

Environmental Rejuvenation during Global pandemic Lockdown

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Abstract

The pandemic of Novel COVID-19 was reported in India in January 2020 and constantly increased day by day due to the movement of people from abroad to India and then to different parts of the country. COVID-19 has been acknowledged as a pandemic due to its high rate of transmission and covered almost all countries of the world. Under this scenario, there is no medicine for its treatments. It is essential to break the chain of transmission with distance and restrict the count of infected people. To limit the coronavirus (known as COVID-19) outburst, the government of India announced a nationwide lockdown in March 2020, followed by the extension of the periods of lockdown. Lockdown promotes various provisions for closing the industries, and transportation except for the basic services (Hudson, 2020). Behavioral changes in nature are highly positive in the case of the biosphere. The hydrosphere is remediating the earth via repairing work under this natural recovery. It has been found that there is an improvement in water quality, air quality, etc. During lockdown worldwide factories have withdrawn from work, industries stopped emitting effluents into the air and water, vehicles discontinued moving and most of the world population quarantined themselves at home which resulted in an unbelievable transformation in the environment around us like noxious gases have been reduced, ozone levels are increasing over the Antarctic region, reduction of smog and haze in the atmosphere.

Keywords: Lockdown, COVID-19, Air Quality, Water Quality, Pollution, Environment.

1. Introduction

COVID-19 is a new communicable disease that causes illness in both animals and humans. History reveals epidemics data such as plague, smallpox, measles, cholera, influenza, AIDS, Severe acute respiratory syndrome (SARS), and the recent era witnessed COVID-19.

Novel coronavirus (SARS-CoV-2) has been produced from mammals excluding human beings (Travaglio, et. al., 2020). The origin of deadly pandemic COVID-19 has been in December 2019 in the city of Wuhan, China (Travaglio, et. al., 2020; Raibhandari, et. al., 2020; Chauhan and Singh, 2020) and spread to the entire world. This event was soon reported to the World Health Organization (WHO).

The microorganism had been identified as a novel coronavirus. Generally, the virus of COVID-19 and Severe Acute Respiratory Syndrome (SARS) are related to each other but the disease caused by them is quite different. World Health Organization had given the name of the disease as COVID-19 in Feb 2020. COVID-19, Co stands for 'corona' VI stands for 'Virus' and D stands for 'Disease'. This virus has not previously been seen in humans so it is called "Novel Corona Virus". The SAR-CoV is a member of the beta coronavirus subgroup from the coronaviridae family. The size of coronavirus is from 65 to 125nm in diameter. The virus of COVID-19 is transmitted through contact with respiratory droplets instead of air.

Transmission of the coronavirus occurs with personal contacts that's why various countries have imposed complete lockdowns to maintain forced social distancing to break the chain of transmission. The main dispersal way of this virus is through respiratory droplets expelled by the person suffering from cold and cough. Due to touching these droplets present on the surface. The World Health Organization has declared the situation of Pandemic. Still, if there were some urgent requirements for the movement of people, they were asked to stay under quarantine for 14 days, considering the appearance of the symptoms that take about 14 days. The Government of India has launched Standard Operating Procedures (SOPs) that should be followed and adopted during COVID-19. Prime Minister of India announced this as a Janta (people's) curfew, which was observed on 22nd March 2020. Due to the Janta curfew, all transportation services, and industrial and commercial activities were closed.

After its success, an absolute lockdown was imposed on 25th Mar 2020 to break the chain of this virus attack (Tahir, et. al., 2020; Prasad, R., 2020). The total lockdown has raised a panic

situation among people but helped in reducing the spreading of the virus among society. Besides this, during the lockdown period, nature shows a positive response to the improvement of natural parameters of the biosphere. Thus, lockdown gives a pause to pollution to rejuvenate nature as a repairing mechanism.

COVID-19 virulent disease has an impact on every aspect of human life and the global economy. The number of new cases and increasing death rates produced drastic estimates on the economy of the country. Depending on the level of COVID-19 impact in each country as well as country-specific situations and capacity, the world Governments are adopting different levels of intervention, including restrictions on travel and lockdowns to contain the spread of the highly contagious virus.

Central and state governments should have guidelines for people to take up certain environmental greening and cleaning activities. People are to be encouraged to practice rooftop farming, urban agriculture, and urban gardening to enhance the urban environment. People are to be made active agents of fair and sustainable development during the lockdown.

2. Effect of COVID-19 on Environment

Due to the epidemic of COVID-19, almost every city (Big & small) and village in the affected countries like China, the USA, Taiwan, Turkey, Spain, France, Italy, Iran, the U.K., India, and more are under partial or total lockdown for a lengthy period from a small number of weeks up to a few months.

The major sectors that cause air pollution are transport, industries, activities of construction of power plants, burning of biomass road dust resuspension, and activity of residential. Besides, definite activities such as the operation of the set of DG, landfill fires, restaurants, etc. also supply to air pollution. Under the nationwide lockdown, all services of transport like road, air, and rail were suspended with exceptions for the essential services. Institutions of education, establishments of industries, and services of hospitality were also suspended. Finally, we observed that the quality of air continuously improved.

Vehicles are available on the roads resulting in almost emission of gases is zero of gases of greenhouse and many toxic suspended particles to the environment. Due to the demand for lesser power in industries, the use of fossil fuels has been lowered significantly. Ecosystems

are being greatly improved. In many big cities, people are experiencing a clear sky for the first time in their lives. The level of pollution in spots for tourists such as forests, beaches sea, areas of hills, etc. is also largely shrinking. The ozone layer has been established to have rejuvenated in some areas. The pandemic has displayed its complementary consequences on the civilization of humans it has caused the worldwide panic situation but created a very positive impact on the world environment.

The economic shutdown under the COVID-19 pandemic has had two monumental impacts on our environment. It has improved our air and water quality dramatically and slashed our material consumption, usage of water, and the production of waste.

2.1. Improvement in Air Quality

It is a great improvement in the quality of air, especially in areas of urban from alarming or poor to satisfactory results. The main reason due to lockdown the human activities are reduced. The standard reduction in concentrations of particulate matter (PM) over the southern part of India is around 50-60% (Chauhan, et. al. 2020). After the lockdown, there was less significant traveling by people. Even industries were closed down and not allowed for any activity. This in turn leads to pollution due to airdropping significantly, as there was marked refuse in the emission of nitrous oxide (Singh and Kulshrestha, 2020).

Table: Percentage Improvement in Air Pollution

Cities	Air Pollutants during Lockdown (in%)				
	SO ₂	NO ₂	CO	O ₃	NH ₃
Delhi	-17.97	-52.68	-30.35	+0.78	-12.33
Mumbai	-15.84	-43.08	-25.34	+0.75	-11.32
Nagpur	-13.19	-48.75	-20.12	+0.68	-29.75
Bangalore	-12.15	-35.62	-11.29	+0.79	-25.62
Jaipur	-11.06	-37.51	-23.32	+2.21	-26.52
Ahmedabad	-14.05	-44.63	-27.22	+1.68	-12.35
Bhopal	-13.14	-42.09	-16.78	+0.78	-17.28
Hyderabad	-12.17	-59.07	-25.88	+1.65	-13.35
Chennai	-15.62	-45.64	-23.21	+0.85	-18.06

During a lockdown, all types of pollution including air pollution which was created by people due to vehicle smoking and burning of waste materials got stopped. Nowadays people are

experiencing fresh air due to covid-19. Improvement in air quality is a good sign of lockdown for the surrounding environment. Air pollutants including toxic matters are now somewhat in a controlled position (Srivastava, et. al., 2020). Some pollution parameters for major Indian cities statistics show improvement in air pollution as illustrated in Table 1 (Mahato, et. al., 2020).

2.2. Enhancement in Water Quality

The Boats are not available whether they are fishing or enjoying ones, plying on the rivers and ways of water, the water has cleared up. In areas like Venice, the water became so clear that the fish could be seen and there was improved water flow. No doubt, because of the lesser human footfall, even the oceans are getting better, and marine life is flourishing. The beach shacks, hotels, restaurants, and industrial units, which are always considered major contributors to the direct release of sewage and waste into the water bodies were found to reduce the pollution resulting in the regular rejuvenation of water to some extent.

The Ganga, the holy river of Hinduism, has been suffering a lot, discharges of industries and other activities of humans. Namami Gange program started by the National Mission for Clean the Ganga with the two objectives of effectual abatement of pollution, protection, and rejuvenation/conservation of National River Ganga was accepted in June month, 2014 as a 'Flagship Programme' with a budget of Rs. 20,000 crores, with a small success in the action cleaning. Lockdown creates the water cleaner automatically.

2.3. Revival of Coastline

The lack of footfalls along the beaches allowed sand to replenish the beaches. Something, which would have never happened considering the number of visitors on the shores. While adding that dune vegetation has got a bit of a breather.

2.4. Influence on Wildlife

The lack of vehicular movements and human interference activities has even promoted animals to come out and live their lives. Animals have been spotted wandering freely where once they would not have the guts to go. Even turtles of the sea have been spotted recurring to areas they once avoided to lay their eggs; this is possible due to the lack of human interference. The

lockdown has seen a turndown in fishing, which means that the biomass of fish will increase after many years of overfishing.

2.5. Progression of Vegetation

Plant growth improved because there is cleaner air and also water, and yet again there is no interference between humans. With everything in decline, plants are allowed to increase their biomass and oxygen. Less waste also means less congestion of river systems.

2.6. Clear Skyline

With completely reduced movement of vehicles on the roads; most of the metro cities in India are a mouthful of air in much cleaner air with relatively safer levels of pollutants to deal with, as compared to the time before the lockdown duration. Ultimately skyline was cleared and the aesthetic view again.

Considering the improvement in air quality, enhanced marine life with clean water quality, safer wildlife, rejuvenated vegetation covers with no human interference which leads to better green cover, etc; all this has resulted in a huge transformation of our health which has generated a need for a relook at planning strategies and actions in architecture. This creates a healthy environment and ensures the good health of the people.

3. Implications of Environmental Rejuvenation

The elements involved in many activities and an organization or services that interact with the environment receive adverse or beneficial, effects of environmental aspects. These environmental aspects generate many impacts such as global warming, water pollution, and contaminated land.

3.1. Physical Environmental Aspect

Uncertain movements of the outside have stopped unnecessary types of transportation like buses, cars, trucks, aircraft, etc. which has controlled emissions of pollutants. China has witnessed a severe reduction in NO₂ during the coronavirus lockdown as compared to the values of last year (2019). Eastern and central China areas showed a significant reduction (10-30%) in levels of NO₂. A huge amount of pollutants from transport roads and operational

emissions from the industrial sector are minimized due to the complete shutdown (Kulshrestha, 2020). This leads to the healing of the climate, repairing ozone depletion, and promoting human health.

3.2. Social Environmental Aspect

Society is directly or indirectly connected with the surrounding environment. Anthropogenic activities have always adversely impacted the environment, but some environmentally friendly people can always save vegetation and take care of it. The major social changes and challenges are discussed below.

- **Family Health**

Being forced to stay home has brought family members together. Hence, the lockdown is good for family health. Ultimately it results in a positive impact on the environment due to fewer external activities.

- **E-Education**

The lockdown has interrupted the educational sessions of primary and secondary school students. Higher education students can engage with their teachers and professors in online mode. The e-education will have an impact on research and its procedures. In online learning mode, students cannot accumulate hands-on experience in real laboratory work like handling apparatus and instruments, etc. Hence, the degree holder of science by e-education will be useful only for teaching, online demonstrations, model creation, online material designing and modeling, etc. Due to the closure of educational institutes, a large amount of traffic pollution decreased and air quality improved.

- **Work from Home (WFH)**

The lockdown has forced us to work from home. This is a huge challenge for future social engineering. WFH has several advantages over traditional work culture. However, the WFH has some side effects such as partial adherence to schedule, local disturbance domestic violence, etc. From home scenario drastically decreased daily traffic jams, noise pollution, and gas emissions leading to air pollution.

- **Social Interaction**

The fear of COVID-19 spread is forcing physical distancing as people are self-quarantined. This is developing new habits of survival and a new approach to interacting with relatives and friends. It is also forcing us to modify our lifestyle. Social distancing created a gap between friends and relatives. However, mobile phones and the internet connect people virtually. Stay stay-at-home approach develops new habits to keep themselves engaged in professional work vis-a-vis domestic work. All these conditions imposed positive results on unnecessary trips, tours, or picnics. Tourist places devoid of plastic and other garbage. It will increase the natural beauty of tourist places. Flora and fauna around that place experience peace and they are not interrupted by human activities.

- **Sustainability and Rejuvenation of the Planet**

The lockdown is a highly sustainable approach. Now, the flights are grounded resulting in the reduction of noise and tropospheric and stratospheric pollutants. The ozone layer is also reported to be healing. Due to the closer of transport services and factories, the emissions of air pollutants are reduced. The shutdown across the world is to allow the planet to heal and rejuvenate itself against the torture of Homo sapiens of the twentieth century.

In this year 2020, the lockdown has proved that people are highly creative and more talented. Their hidden talent is expressed. In terms of writing poetry, making cartoons, attending online classes, developing websites, playing music, singing songs, etc. These hobbies are eco-friendly and have minimum impact on the environment.

3.3. Spiritual Environmental Aspect

One of the best methods during lockdown is meditation and Yoga which give peace and good health. Doing yoga and meditation can rejuvenate the human body by enhancing the immune system, and the concentration of the mind.

4. Society and Community Perspectives

Human being's existence depends on a healthy planet i.e. Earth. If the earth's essential functions and systems are revitalized by lockdown every year, the citizens of any nation will directly benefit. The lockdown will create a lot of awareness among the public regarding the essence

of the environment, ecology, and natural habitats which are essential components of the earth's system. Lockdown educates people about the environment and ecology, which will help them understand the natural process of the earth (Prasad, 2020). The lockdown is sure to have a positive impact on the majority of the masses and the environment (CNBC TV, healthcare, 2020).

- **Good Hygiene**

Good hygiene is very useful for all kinds of people. Everyone nowadays has good habits like washing their hands more often and covering their mouths while coughing or sneezing. These are some practices that were not common, at least in a country like India. But nowadays people are aware of the spread of the virus; these habits will surely go on to become part of our lifestyle.

- **No Traffic Congestion**

The lockdown has shut all offices, industries, educational institutes, and movement vehicles, deserted streets are a rare sight, especially in cities like Mumbai, Delhi, Bengaluru, and Hyderabad. (Plumer, et. al., 2020). Thus, overall travel time gets significantly reduced for emergency services.

- **No Noise Pollution**

Noise pollution is a big problem especially in cities like Delhi and Mumbai as commuters would use blaring horns near the hospital and school zones. It even felt like drivers were competing to show off that had a louder horn. Recently, people have experienced the sounds of birds chirping which is a blessing for humanity.

- **The Decrease in Carbon Footprint**

This is the first time that all carbon-producing economies have gone under a lockdown at the same time. The results are amazing. NASA has discovered that levels of carbon monoxide were 30-45% lower in the atmosphere in China during February and early March, compared to the same period in 2019.

- **Reconnecting with Lost Friends and Relatives**

This period was very useful for connections developed between friends without any excuses. People are now engaging in video and phone calls with even those who have lost contact with them.

- **Sleeping Well**

Sleeping was very well due to the lockdown. That time no 5 am alarm, no pressure to reach the office on time, and the best one is this, no exam pressure, many individuals are giving their bodies and minds the rest they deserve (Besedovsky, et. al., 2012).

- **No Eating Out**

During this lockdown period, every person maintains their health portion, not eat anything from outside. This one could have mixed reactions. If you're not good in the kitchen, you are surviving on the food that you almost certainly don't like. Your preferred Restaurant may have shut and you could be suspicious of the ordering of food from another place due to doubts of getting an infection with the coronavirus.

- **No Shopping, Drinking, and Smoking**

This period was very relaxed from the mental stress. Due to the lockdown no smoking, drinking of alcohol, buying clothes, and all types of shopping like shoes, jewelry, and accessories.

- **International Unity**

Challenger nations have joined hands in fighting the common enemy that cannot be killed yet with the biggest weapons. For the first time, the countries have set to the side business interests and are discussing healthcare. Nations are helping each other in these times of pandemic.

5. Towards the Cleaner Future

Globally, the death rate related to air pollution is similar to that of pandemic proportions, having 7 million deaths every year, According to the World Health Organization (WHO), the coronavirus crisis presents an opportunity to invest in a clean energy future. After a pandemic, there must be an investment towards a cleaner future. By ramping up the old fossil fuel-based intensive industries, and moving towards more sustainable options. Governments cannot use

this disruption as an excuse to go back against the gains that have been made. Right now, this is a priority to think about for the future.

During COVID-19 while the human race continued/regularly grappling with the coronavirus pandemic, obeying social distancing between peoples, staying at home taking charge of the global economy. Mother nature takes a sigh of relief (Lal, 2020 & Garg, 2020). No extra public and private transportation, no more emissions of gas from the industries, no discharges from the different industries into the water bodies, which helps Mother Nature restore itself. As the continues lockdown, videos taping the movement of all animals on the blank streets are progressively being shared.

6. Conclusion

Covid-19 and its associated lockdown have given us an unusual chance to step back and evaluate the impact of anthropogenic activities on the environment. Earth has witnessed cleaner air, water, and livable cities. Thus, before resuming life as usual, one should commit to imparting the principles of sustainable development in social behavior, lifestyle, and public policymaking to keep the environment clean and sustainable.

7. References

- Besedovsky, L., Lange, T., & Born, J., (2012). Sleep and immune function. *Pflugers Arch.* 463; 121-137. Doi: 10.1007/s00424-011-1044-0.
- Chauhan, A., Singh, R.P., (2020). The decline in PM2.5 concentrations over major cities around the world associated with COVID-19 environmental research. 1096-34
- Garg, R., (2020). Earth day: how the planet healed during Covid-19 lockdown. *Hindustan Times.*
- Hudson, T., (2012). *Living with Earth: an introduction to environmental geology.* New Jersey: Pearson Education Inc.
- [https://www.cnbc.com/healthcare/coronavirus-pandemic-10-ways-in-which-lockdown.](https://www.cnbc.com/healthcare/coronavirus-pandemic-10-ways-in-which-lockdown)
- Kulshrestha, U.C., (2020). Environmental changes during COVID-19 Lockdown: Future Implications. *Current world environment.* 15(1); 01-04.
- Lal, B., (2020). Mother Earth rejuvenating during the Covid-19 lockdown.
- Plumer, B. and Popovich, N. (2020). Traffic and pollution plummet as U.S. cities shutdown for coronavirus.

- Prasad, R., (2020). Shutdown alone is not enough to break the chain. THE HINDU.
- Raibhandari, B., phuyal, N., Shrestha, B., Thap, M., (2020). Air medical evacuation of Nepalese citizens during epidemic of COVID-19 from Wuhan to Nepal. J Nepal med associate 58 (222).
- Singh and kulshrestha, (2020). Changes in air quality index of PM2.5, NO2, and O3 in Delhi City during lockdown period due to Pandemic COVID-19.
- Travaglio, M., Yu Y., Popovic, R., Leal, N.S., Martins, L.M. Links between air pollution and COVID-19 in England. MedRxiv. 2020:2020.04.16.20067405.
- Tahir, F, Bin, A. T., Ahmed, J., (May 08, 2020). Cardiac Manifestations of Coronavirus Disease 2019 (COVID-19): A Comprehensive Review. Cureus 12(5): e8021. DOI:10.7759/cureus.8021
- Website of the World Health Organization.
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.
- Mahato, S., Pal, S., and Ghosh, K.G., 2020. Effect of lockdown amid COVID-19 pandemic on air quality of the megacity Delhi, India.
- Srivastava, S., Kumar, A., and Kumar, S., 2020. 21 Day lockdown in India Dramatically Reduced Air Pollution Indices in Lucknow and New Delhi, India.

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