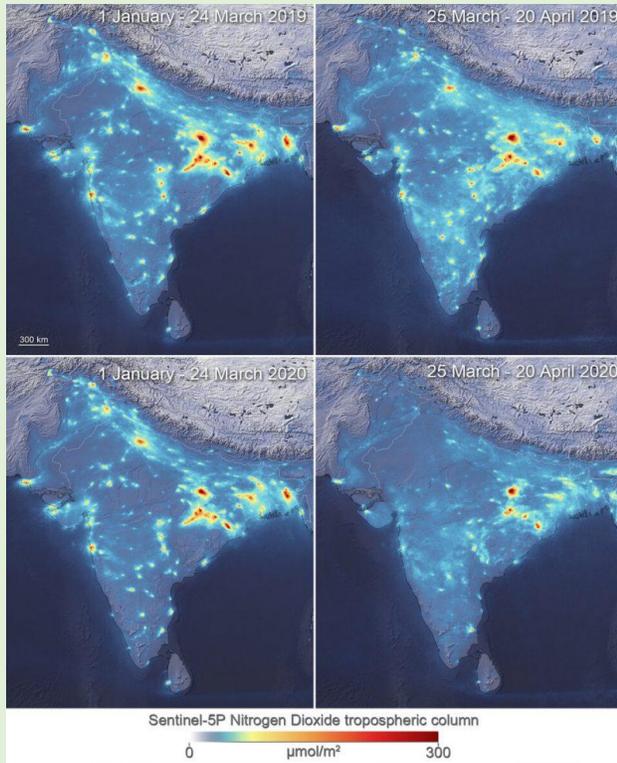
In the image, it shows satellite images, produced using data from the Copernicus Sentinel-5P satellite, show averaged nitrogen dioxide concentrations over India from January 1 to March 24, 2020 and March 25 (the first day of the lockdown) to April 20, 2020 – compared to the same time-frame as last year. The significant reduction in the concentrations can be seen over major cities across India. Mumbai and Delhi saw drops of around 40-50% compared to the same time last year. Image via ESA.

Every year, aerosols from anthropogenic (human-made) sources contribute to unhealthy levels of air pollution in many Indian cities. Aerosols are tiny solid and liquid particles suspended in the air that reduce visibility and can damage the human lungs and heart. Some aerosols have natural sources, such as dust storms, volcanic eruptions, and forest fires. Others come from human activities, such as the burning of fossil fuels and croplands. Human-made aerosols tend to contribute most of the smaller particles that have greater potential for damaging human health.
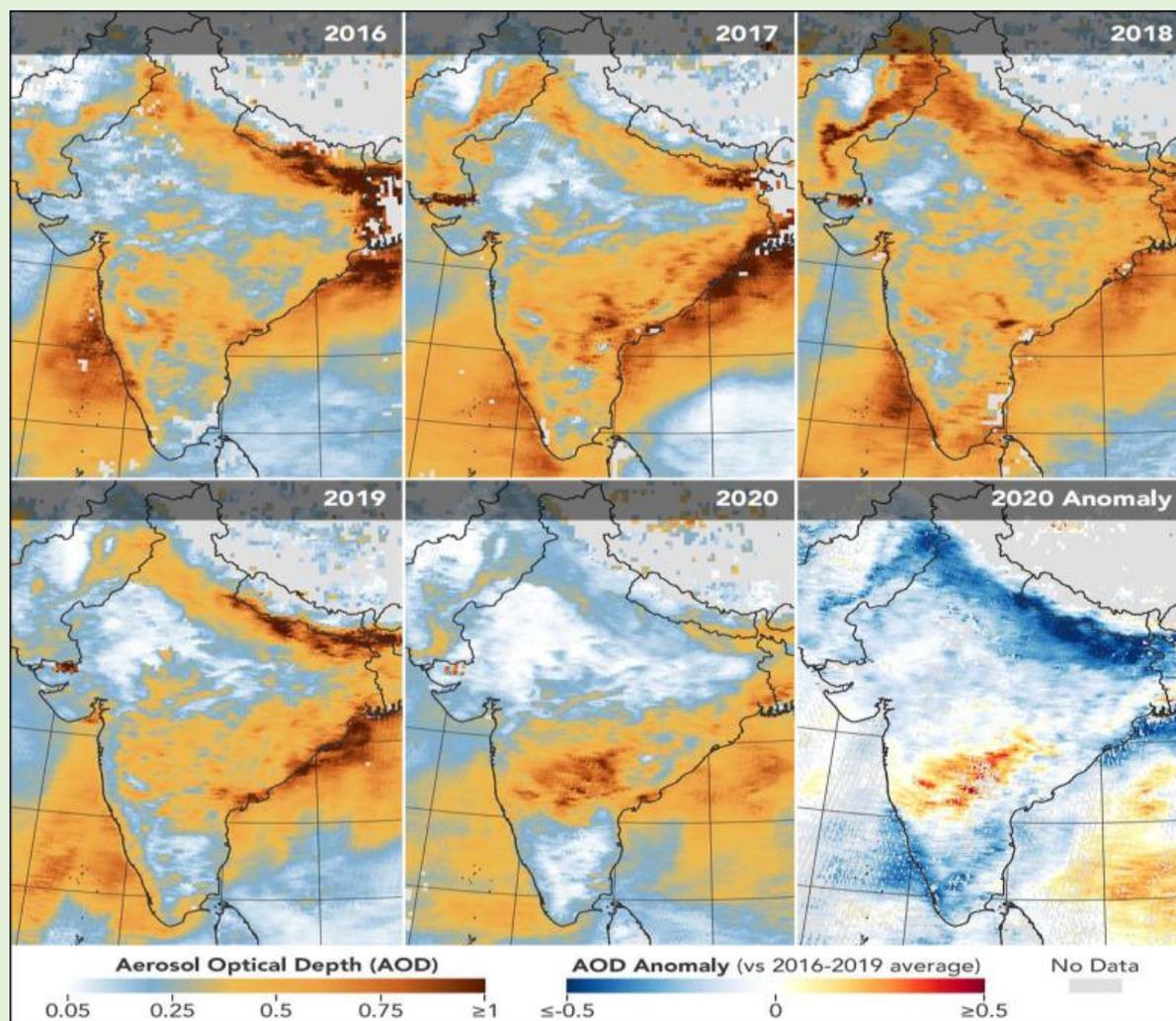
The first 5 maps above show aerosol optical depth (AOD) measurements over India during the same March 31 to April 5 period for each year from 2016 through 2020. The 6th map (anomaly) shows how AOD in 2020 compared to the average for 2016-2019. Aerosol optical depth is a measure of how light is absorbed or reflected by airborne particles as it travels through the atmosphere. If aerosols are concentrated near the surface, an optical depth of 1 or above indicates very hazy conditions. An optical depth, or thickness, of less than 0.1 over the entire atmospheric vertical column is considered "clean." The data were retrieved by the Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's Terra satellite.

CONCLUSION

Covid-19 which originated in Wuhan somewhere three months back has now taken refuge in host bodies in 210 countries around the globe infecting 1,968,893 people and 123,783 deaths as on 14th April 2020. On same day, India has also reported to have more than 10,000 positive cases with 350+ death toll. The condition is still uncontrolled and with no proven

cure for the virus. Locking down in homes and social distancing is the only preventive step that the entire country is following. But as the human activities are restricted in most of the areas, the natural environment of country has started healing itself. Factories, transport, vehicles and aviation have all ground to a halt. Carbon emissions have decreased and the quality of air has seen an unprecedented improvement. It is remarkable to see a reduction in PM 2.5 concentration in one of the India's most polluted city, as compared to the concentration just three months back. The other parameters lime PM 10, NO_2, and CO has also reduced distinctly which is the result of restricted human activities and mechanical movements. Satellite images of Indian atmosphere also reflects the same trend of reduction in air pollution after COVID-19 outbreak. The Air quality index (AQI) in all the states of India are now in two figures (indicating moderately good quality of air) after this lockdown. Not only air but the rivers of India like Ganga, Yamuna, and Cauvery etc. have become clean and clear and marine life is visible. After reviewing various reports as cited earlier, it can be summarised that undoubtedly COVID-19 has brought a fearful devastating scourge for human being but it has emerged as a blessing for natural environment providing it a "recovery time". We have also learnt that the environmental degradation caused by humans is not totally irreversible. In a period of just 1–2 months, "recovery of nature" is being witnessed by everyone. This is a signal for us to understand and react. Government and Policy makers should take necessary steps so that this healing process does not become a temporary thing. The research focusses on the changes in air quality during the lockdown period. There is a need for rigorous study on the effect of implementation of such short-term lockdown as an alternative measure for pollution reduction and its effect on economy. This study may also be used as a reference document to analyse post Covid condition as well to analyse effect of reduced pollution on health data of sensitive receptors. At present when entire globe is struggling to frame proper strategies to combat Covid-19, the early lockdown implemented has shown an absolute way towards restoring ecosystem and environment.

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