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COVID-19 and its Impact on the Environment of India

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The fifth known pandemic since the 1918 flu pandemic was caused by the unique human coronavirus disease (COVID-19), which was originally discovered in Wuhan, China, in 2019. As of October 2022, there have been more than six hundred seventeen million confirmed cases worldwide. In India, 45 million confirmed cases of COVID-19 with 6 lakh fatalities have been reported to WHO from January 2020 till 7 October 2022. The 2019 worldwide coronavirus disease epidemic (COVID-19) had an impact on all aspects of human life, including the natural surroundings. The actions that were required to stop the virus's spread and the consequent halt in economic activity had a big impact on the environment. In this paper, the Author examines the pertinent scientific literature and evaluates the positive and negative impact of the pandemic on the Environment and its law in India. This study also suggests potential strategies for achieving long-term environmental advantages and also global sustainability.

Keywords: *environment, covid-19, pandemic, scientific literature, epidemic.*

INTRODUCTION

The World Health Organization (WHO) discovered that COVID-19 is transmitted by respiratory droplets in January 2020. Due to rapidly transmitted diseases, its impact was thereafter felt in all nations. It was discovered that a seafood market in Wuhan, China, was a source of the coronavirus. The COVID-19 epidemic had a significant negative impact on the economy and

the environment. COVID-19 instances began to increase in February in Italy, and other countries. The WHO classified COVID-19 as an epidemic due to the brief duration of the transmission. Half of the world's population was in some kind of containment by the end of March. There were 118,000 cases and more than 5,000 fatalities from this contagious disease, which was disseminated to 115 nations.¹

The majority of the governments of the afflicted nations started limiting the movement of their citizens to stop the virus' spread and lower the fatality rate. India was reported to have limited the highest number of people's movements (1.3 billion) as a precautionary step for COVID-19, which began on March 24, 2020.² To encourage individuals to remain at home, all other entities, including academic institutions, were closed, except emergency services which included the police or the fire department. All forms of public transportation were also halted, except emergency responders and the delivery of necessities.

Due to the nationwide lockdown, all the significant factors contributing to environmental pollution such as construction, power plants, transportation, and industries were suspended. The emission of industrial waste had significantly decreased as a result of the closure of industries. Since there were barely any vehicles on the roads, there was practically no environmental pollution from hazardous microscopic suspended particles or greenhouse gases.³ The usage of fossil fuels and other traditional energy sources had significantly decreased as a result of the decline in industrial power demand.⁴ The ecosystem seemed to be recovering significantly and for the first time, residents of many large cities with extreme pollution were

¹ Gunjan Gupta, 'Management of covid-19 waste COVID-19 in the Environment' (*Sciencedirect*, 2021) <<https://www.sciencedirect.com/science/article/pii/B9780323902724000038#!>> accessed 10 October 2022

² 'India lockdown: First lockdown announced' (*The Economic Times*) <<https://economictimes.indiatimes.com/news/india/one-year-since-a-complete-lockdown-was-announced-we-look-back-on-how-india-fought-covid/first-lockdown-announced/slideshow/81662838.cms>> accessed 10 October 2022

³ Vedika Gupta & Ors, 'Air and Water Health: Industrial footprints of covid-19 imposed lockdown - arabian journal of geosciences' (*SpringerLink*, 2022) <<https://link.springer.com/article/10.1007/s12517-022-09986-4>> accessed 10 October 2022

⁴ *Ibid*

witnessing a clear sky.⁵ The Covid-19 pandemic however did bring a lot of negative impacts to the environment of India which include a tremendous rise in medical waste, the careless use and disposal of disinfectants, masks, and gloves, and the weight of untreated wastes that are constantly damaging the environment. An estimate calculation that was conducted by Central Pollution Control Board stated that from May 2020-21, India generated more than 50,000 tonnes of Covid-19 waste.

THE POSITIVE IMPACT OF COVID-19 TOWARDS THE ENVIRONMENT

The COVID-19 worldwide disruption has had several impacts on the ecology and climate. Air quality had improved in many places and water pollution has decreased globally as a result of mobility restrictions and a major delay in social and economic activity. Additionally, material consumption, water use, and waste output also momentarily decreased.

EFFECT ON AIR

India as a country has seen significantly poor quality of air in this decade and this has been a root cause of death for man. Research that has been conducted by Bloomberg showed that out of the 30 most polluted cities in the world, India has 15 of them. The COVID-19 curfew does have a good impact on the air quality in cities all around India. An overall improvement in the Air Quality Index (AQI) was seen during the lockout period compared to the same period the previous year, even though pollutant concentrations differed from city to city based on significant producers and notable pollutants. It is significant to remember that the ambient air quality is also impacted by climatic factors, local sources close to monitoring stations, and the placement of the monitoring network across a metropolis.

Because Delhi-cities NCRs are located within the same area, they saw a similar degree of decrease. The results of a source statistic study of PM2.5 in New Delhi showed that contributors related to vehicle emissions, domestic/local coal combustion, and waste incineration, sharply

⁵ Sushmita Pathak, 'With Coronavirus Lockdown, India's cities see clear blue skies as Air Pollution Drops NPR' (NPR, 2020) <<https://www.npr.org/sections/coronavirus-live-updates/2020/04/10/831592401/with-coronavirus-lockdown-indias-cities-see-clear-blue-skies-as-air-pollution-dr>> accessed 10 October 2022

decreased from the pre-lockdown phase into lockdown phase-I and were discovered to rapidly rise back as more and more relaxation was being made towards the lockdown. However, there was a decrease in the concentration of all pollutants (PM10, PM2.5, NO2, SO2, Benzene) in Delhi and the four NCR cities in 2020 compared to 2019, except the NO2 levels in Gurugram in 2020 during phase I of the lockdown and the SO2 levels in phases I and II of the lockdown.

Other cities, including Mumbai, Patna, Chennai, Kolkata, Indore, and Bengaluru all saw improvements. There could have been a few geological influences towards the improvement such as the number of stations monitoring the AIR quality and its locations of placement. Except for Kolkata, Bengaluru, and Singrauli, all cities had a drop in SO2 levels and a visible development in the NO2 levels in 2020 when compared to levels visible in 2019. It is worth mentioning that the state of Hyderabad which as of January 2020 had 0 areas with a “Good” quality standard of air jumped to more than 26 areas having a good quality of air out of the 90 areas that were tested.

EFFECT ON WATER

All significant contaminating factories were shut down during the curfew, and the poisonous burden was removed from the river. Particularly near industrial hubs and urban areas, where the release of partly and unprocessed effluent used to cause significant contamination loads. Since the commissioned Stations were operating as they had been operating before the lockout period, the factor contributing to residential wastewater generation and processing capabilities remained constant. Large rainfall occurrences were also experienced throughout the lockdown period, which increased river flow and improved the likelihood that contaminants would be diluted.

A study of the water quality of the River Ganga was conducted where 2 composite samples of its river water were collected from 5 different locations which included the Asi Ghat and the Raj

Ghat. The first batch of the sample was collected before the lockdown was initiated and the second batch of the sample was collected in April 2020.⁶

BD Tripathi, chairman of the Mahamana Malviya Research Centre for Ganga, River Development, and Water Resource Management at Banaras Hindu University (BHU) stated that⁷:-

"We tested biochemical oxygen demand (BOD) and the dissolved oxygen (DO) level in the samples. We found the concentration of DO increased by 20% to 30% and the concentration of BOD decreased by 35% to 40%. In total, the Ganga pollution load has decreased by 25% to 30%".

BD Tripathi further stated that the cleansing of the Ganga has been due to multiple reasons, which include the shutting down of more than one thousand factories and workshops near the river and also the 50% reduction in cremation during that period. Another study that was conducted by the Central Pollution Control Board regarding the water quality changes of the Yamuna River showed that due to the temporary shutdown of the sources of pollutants the Yamuna River showed great improvement in the quality of its water. When compared to the pre-lockdown period in Yamuna River, the concentrations of pH, EC, DO, BOD, and COD decreased by 1-10%, 3-66%, 51%, 45-90%, and 33-82%, respectively, during the lockdown phase. The Yamuna River catchment region in Delhi's Nizamuddin Bridge, Okhla U/s, Najafgarh Drain, and Shahdara Drain are the main hotspots of effluent.

Dr. Rajeev Chauhan, a conservation officer with the Wildlife Institute of India-Dehradun stated that:-

"I have been associated with the Yamuna Action Plan since the year 2000 and I have never seen the river this clean. The level of pollution reduces further and its water becomes clearer near

⁶ P R Muduli & Ors, 'Water quality assessment of the Ganges river during COVID-19 Lockdown - International Journal of Environmental Science and Technology' (SpringerLink, 2021) <<https://link.springer.com/article/10.1007/s13762-021-03245-x>> accessed 10 October 2022

⁷ *Ibid*

Etawah; here the water from the Chambal river further dilutes the pollution. I am amazed at the effect the lockdown has had on all rivers,"

The Kaveri River which flows thru the states of Karnataka and Tamil Nadu had a study conducted by the Karnataka State Pollution Control Board (KSPCB) which stated the quality of the river water has seen a drastic change from grading level C (poor) to level A in a few and level B in many parts of the river.⁸

SOUND POLLUTION

The Delhi Pollution Control Committee had set up 24 authentic ambient noise monitoring sites which were established all around the city of Delhi and were used to collect relevant data regarding the noise and its pollution in the city. The data revealed that in comparison to the pre-lockdown and post-lockdown periods, a considerable decrease in the daytime and nighttime equivalent noise levels of up to 10 and 3 dB(A), respectively, had been noticed throughout the lockdown period. The data also showed that no locations in the silent or residential zones met the ambient noise limits even during the lockdown period, whereas just nine sites – including four industrial and five commercial zone sites – met those levels.

India launched the “National Ambient Noise Monitoring Network (NANMN)” in 2011 which set up more than 60 accurate noise monitoring equipment in seven major Indian cities. The cities included Lucknow, Kolkata, Hyderabad, Chennai, Bengaluru, and Mumbai. This study utilized the data collected by this network and analysed the sound levels in pre-lockdown and post-lockdown periods. The study showed that 50 locations (72.3%) exhibited a decrease in both day and night equivalent noise levels, according to an examination of average ambient day and night equivalent noise levels during the lockdown period compared to the pre-lockdown period.

The decrease in daytime equivalent noise levels was seen at 52 locations (74.6%), while the decrease in nighttime equivalent noise levels was seen at 54 sites (77.9%). Overall, day equivalent noise levels decreased at 22 commercial sites, 15 quiet zone sites, 12 residential sites,

⁸ G Rajendra, ‘Lockdown plugs flow of effluents to cauvery; river flows pure again: Mysuru News’ (*Times of India*, 2020) <<https://timesofindia.indiatimes.com/city/mysuru/lockdown-plugs-flow-of-effluents-to-cauvery-river-flows-pure-again/articleshow/75207190.cms>> accessed 10 October 2022

and 9 industrial sites by 0 to 12 dB. (A). Additionally, night equivalent noise levels in the range of 0 to 14 dB decreased at 20 commercial sites, 16 silent zone sites, 12 residential sites, and 10 industrial sites (A).⁹ The majority of the locations were found to have decreased ambient day and night equivalent noise levels.¹⁰

NEGATIVE IMPACTS

The covid lockdown and the temporary shutdown of all factors that contributed to pollution were beneficial for the environment and the ecosystem of India, however, there have also been a few negative impacts such as increased non-recyclable waste, biomedical waste, organic waste, and stress on waste management processes.

GENERATION OF BIOMEDICAL WASTE

The COVID-19 epidemic changed people's lifestyles dramatically, but it also had an impact on waste, a crucial but rarely considered component of daily life. The pandemic significantly altered the kinds and quantities of waste that are produced, and it is expected to do so again in the coming years. According to a paper published in "The Science of the Total Ecosystem" in November 2021, the garbage generated by the widespread vaccination campaigns to stop the spread of COVID-19 might have a significant negative impact on the environment. With more than 4000 clinics spread in every corner of the nation, India had launched one of the largest vaccination campaigns in the world. Additionally, the manufacturing and use of facemasks, gloves, syringes, and disinfectants in large quantities, as well as the preparation and storage of vaccinations, all add to the global greenhouse gas emissions associated with the vaccination process.

Calculations based on data gathered by CPCB reveal that, as of June 12, 2021, the nation has produced over 50,000 tonnes of COVID-19 waste. Since the pandemic's initial wave, 130 tonnes of COVID-19 trash have been produced per day, accounting for roughly 30% of the 620 tonnes

⁹ N Garg & Ors, 'Impact of covid-19 lockdown on ambient noise levels in seven metropolitan cities of India Applied Acoustics' (*Scencedirect*, 2021)

<<https://www.sciencedirect.com/science/article/pii/S0003682X21006769#f0015>> accessed 10 October 2022

¹⁰ *Ibid*

of biomedical waste that the nation produces every day. Among the states that generated biomedical waste in Haryana, COVID-19 trash accounted for 50% of it, followed by Chhattisgarh (41%), Himachal Pradesh (43%), Andhra Pradesh (42%), and Delhi (40 percent).¹¹

IMPROPER DISPOSAL OF BIOMEDICAL WASTE

One does not require a case study or statistics to know the situation of the improper disposal of biomedical waste, ever since covid 19 lockdown was lifted, it was a normalized sight to see used face masks and PPE kits in every corner of India. The International Institute of Population Sciences (IIPS) conducted a study and found that India is at a high risk of environmental deterioration as it does not have the proper mechanism for the disposal of biomedical waste. It had been further stated that only 200 Common Bio-Medical Waste Treatment Facilities (CBMWTF) exist in 12 states which is very little for its population and the amount of waste generated by it.

The city of Mumbai was producing more than 3 times the biomedical waste in the month of July 2020 when it was put in comparison with the month of April 2020. The city of Mumbai even before the covid outbreak was failing to manage and control its waste and with the outbreak of covid and the increase in the production of biomedical waste the city was creating a burden on the municipal corporation. Mumbai citizens had expressed their displeasure with the careless way COVID-related waste had been disposed of. Residents of nearby societies had raised questions regarding the PPEs being burnt outside the housing society in Mumbai's Wadala neighbourhood after the cemetery rituals were being conducted.¹²

¹¹ Ashish Dehal & Ors, 'Biomedical waste generation and management during COVID-19 pandemic in India: Challenges and possible management strategies - environmental science and Pollution Research' (*SpringerLink*, 2021) <<https://link.springer.com/article/10.1007/S11356-021-16736-8>> accessed 10 October 2022

¹² Tanvi Deshpande, 'Mumbai's COVID-19 Waste Peaks, second waste treatment plant not in sight' (*The Wire Science*, 2020) <<https://science.thewire.in/environment/mumbais-covid-19-waste-peaks-second-waste-treatment-plant-not-in-sight/>> accessed 10 October 2022

Prabhakaran, an environmental engineer at Poovulagin Nanbarga statement regarding the chocking of the Chennai shore posts due to the mismanagement of the biomedical wastes generated by Covid-19¹³:-

“Fishermen from the Thiruchinakuppam road in Tiruvottiyur, Chennai found masks, syringes, blood bags, and testing equipment dumped along the seacoast. Biomedical waste has also been traced in the Anakaputhur and Manivakkam lakes (in Chennai). The water bodies in Vandalur, Otteri Nalla, Porur, Maduravoyal, Muttukadu, and Puzhal had always been dumping grounds for medical supplies. Before COVID-19, a government hospital bed would generate around half a kg of biomedical waste per day which has now gone up to 3-5 kg (per day). Though the city leads the biomedical waste generation in the state, the handling capacity is only 25 percent,”

In Assam, The residents and the officials of the disaster management authority (ASDMA) had raised their concerns regarding the improper disposal of covid related biomedical waste that was being washed up in the residential areas of Assam, used PPE kits, needles, syringes, masks, and blood pouches were seen flowing in the waterways. It was discovered and stated by the authority that the private firms that were hired and assigned to properly destroy and discharge the waste had alternatively decided to dump the waste in the waters which caused a medical hazard to the people of Assam and serious damage to the environment and water body of Assam and had stated that strict action will be taken against the firm.¹⁴

MUNICIPAL WASTE

The biomedical form of waste was one huge cause of damage to the environment however the generation of organic and inorganic municipal waste also played a huge part. India had proposed the draft National Resource Efficiency Policy 2019¹⁵ which was going to focus on recycling and protecting the environment and also an absolute ban on single-use plastic from the year 2022 which was initiated by the ministry of environment, forest and climate change¹⁶

¹³ *Ibid*

¹⁴ *Ibid*

¹⁵ Draft National Resource Efficiency Policy (NREP)

¹⁶ Ban on identified single use plastic items from 1st July 2022

but due to the outbreak of the virus the policies and norms had changed which lead to people using more of eCommerce websites for products and essential goods which in turn increase the usage of non-recyclable plastics and wastes.

During the peak of covid 19 when offline businesses were struggling to stay afloat, Amazon, Grofers, and Flipkart claimed threefold growth in order volumes in India, while total e-commerce expanded by 30% in 2020–2021.¹⁷ Local governments in India were too busy battling the pandemic to have any resources left over to enforce restrictions on single-use plastics like plastic bags, disposable cups, and cutlery, whose use exploded after the first shutdown.¹⁸ There were also a few more practices that were followed that caused harm to the environment such as the heavy use of disinfectants on the streets and commonly used areas of public and residents which cause harm to innocuous plants and insects/ animals.¹⁹

THE STRATEGIES THAT CAN BE IMPLEMENTED TOWARDS THE PROTECTION OF THE ENVIRONMENT

Educate

It is not wholly the duty of the government to protect the environment but also the duty of the citizens of India to save and protect the environment. It is extremely important to educate the citizens regarding the harm and damages that can be caused by littering and throwing away biobio-medical and inorganic wastes. The government should take the initiative to make people aware of how they are supposed to dispose of their waste materials in the right way.

Use of electric and public transportation

To protect the environment the government should improve its public transportation systems which would encourage the citizens to use more eco-friendly methods of travelling not only to

¹⁷ 'Covid-19 and the changing nature of waste' (Mongabay, 2022) <<https://india.mongabay.com/2022/01/covid-19-and-the-changing-nature-of-waste/>> accessed 10 October 2022

¹⁸ *Ibid*

¹⁹ S M Didar-Ul Islam, 'Impact scenarios of shrimp farming in coastal region of Bangladesh: An approach of an ecological model for sustainable management - aquaculture international' (SpringerLink, 2016) <<https://link.springer.com/article/10.1007/s10499-016-9978-z>> 11 October 2022

reduce emissions but to also reduce the use of unrenovable resources. Indian government should provide incentives and reduce taxes on electric vehicles which would allow more people to purchase such means of transportation over diesel and petrol vehicles.²⁰

Development in a sustainable method

Sustainable development is a strategy for a nation's economic expansion without sacrificing the ecosystem's condition for current and future generations. The government and the people of India should encourage and move towards industries with less energy usage and uses better quality fuels and technology that is better for the environment. With this method the country can expand and grow in an economic and technological sense without causing great harm to the current and the forthcoming ecosystem.

Proper waste treatment

The government has to increase the number of waste treatment centres and improve its method to not only collect biomedical and inorganic waste but to dispose of and destroy such waste which does not cause any harm towards the environment, as the current waste treatment system is not equipped to handle excess loads of waste that was seen during the waves of COVID -19. Wastewater can also be treated and reused in multiple ways to be more efficient.

Use of renewable energy

Renewable Energy is energy that is derived from resources that can be regenerated naturally over time. It includes energy sources including sunlight, wind, water currents, and thermal energy. The government should encourage industries and the population to use resources and products that use and are powered by renewable resources. Doing so would not only protect the environment but also reduce the use of non-renewable resources.

Taking part in global environment initiatives

²⁰ *Ibid*

Environment protection is not an individual initiative, it requires the mutual contribution of all countries and international cooperation for the betterment of the ecosystem of the world as a whole. There are many treaties, conventions, and agreements that exist to protect the environment, and India should take such initiatives and be an active participant in these conventions to improve the environment.

CONCLUSION

The findings of this current study verify that the covid 19 pandemic had positive and negative impacts towards the environment in its ways. On one hand, the water bodies and the air quality of India improved significantly with a visible notice of reduction in noise pollution however on the other we saw the misuse of non-recyclable waste and its mismanagement which caused noticeable harm towards the environment. India as a developed country should take cognition of the insufficient amount of waste treatment systems and equipment that exist and how it is not well equipped to manage and dispose of biomedical and municipal wastes without harming the environment. India should also focus on its goal of banning single-use plastic to a 100% extent.²¹

We have had an opportunity to stand back and evaluate our influence on the environment due to COVID-19 and the related shutdown. Due to the time provided to us in social distancing and isolation, we had a glimpse of what it is like to experience the clean air, water, and liveable cities that we have long sought.²² To keep our environment clean and sustainable, we need to pledge to embed the concepts of sustainable development in our social behaviour, way of life, and public policy-making before it is too late. We should protect the environment today so the environment can protect us tomorrow.

²¹ 'Another pandemic: India's fight against single-use plastic falls victim to covid' (*The Economic Times*, 2022) <<https://economictimes.indiatimes.com/news/politics-and-nation/another-pandemic-indias-fight-against-single-use-plastic-falls-victim-to-covid/articleshow/78848847.cms?from=mdr>> accessed 11 October 2022

²² *Ibid*