Impact on Environment due to SARS-CoV-2 in India

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ABSTRACT

Before the start of the SARS-CoV-2 (COVID-19) pandemic, the whole environment around us had been deemed very toxic to breathe in due to the amount of greenhouse gases that had been emitted over the centuries. The Earth faced rising temperatures, which in turn led to the melting of glaciers and rising of sea levels. Environmental degradation was happening fast due to the depletion of resources such as air, water and soil. But after the coronavirus lockdown (Talabandi) commenced, there have been changes in the environment. The lockdown still has a huge impact on people in India too. The halt of industrial production and traffic resulted in cleaner air and rivers. In India the first phase of the nationwide lockdown that began on March 24 followed by enforcement of a series of regulations had some evidences that the COVID-19 curve is flattening in the country's COVID-19 affected regions. There was a good chance Prime Minister Narendra Modi extended the lockdown (Talabandi) four times that ended on (Phase 1 (24 March-14 April)., Phase 2 (15 April-3 May)., Phase 3 (4 May-17 May) & Phase 4 (18 May-31 May).

The paper focuses on different aspects of environmental impact due to SARS-CoV-2 in India.

Keywords: *Pandemic, Environment, Toxicity, SARS-CoV-2, Lockdown.*

INTRODUCTION

The COVID-19 pandemic has caused industrial activity to shut down and cancelled flights and other journeys, slashing greenhouse gas emissions and air pollution around the world. If there is something positive to take from this terrible crisis, it could be that it's offered a taste of the air we might breathe in a low-carbon future. The World Health Organization (WHO) estimates that about 3 million people die each year from ailments caused by air pollution, and that more than 80% of people living in urban areas are exposed to air quality levels that exceed safe limits. The situation is worse in low-income countries, where 98% of cities fail to meet WHO air quality standards. Measurements from the European Space Agency's Sentinel-5P satellite show that during late January and early February 2020, levels of nitrogen dioxide (NO_2) over cities and industrial areas in Asia and Europe were lower than in the same period in 2019, by as much as 40%. The water pollution levels in the Yamuna have registered a significant decline due to closure of industrial units during the 21-day lockdown imposed to wind down the COVID-19 pandemic. The closure of industrial units in Delhi-NCR during the lockdown led to an apparent improvement in water quality of the Yamuna river as the tons of toxic wastes and effluents are no more discharged into it. "Many industries and offices are closed due to the lockdown and therefore the Yamuna is looked cleaner those days. The stoppage of industrial pollutants and industrial waste has definitely had a positive effect on water quality. "The improvement in this period hints that there is a chance for the Yamuna to get cleaned up easily if the people and the government come together. The lockdown has shown us that it is possible, however, it will not stay in place forever," The water in the Yamuna looks much cleaner nowadays."

However, with industries shut and people mostly staying indoors, Yamuna is not the only river in the country which witnessed improvement in water quality. Likewise the quality of water in the holy Ganga river has also witnessed a significant improvement of around '40 to 50 percent' since March 24, the day when Prime Minister Narendra Modi announced a 21-day lockdown in the wake of the coronavirus pandemic. "one-tenth of the pollution in the Ganga river comes from industries (Fig.1)
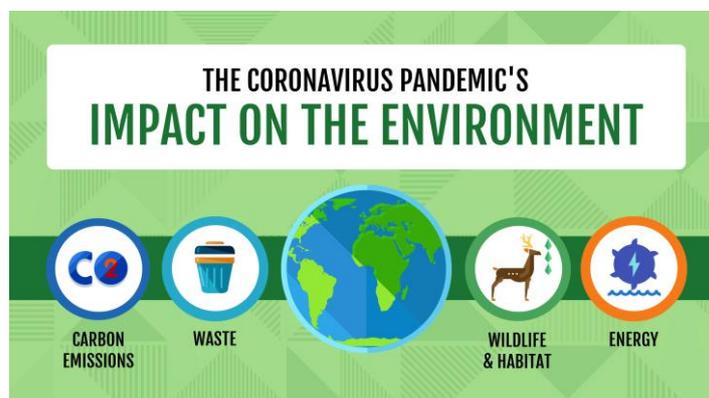
Fig.1. The SARS-CoV-2 impact on the Environment

As industries are shut due to lockdown, the situation has become better. "Due to rainfall on March 15-16 in areas where Ganga flows, the water level has also increased, which means that its cleaning capacity has also increased. There is a considerable improvement if we look at the pre-lockdown period and after March 24 (https://www.timesnownews.com).

MATERIALS AND METHODS

For the study we visited webpages, different review literatures returned from a Google search on different positive impacts, research articles and newspapers due to COVID-19 pandemic lockdown in India to contribute a concise knowledge. All the figures and graphs has been taken from https://www.google.com

RESULTS AND DISCUSSION

In India, different aspects of unbelievable environmental changes seen since lockdown due to COVID-19. The COVID-19 lockdown is healing the planet in a way never seen before in living history. We have here some of the most vital environmental changes seen in India after the COVID-19 lockdown. Human beings often forget that we are largely dependent on Mother Nature and become ignorant towards taking care of it. We have been so reluctant to the preservation of natural resources and sustainable development that we had forgotten the beauty of the Earth completely. With everyone stuck at home, as COVID-19 creates havoc in the world in terms of economics, trains and flights are being cancelled to reduce travel. Life, as we know it, has changed within days and beyond recognition. Coronavirus has taken the lives of people across the globe and we can see the numbers as soon as we switch on the TV. The governments of all over the world including India are taking whatever precautions they can take to prevent the spread. However, if we look closely, the pandemic also has some positive effects on the environment. For breathing pure air to greener trees, spotting various wildlife into the cities here are some important environmental

changes that we have seen for coronavirus lockdown in India (Goswami, 2020 & Middha, 2020) which are being included as: 1. Improvement in air quality, 2. Dolphins spotted near Kolkata ghats, 3. The number of flamingos increased in Mumbai, 4. Ganga fit for drinking in Haridwar, 5. The Himalayan Range Seen After 30 Years, 6. No Traffic in India, 7. Reduction of Air Pollution in India, 8. Clean Water in Yamuna, 9. Pollution-Free Taj Mahal, 10. Drinking-Water from Ganga, 11. Animals Roam Freely on Streets, 12. Water Quality, 13. Effect on Vegetation, 14. Effect on Wildlife.

1. Improvement in air quality: Since the Janta Curfew on March 22 till now, there has been a significant dip in the Air Quality Index (AQI) across the country. New Delhi was ranked as the most polluted city in the world by WHO in May 2014. The usual air quality of India's national capital according to the air quality index used to be 200. When the pollution level hit its peak, the pollution level soared to 900 and sometimes, off the measurable scale. While 200 itself is 25 percent above unsafe level as deemed by World Health Organization, but as Delhi's 11 million registered cars were taken off the roads and factories and construction were ground to a halt, AQI levels have regularly fallen below 20. The skies are suddenly a rare, piercing blue. Even the bird song seems louder. (Fig.2).

Fig. 2. India Gate before & after lockdown, showing improvement in Air Quality

2. Dolphins spotted near Kolkata ghats: Critically endangered, South Asian River Dolphins also known as Ganges Dolphins have been spotted back in the Ganga river after 30 years. Due to the reduced pollution in water, the South Asian River Dolphins have been spotted at various Ganga Ghats of Kolkata (Fig.3).

Fig. 3. Lockdown Effect: Ganges Dolphin spotted at Kolkata ghats after 30 years

3. The number of flamingos increased in Mumbai: As a result of the lockdown imposed due to COVID-19, tens of thousands of flamingos have gathered in the city of Navi Mumbai. The birds normally migrate to the area every year, but residents have reported that this year they have seen a massive increase in their numbers (Fig.4).

Fig.4.Thousands of migratory birds were spotted at Navi Mumbai during Lockdown.

4. Ganga fit for drinking in Haridwar: The Uttarakhand Pollution Control Board Water from Har-ki-Pauri in Haridwar was tested and the results from the tests reveal that the water here has been classified as 'fit for drinking after chlorination', for the first time in decades. It is assumed that due to the lockdown, the drainage of industrial waste into the river water has stopped and brought a significant change in the water quality (Fig.5 & 6).

Fig.5. Showing Clean Ganga   **Fig.6. Showing towards clean Ganga**

5. The Himalayan Range Seen After 30 Years: With the reduction of air pollution due to the lockdown, people in Punjab can see Himalayan Ranges from more than 100 miles away. People in the northern Indian state of Punjab are reacting with awe at the sight of the Himalayan mountain range, which is now visible from more than 100 miles away due to the reduction in air pollution caused by the country's coronavirus lockdown. Indians in the city of Jalandhar and the surrounding area have posted photos online of the views from their homes, with some saying they haven't seen the peaks of the Himalayas for decades (Fig.7)"For the first time in almost 30 years (I) could clearly see the Himalayas due to India's lockdown clearing air pollution. Just amazing," Manjit Kang wrote. (Picheta (CNN), 2020 & Boyle, 2020).

Fig.7. Himalayas due to India's lockdown clearly seen after 30 Years.

6. No Traffic in India: With companies asking their employees to work from home, it has reduced vehicles on the road. The famous Silk Board Junction, known for the worst traffic jam in Bangalore, is empty due to the lockdown. Similar gesture were seen all around. Before COVID-19, pollution-from traffic, solid waste burning, residential cooking and heating, and dust from road works and construction-led to constant poor air quality, failing to meet even Indian air quality standards, and substantially out of line with WHO air quality recommendations. Emissions from vehicular pollution are a key contributor to air pollution in Bengaluru, which is the most traffic-congested city in India (Graph.1). 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 (Sudhir, 2020).
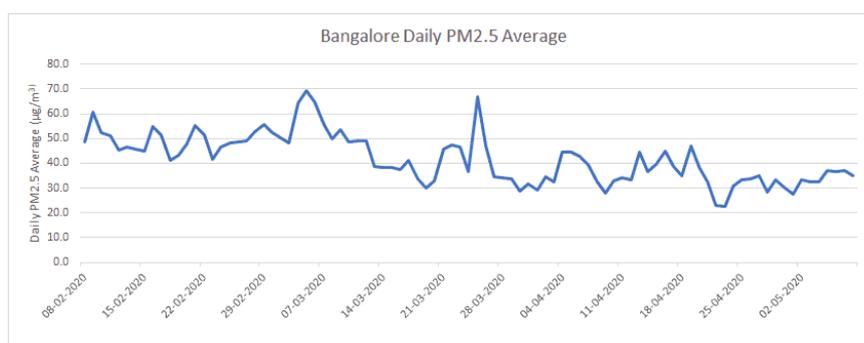
Graph.1. Showing Bengalore Daily PM2.5 Average

7. Reduction of Air Pollution in India: Schools were closed in India due to COVID-19. However in New Delhi and some other states the pollution level was much high and odd-even formula in different categories were implemented to reduce particularly air pollution. With the lockdown, the air quality has improved mainly due to the fall in road traffic. An analysis of air quality data has shown that air pollution (measured as PM2.5) was reduced by an average of 28% in Bengaluru during COVID-19 lockdown. The analysis was done by the Centre for Research on Energy and Clean Air (CREA), using data collected by 'Bengaluru's Healthy Air Coalition'. Additional analysis of satellite data confirms this downward trend (Mahto *et al*., 2020)

8. Clean Water in Yamuna: Two months of the Coronavirus lockdown have done what successive governments could not do in 25 years with over Rs 5,000 crore at their disposal-clean up the Yamuna river. As industrial activity halted and other commercial activities slowed during the lockdown, the Yamuna river cleaned itself, allowing numerous Indian and migratory birds to flock to its waters. One can now see Indian and migratory birds, such as Grey Heron, Ibis and Storks feasting on fish, which too can be seen swimming in the river's clearer waters. Almost 1,400 km in length, Yamuna flows through seven states where industrial units discharge their effluents, mostly untreated, into it. Between Haryana's Panipat and Delhi alone, over 300 units of industrial discharge is released into the Yamuna, making it the country's most polluted river. The river picks up 80 per cent of its pollutants at Delhi, Agra and Mathura (ANI, 2020). A finding by the Delhi Pollution Control Committee shows that in Delhi, compared to the pre-lockdown days, the river is now cleaner by around 33%. (Shukla, 2020). Additionally, the committee found that the water improved further downstream near Mathura(Fig.8).

Fig.8.Clean water in Yamuna after Lockdown

9. Pollution-Free Taj Mahal: With the reduction of air pollution in Agra due to the lockdown, Taj Mahal looks much vibrant in clean air. The lockdown has not only kept just tourists away from Taj Mahal this year but also the insects that stick to it every summer. In a first, in more than five years, swarms of insects, Goeldichironomus, that descend upon the Taj during summers have not made 'annual visit' (Fig. 9a & 9b., Jaiswal, 2020).
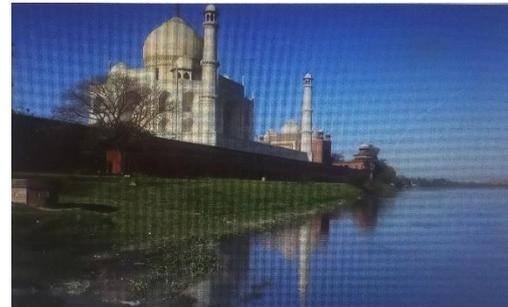
9a   9**b**

Fig. 9a & 9b: Taj Mahal & Yamuna before(a) and after lockdown(b) (2019-2020)

10. Drinking-Water from Ganga: With the lockdown and reduction of water pollution in many states of India, the water of Ganga River is now fit for drinking after necessary treatment. According to the UP Pollution Control Board, results of the samples collected from the rivers on those dates showed there was a remarkable drop in pollution levels during the lockdown period (Fig.10).Two other vital parameters to determine the quality of river water are total coliform and fecal coliform, which also saw declines in Sangam (Mani, 2020).

DIP IN POLLUTION AT SANGAM			
	BOD level	**Total coliform**	**Fecal coliform**
March 13	2.8mg/l	3400 MPN/100ml	1300MPN/100ml
April 9	2.4mg/l	2600MPN/100ml	820MPN/100ml
April 30	2.2mg/l	2100MPN	680MPN/100m

Fig. 10. Dip in pollution in Sangam, Allahabad

11. Animals Roam Freely on Streets: The ongoing COVID-19 pandemic has ushered in stay-at-home rules worldwide, which in turn have resulted in empty urban landscapes that are slowly being reclaimed by certain wild species. Animals emerge from the wild into the open, reaching areas where they rarely venture into as they search for food. Wild animals can be seen roaming freely in various parts in India as humans are confined to their homes due to the coronavirus lockdown (Fig.11) (Gandhi, 2020., Sengupta, 2020 & Singh, 2020).

Fig.11. Animals Roam Freely on Streets

12. Water Quality: Since there were no boats, whether they be fishing or pleasure ones, plying on the rivers and waterways, the water has cleared up. The water became so clear that the fish could be seen and there was better water flow. No doubt, because of the lesser human footfall even the oceans are recovering and marine life is thriving (Fig.12).

Fig. 12. "Unfit to bath" to "safe to drink": COVID-19 lockdown improvement

13. Effect on Vegetation: Plants are growing better because there is cleaner air and water, and because yet again there is no human interference. With everything at a standstill, plants are allowed to thrive and grow and produce more coverage and oxygen. Less litter also means lesser clogging of river systems, which is good in the long run for the environment. It's been two months to the lockdown (Fig.13).

Fig. 13. New vegetation during Lockdown in India & abroad

14. Effect on Wildlife: Again where fish is concerned, the lockdown has seen a decline in fishing, which means that the fish biomass will increase after over-fishing almost depleted it. Apart from that, animals have been spotted moving about freely where once they would not dare to go. Even sea turtles have been spotted returning to areas they once avoided to lay their eggs, all due to the lack human interference (Vega, 2020).

While this global emergency has beseeched us to pause, slow down, and reflect; it has also given us moments to reminisce over nature's generosity, like the summery floral abundance- which many of us may have missed to observe and cherish, during these moments of introspection.

CONCLUSION

In conclusion, though there has been a positive impact on the environment due to the lockdown, there is fear that once people start travelling again or go back to doing what they have been doing, all the positive impact will also disappear. With hope in our hearts to surpass the hard times, we shall move to a future of refined lifestyle choices to preserve Mother Nature and hope to be working cumulatively to restore our planet earth from the destruction that had been caused over the several years.

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