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A Pandemic Conveyance to Environmental Change-Post Covid Changes

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Abstract

In a matter of few months, the world has got fully transformed. Tens of thousands of people around the world have died, and hundreds of thousands have fallen ill, from corona virus which appeared in the city of Wuhan previous year in December 2019. Millions of people are lucky to have not caught the disease, but their entire way of life has got changed. The streets of Wuhan, in China, became fully empty after the authorities implemented strict lockdown. In Italy, the most strict travel restrictions have been imposed. In London, the normally crowded & bustling pubs, bars and theaters were forcefully closed and people have been told to stay in their homes. Worldwide, flights are getting delayed or cancelled or turning around in mid-air, as the aviation industry is shaking.

All the above action are aimed at controlling the widespread of Covid-19, and hopefully to reduce the death toll. But all these actions has also led to many unexpected consequences. As manufacturing industries, transport networks and daily businesses have closed down, it has resulted in a sudden drop in carbon emissions. Compared with this point of time last year, the levels of pollution in New York city have reduced by nearly 50% mainly because of the measures taken to contain the virus.

In India, major cities have shown a drastic drop in pollution level and the air quality has changed from moderate to good, which seemed to be nearly impossible to achieve before COVID-19.

Pollution and greenhouse gas emissions have fallen across continents as countries try to contain the spread of the new corona virus. Is this just a fleeting change, or could it lead to longer-lasting fall in emissions?

Keywords: Pandemic, Aerosol Emission, Quarantine, Greenhouse Gases, Disinfectants, Respiratory Illness.

Introduction

Most of the people who got infected with COVID-19 disease will experience mild respiratory illness and will recover without requiring any special treatment. Those people are more likely to develop serious illness who have underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer.

The best way for the prevention and to slow down the transmission, is to get well informed about the COVID-19 virus, the diseases caused by it and how it spreads. To protect yourself and others from infection, wash your hands properly or use an alcohol based sanitizer and don't touch your face. This COVID-19 virus spreads mainly by droplets of saliva or discharge from the nose when the infected person coughs or sneezes, hence it is important that you practice respiratory etiquette. Currently, there is no cure or vaccine for COVID-19. However, many trails and experiments are ongoing to evaluate potential treatments.

The best way to slow down the death rate and the rate of spread in patients is to practice social distancing and staying at home. There are countries like Italy and India where government ordered lockdown and is still in practice. People are going out only for their essential items like food and medicines. And even all offices, shops and businesses are shut down by the government till the curve of the graph, showing the number of increase in corona virus positive patients and deaths goes down.

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Lockdown means people are not going out from their houses and doing their jobs from home as much as possible like virtual classes, I.T jobs, business meeting through video calling, property virtual tours etc. Only those who are required for the fight against corona virus required in field are stepping out to help everyone in society like Doctors, nurses, police, administrators, food stalls, medical shops workers and factories where essential goods like masks, medicines, disinfectants, food items, packaging items etc.

Now because of this new situation of world like lockdown, more and more people are staying at home, industries are shut, flights are not taking off, trains are not running, no traffic on roads results in few changes in environment like cleaner air in few polluted areas like Delhi, where PPM level decreased drastically within few days of lockdown and rivers like Ganga river in northern India, famous Venice canal looks more clearer, more wildlife seen on roads, beaches are clean , aquatic animals are easily seen near shore areas.

Aim of the Study

The corona virus (COVID-19) epidemic is a critical issue for human health and safety. Since most of the people have changed their behaviors to contain or avoid the virus, some subtle effects on the environment can be seen, which are as follows.

Decrease in Air Pollutants- Nitrogen Dioxide, Carbon Dioxide

It has been reported that how the decrease in industrial, transportation, and business activities after the corona virus outbreak have reduced levels of atmospheric nitrogen dioxide (NO_2). But researchers say that decrease of one pollutant does not mean that air quality will become healthy. In February, many of the news channels reported unhealthy air pollution in Beijing, which was mainly due to airborne particle pollution known as PM 2.5. This was the headline in the South China Morning Post, "weak winds, high humidity and a strong thermal inversion had trapped bad air in the city." NASA satellites had also shown high load of airborne aerosols. Till what extent does the presence of natural or man made particles in the air prevents light from traveling through the atmosphere to the ground, is depicted by the measurements of aerosol optical depth.

Weather also plays an important role in determining air quality, beyond aerosol emissions. Wind patterns and the height of planetary boundary layer (lowest layer of the troposphere near Earth's surface) are important meteorological factors, as was noted by NASA/USRA researcher Fei Liu. A study on how changes in such meteorological factors have influenced the decrease in NO_2 before and during the quarantine period, is being done by Liu and her colleagues.

Data source: Tropospheric Monitoring Instrument (TROPOMI) on ESA's Sentinel-5 satellite Image credit: Josh Stevens / NASA Earth Observatory

Roads and Transportation Hubs are Empty during the Quarantine

It is evident that traffic on roads in major cities of the world has become less, as public transportation is not working shut down and people have been told to stay home. For proof, scenes of reduced traffic and empty parking lots near the Wuhan train station and airport have been captured by Satellite imagery from Planet Labs. Trains had stopped operating around January 22, when the first lockdown began. Domestic flights within China this year dropped by 60 to 70 percent, compared to January 2019.

When India suspended all transport and announced lockdown in March to contain the spread of corona virus, the skies over its polluted cities turned azure blue, and the air became fresh. People shared pictures of spotless skies and also the Himalayan peaks from cities where the view had been obscured by fog and smoke for decades, as air pollution

plummeted to levels unseen in living memory of people.

The capital city Delhi celebrated the city's "alpine weather", which usually records the foulest air in the world. "Blissful sight of blue skies and the joy of breathing clean air provides just the contrast to illustrate what we are doing to ourselves the rest of the time", wrote the politician and author Shashi Tharoor. Delhi was gasping for breath just less than six months ago. Authorities had said that air quality had reached "unbearable levels". Schools were forced to shut, flights had to be diverted, and people were urged to avoid polluted areas, wear masks and to keep their doors and windows closed.

Delhi and 13 more Indian cities featured on the world's 20 most polluted cities list. It has been estimated that more than a million people in Indian die every year because of air pollution and related diseases, the major contributors being industrial smoke, vehicular emissions, burning of trash and crop residue, construction and road dust. As researchers worked to collect data on how the grinding lockdown was impacting air pollution, common people breathed clean air inside their homes.

For countries like India, this can be an unparalleled event, to take a closer look at air pollution levels during these quarantine days, and how the environment has reacted. This should be taken as an opportunity to plan how the pollution problem can be fixed. A drastic improvement in air quality levels in 85 cities was marked by Federal pollution control authorities. Air pollution in Delhi and its suburbs (a massive sprawl called the National Capital region, where more than 20 million people live) had reached more than 20 times the World Health Organization's safe limit in last winter. The deadliest particle in Delhi's foul air, which increases the probability of respiratory and cardiovascular diseases, is the tiny but deadly PM 2.5. They primarily get generated from combustion - fires, automobiles and power plants.

Urban Emissions found the levels of PM 2.5 in Delhi during the lockdown plummeted to 20 microgram per cubic metre with a 20-day average of 35.

The monthly average of PM 2.5 in the capital was up to four times higher between 2017 and 2019 (The national standard is set at 40, and the WHO has an annual average guideline of just 10 microgram per cubic metre.) It means that at least 70% of the pollution is locally generated, since 35 is the lowest available average of PM2.5 with limited local emissions.

Studies have marked dip in PM 10, which is caused mainly by road and construction dust, which comes mainly from vehicular emissions, and nearly 90% of vehicles are at halt. "The current crisis has shown us that clear skies and breathable air can be

achieved very fast if concrete action is taken to reduce burning of fossil fuels," says Sunil Dahiya, of the Centre for Research on Energy and Clean Air. This agency has been tracking air pollution levels during the lockdown. Indians' and the media's panic and outrage during the deadly winter pollution gets lost in the fog of summer heat and concerns over monsoon rains. So will this lockdown prompt any change? Life changing reforms are mostly triggered during crises. For instance, in 1952 a fatal four-day "pea-souper" that engulfed London and killed thousands, provoked people and led to passing of the Clean Air Act to reduce the use of smoky fuels. Before hosting marquee international events like the Beijing Olympics in 2008, the World Expo in Shanghai and the Guangzhou Asian Games in 2010, China tried to clean up its air several times before it slipped back to grey, smoky skies. But when in 2014 China hosted 21 heads of Asia-Pacific economies in the Apec meeting in Beijing, that was believed to be a turning point by many. China introduced a set of far-reaching measures in a rush to clean its air. This resulted in a 32% drop in average pollution across major Chinese cities over the next four years.

In India, demand for fresh air and clear skies is not yet democratic. So could a lockdown, which was implemented to prevent the spread of a pandemic, trigger similar policy changes to clean up India's air? Is it possible that this experience of breathable air and clear skies could trigger a movement in the country to demand for pollution less India?

Carbon Dioxide Emissions Have Decreased, As The Coal And Oil Industrial Activities Have Dropped

Major industries in China had been operated at a much lower-than-normal rates during the quarantine, stated a report from Carbon Brief. For instance, in Shandong province, oil refinery operations were at their lowest since 2015. At power plants, the average coal consumption also reached a four-year low. Hence carbon dioxide (CO_2) emissions went 25 percent lower in the two weeks following the Lunar New Year compared to 2019. However, this decrease in CO_2 emissions for two weeks will reduce the annual total just by 1 percent approximately.

The Pandemic Has Already Reduced Greenhouse Gases

Across the world, air pollution is plummeting during the lockdown. A new study from IQAir shows that air pollution levels in 10 major global cities have dropped 9 percent to 60 percent during the corona virus pandemic lockdowns. Delhi, India, has had a 60 percent reduction in pollution compared to this time last year. Seoul, South Korea, had a 54 percent reduction and Wuhan, China, had a 44 percent reduction when the city was on lockdown.

Daily coal consumption at six major power firms
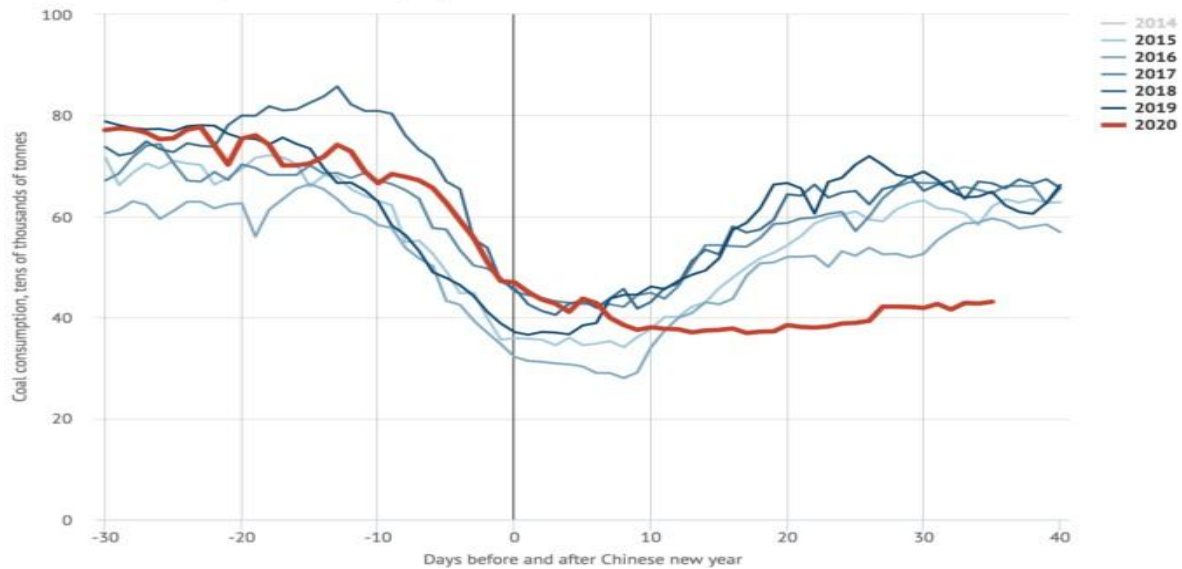
A Stanford University researcher estimates that in China alone, reduced emissions have saved the lives of 4,000 children under the age of 5 and 73,000 adults over the age of 70.

The European Space Agency shows nitrogen dioxide emissions (NO2) dropped dramatically over Italy. The agency's Sentinel-5P satellite shows that concentrations of NO2 dropped drastically between Jan. 1 and March 12, particularly over northern Italy, which was hardest hit by the corona virus. The IQAir report says that in early April, Los Angeles's air quality "was among the best in the world" due to the shutdowns.
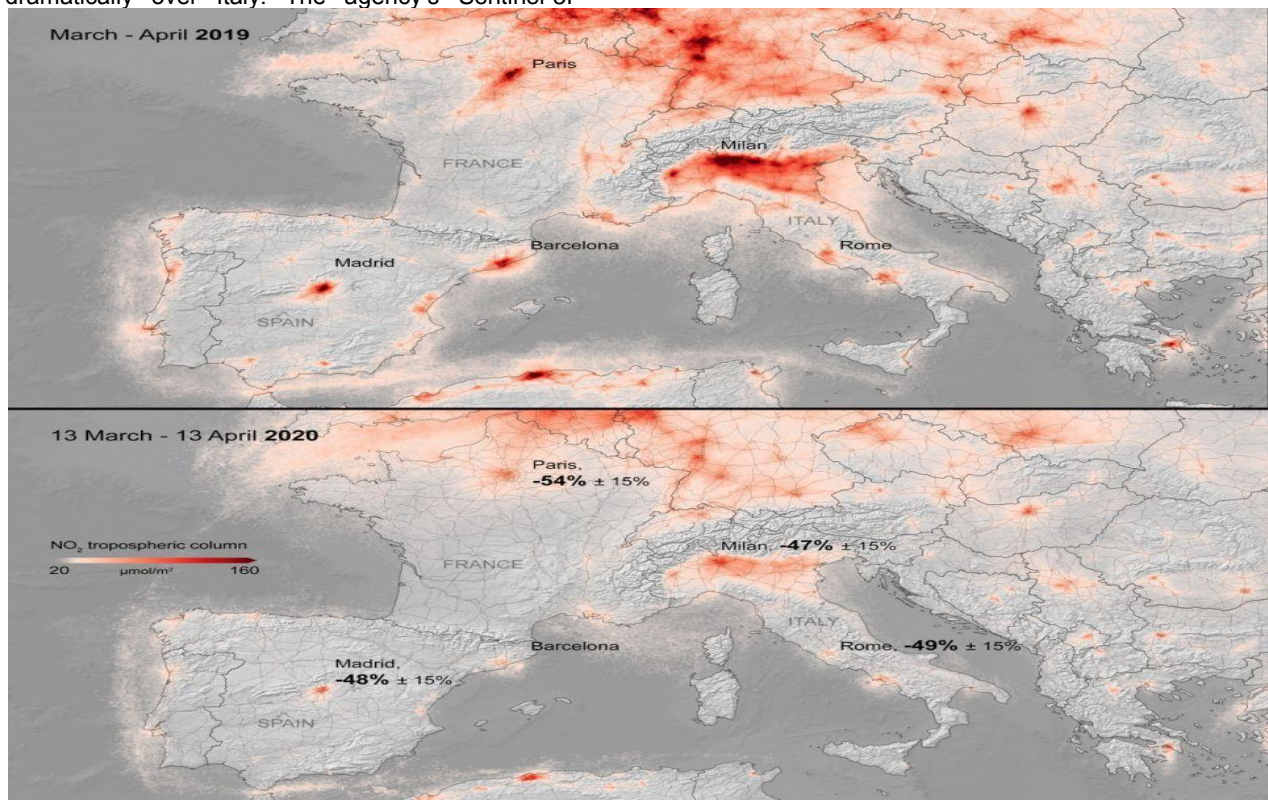
Nitrogen dioxide levels dropped dramatically in northern Italy during the corona virus pandemic lockdown. (European Space Agency)

Conclusion

The COVID-19 pandemic is creating big havoc in all countries around the world, causing a global health crisis and forcing even the biggest world economies to shut down due to implementation of quarantine measures. But this outbreak is also having a positive impact on Earth's environment, as the movement of people is restricted.

Air quality is one of the areas that scientists are witnessing a big difference in. As industries,

aviation and other forms of transport grind to a halt, it seems that the pandemic has resulted in huge reductions in air pollution, primarily in those regions that have been significantly affected by COVID-19, such as China and Italy.

As observed by satellites, the air pollution levels are showing very drastic improvement in areas that are undergoing restrictive quarantines. Industrial areas in both China and Italy have shown big drops in nitrogen dioxide (NO2), corresponding to reductions in industrial activity and vehicular traffic. This seems to be obvious since vehicles and industries are the main source of NO2 emission, and when these emission sources are turned off, the atmosphere will clear up automatically.

1. Reductions on the amount of cars on the roads in some countries are one of the clearest impacts of work-from-home and social distancing policies.
2. But it's [also] very clear that airline passenger numbers are way down, as many countries introduce travel bans and meetings/conferences/work related travel is cancelled. Industrial activity is also reduced, but not necessarily to the extent of traffic. For example, power plants still need to run to produce electricity, water treatment plants still need to continue to treat water, etc.

The COVID-19 pandemic is already transforming the lives of millions of people across the globe, and right now minds are understandably focused on tackling the growing public health crisis. But what could the potential long-term implications be when it comes to the environment?

"In the long term, there are lots of folks talking about how the COVID-19 pandemic holds lessons and opportunities for environmental action," Davis told Newsweek. "For example, we will have a new baseline of what's possible to do online: telecommute, educate, shop, etc. And to the extent our government, institutions, and social networks succeed by coming together, we may feel more empowered to take on daunting issues like climate change and a transition to sustainable energy sources.

"On the other hand, hard economic times could undermine enthusiasm for environmental protection as people prioritize health, safety, and recovery. For example, if consumers turn their backs on solar and electric vehicles, the pandemic could stem the progress we've been making toward decarbonization."

The good news is that we do see drops in air pollution in big cities. In fact, over very wide regions we see drops in air pollution. We've seen a drop in emissions of greenhouse gases — the gases responsible for climate change. But are these changes short-term? They're very unlikely to be permanent unless we fundamentally change our economies, which is a much harder thing to do.

This lockdown has proved that the environment is resilient and can bounce back from negative impacts due to human activity. But it's not going to be permanent unless we really address the burning of fossil fuels. "The question is whether we'll be able to act on it in a way that permits us to have both a healthy environment and a healthy economy. That's got to be the ultimate goal."

Major cities of the world need to come with new traffic plans, industrial step up plans, ban on single use plastic that might bring this change as permanent change. But there is a new angle of this pandemic which has shown us a new hope how to preserve Earth but I believe the pandemic could bring a new kind and a different level of pollution in the form of uses of disinfectants, masks or any other form of sanitization. People will be using more harmful disinfectant sprays, one time use of gloves, masks, tissues is going to be common and will add up into more pollution. Again this unparalleled situation is new for everyone lets hope for the best in terms of recovery from pandemic, recovery from economic recession and recovery of our planet from pollution.

A global pandemic which is taking people's lives shouldn't be seen as a way to bring about the environmental change. Currently, it's far from certain to determine how long lasting this dip in emissions will be. When the pandemic will eventually reduce, will the carbon and other pollutant emissions "bounce back" to the levels as were before? It is an early time to conclude on anything, as there is this famous dialogue from a bollywood movie" PICTURE ABHI BAKI HAI MERE DOST".

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