
REVIEW ARTICLE

Assessment of COVID-19 Pandemic on the Global Environment: A Review

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ABSTRACT

Worldwide coronavirus disease in 2019 (COVID-19) has drastically affected everyone, together with the physical world. After studying the scientific publications, both the pessimistic and worthwhile impacts of COVID-19 are examined. We have concentrated on the general diffusion of knowledge regarding the characteristics of the status of the declining industrial pollution in water, air, and soil. According to this study, the pandemic scenario greatly improves air quality in remarkable cities throughout the world, decreases GHG emissions, pollutants in water are reduced, and traveler stress is reduced, all of which may contribute in the recovery of the ecological system. Furthermore, COVID-19 has a number of negative implications, including an increase in scientific waste, the disposal of disinfectants, gloves, and masks, and the continual load of untreated waste damaging the environment. We spoke about how to enhance water quality by changing the pH, total dissolved solids (TDS), biological oxygen demand (BOD), chemical oxygen demand (COD), and heavy metal poisoning in sewage and ground water. Furthermore, in the case of air pollution, it was discovered that there has been a significant decrease in air pollutants such as PM_{2.5}, PM₁₀, O₃, SO₂, CO, hydrocarbons, and NO₂, although similar results were recorded before to lock down. Some findings suggested that the ozone hole in the Earth's polar regions be repaired. These changing statistics on pollution rate can help us in the exploration of various private and public views, which could further encourage us to adopt better pollution-control strategies.

Keywords- Environment, Covid-19, Pollution, Pandemic, Outbreak, Lockdown

Received 23.09.2023

Revised 06.10.2023

Accepted 23.11.2023

How to cite this article:

Abhit S, Raj S S, Anamika R, Divyanshi B, Preeti Y, Prachi S, Ayushi R. Assessment of COVID-19 Pandemic on the Global Environment: A Review. Adv. Biores. Vol 14 [6] November 2023. 552-558

INTRODUCTION

The coronavirus disease-2019 (COVID-19) outbreak first became known in December 2019 in a Hunan seafood market in Wuhan, China, and was promptly declared an international public health emergency. It's an infectious disease caused by coronavirus-2, which causes severe acute respiratory syndrome (1,2). SARS-CoV-2 is taxonomically related to the SARS virus, according to the genomic study and must represent bats' potential initial source (3). The virus was usually spread from person to person by direct contact or droplets produced by coughing, sneezing, and speaking (4-6). The virus was said to have spread to 216 nations, regions, or territories by September 6, 2020, with 876, 616 deaths out of 26,763, 217 confirmed cases (7), and the number is fast growing. COVID-19 infection is characterised by fever, chills, cough, sore throat, respiratory problems, myalgia or fatigue, nausea, vomiting, and diarrhea(5,8). In extreme cases, there is a danger of heart damage, respiratory failure, acute respiratory distress syndrome, and even death(9). People who are older and have other medical issues are more likely to die(10). Non-drug methods like wearing face masks and hand gloves, cleaning fingers with cleanser, using antibacterial solutions in general, and keeping a communal distance are recommended by federal and international power and sanitation experts(11). To slow the spread of the virus and limit the number of people who died, the governments of most of the nations impacted took steps to restrict people's travel. As a

preventative measure against COVID-19, which began on March 24, 2020, India has restricted the most people's mobility (about 1.3 billion)(12). All organizations, including educational institutions, are closed to urge people to stay at home, with the exception of emergency services (medical, fire, police, food given, and so on).With the exception of vital transportation, products, and emergency services, all public transportation services (e.g., buses, trucks, trains, aircraft, etc.) were postponed(1,13). Pubs, bars, and movies are generally lively in London, but they have been closed, and residents have been advised to stay at home. According to the World Economic Forum, roughly three billion people are facing some type of lockdown as of April 7, 2020, and the movement is for COVID-19 management. The use of infection control techniques places restrictions on the various governments (14). Overall, the pandemic has caused huge worldwide socioeconomic upheaval, which has directly or indirectly influenced the environment, such as improved water quality, air quality, noise reduction, and ecological rehabilitation(1). Furthermore, the growing use of personal protective equipment (PPE) (e.g., face masks, hand gloves, gowns, goggles, facial defenders, and so on) and their haphazard disposal adds to the environmental burden(15-17). COVID-19 variants (such as omicron, alpha, beta, gamma, and delta) have been discovered all over the world to date. The beneficial and negative consequences of the coronavirus on the environment are discussed in this review article (Fig 1).

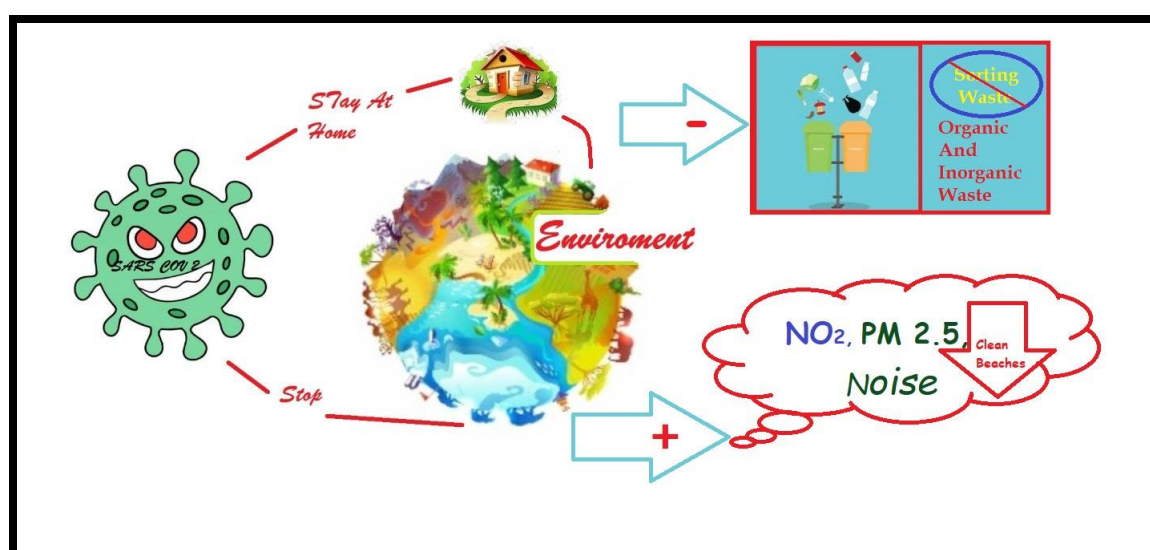


Fig 1Impact (positive and negative) of Covid-19 on environment.

Methodology

We did an organized study of the scientific publications to lookor peer-reviewed research studies on COVID-19 effects on Environment. We executed a search strategy of articles published in the MEDLINE (via PubMed) Scopus, Springer, R ResearchGate and Google scholar. This study gathers the environmental implications of Covid 19 from a variety of studies and fulfils the study's goal.

Positive effects on the Environment

Effect on Air

To some extent, the COVID19 epidemic has improved air quality, water quality, and other environmental factors. The impacts of the COVID19 epidemic on air quality were discovered using meteorological and air quality data from satellites and monitoring stations (18). Carbon monoxide (CO), Sulphur dioxide (SO₂), nitrogen carbon dioxide (NO₂), ozone (O₃), inhaled particles (PM₁₀), and other elements are examples of air pollutants. When the air quality indexes of unblocked cities and blocked cities were compared, it was discovered that the daily air quality index and PM_{2.5} of the blocked cities decreased by 19, 84 points (17%) and 14.07 g m⁻³ (17%), respectively, and that after the city was blocked, the numerical indicators of CO, SO₂, NO₂, and O₃ decreased. In comparison to the previous 7 years, the concentration of NO in the UK has decreased by almost 61% in 2021(19). For the environment, this lockdown on people proves to be a benefit; the main parameters have begun to improve. This has improved overall air quality worldwide as the level of air pollution plummeted in an unprecedented way and provides new opportunities to study air pollution and many other ways each other to control when the lockdown is lifted(8).According to the Global Carbon Project (2020), greenhouse emissions might plummet at a rate not seen since World War II. According to the IQAir report (2020), there is a severe decrease in gases and particles in the

atmosphere, more than ten major cities, of which are currently confined; Delhi, Mumbai, Wuhan, London, Los Angeles, Milan, New York, São Paulo, Seoul, Rome, all these cities are showing a decrease of 9% to 60% if compared to data of 2019 data and from +2% to 55% from average of four previous years (20,21). Another study mentioned that China's carbon emissions (the largest carbon emitter in the world) fell by 18% (250 million tons) between of early February and May 3, which is more than the UK annual equivalent production. Similarly, in Europe, carbon emissions are expected to decrease by 390 million tons while in the US by up to 40%, where car traffic is the major source of carbon emissions (22). In the Indian subcontinent, CO₂ emissions decreased slightly between week 11 and week 16 of 2020. Mid-March to late April due to effective lockdown enforcement (23). The United States has been the worst struck by the coronavirus, with 4,706,180 people infected and 156,764 fatalities. Bermen and Ebisu's (2020) research indicated that the closure of non-essential companies in the United States during COVID 19 resulted in a drop in PM_{2.5} and NO₂ concentrations in urban regions(13).

Effect on Water

Water is said to be the most crucial way of life detail for all living animals on Earth since the development of ways of life happened on it, although other planets in the solar machine no longer have water and so are no longer capable in the foundation of lifestyles. According to WHO, about 2 billion people around the world drink infected water due to the release of a giant type of pollution by means of industry and public redress directly into the waters, as a result of numerous diseases such as cholera, polio, diarrhea, typhoid, dysentery, etc. are spreading on a large scale. Not just man Life, water pollutants also play a prominent role in the environment Degradation, this form of damage particularly affects people in developing and underdeveloped countries (India, Bangladesh, Nepal) exclusively depend on environmental services (24). Lockdown has been very helpful in reviving water resources reducing both direct and indirect sources of water pollution. Direct water pollution includes sewage, Industrial effluent, treatment plant of sewage and refineries, etc., into which liquids are directly discharged into the bodies of water(10).The COVID-19 outbreak has had a positive environmental impact all over the world; the Venice Lagoon has always been affected by anthropogenic stress, but when the lockdown was implemented in Italy, water stagnation around Venice stopped, resulting in a decrease in suspended matter and thus increased water transparency. The high water transparency is due to a combination of COVID-19 limits and natural seasonal variables(25). During the April shutdown, a rapid decline in the quantity of dissolved zinc and other heavy metals was recorded in the coastal region of the coastal state of West Bengal (3).According to Selvam et al., (21) groundwater quality in the industrial city of Tuticorin (South India) in terms of NO₃, As, Fe, Pb, Se, and total coliform concentrations improved and decreased throughout the Covid 19 lockdown period.

Impact of Covid - 19 on Ganga and Yamuna River of India

India is regarded as the "Land of Rivers," having a vast network of rivers in the Himalayas and the Peninsula. They transport water, organisms, and important gases and nutrients to many areas. They also help in draining rainwater and in providing habitat to different plants and animals species. Rivers also have a great role in helping in shaping the properties of the earth. Industrial discharges (Water wastage) is therefore one of major reason of irreversible ecosystem destruction (26); Several nations are trying to establish effective industrial entrance control measures. Ganga: The lockdown has substantially altered the water quality regulations of the Ganges River (27)observed that during the COVID-19 lockdown (April 2020), a huge fall in the total number of coliforms in the Ganges was recorded, and this dramatic decline is attributable to non-functioning industry, fewer traffic, and closed tourism, paired with a reduction in waste disposal operations. The lockdown also allowed for the revival of aquatic life and also reduced the pressure from aquatic flora and fauna(28). The pH of the aquatic ecosystem of the Ganges River has decreased due to climate change, leading to increased amount of carbon dioxide in the atmosphere (CO₂) and acidification (carbonation) of the water, During the lockdown, however, there has been a consistent increase in pH. The value verifies the opposite in the acidification process(29).Yamuna is another significant watercourse in the Republic of India, and it is one of the dirtiest rivers in the country Because it is the second largest and longest tributary of the Ganga, tainted water from the Yamuna eventually impacts the water parameters of the Ganga riverbed. The Central Pollution electrical device(CPCB) had known over 351 contaminated watercourse sites across Republic of India in 2018 and lots of of those sites were located aboard giant urban cities and industrial areas (30). According to (2) the quality of water of Yamuna from the chain of mountains section up to Palla (before getting into in Delhi) is moderate, whereas the metropolis section is that the worst affected space of entire watercourse length.

Effective Changes in the Noise and Soil pollution

Ambient noise is the primary cause of health problems, environmental and population distress, and ultimately modifies the ecosystem's circumstances(31,32)stated that noise levels at the stone crushing and quarry site have decreased. In Dwarka, East India's river basin, noise levels reduced to 65 dBA, down from 85 dBA before the closure in an area dominated by rock crushers. On either side, amounts of pollutants that are deposited in the ground or disposed of, such as solid by-products of industry, cars Cores, mining waste, etc. also decreased in the lockdown, but when we talk about household waste and hospital solid waste, the amount of this type of waste in the ground is increasing. As quarantine rules in several nations move customers toward online shopping and home delivery, organic and inorganic solid waste created by houses has grown (13).The creation of inorganic and organic garbage has directly or indirectly impacted the environment, causing problems such as desertification, soil erosion, air and water pollution, and so on (33). Because of a reduction in movement of vehicle during the closure period, level of noise of Govindpuri (Delhi) Metro Station will be decreased to 50–60 dB, from 100 dB(29). Also, due to restriction of travel the number of flights and vehicle movements all over the world has drastically reduced, ultimately leading to reduction in noise level (34). Total COVID-19 lockout and a drop in economic activity lowered noise pollution globally.

Negative effects on environment

Amplification of biomedical waste generation:

Medical waste creation has surged significantly since COVID-19's eruption, posing a significant risk to human health and the environment. For sample series of suspected COVID-19 patients, diagnosis and treatment of a vast and diverse spectrum of patients, and disinfection purposes, hospitals generate a lot of infectious and biological waste. (Fig 4.1) (12,31). For example, during the pandemic in Wuhan, China, more over 240 metric tonnes of medical waste were generated every day, which is approximately 190 tonnes more than typical (1). The quantity of scientific trash output in India's Ahmedabad metropolis has been increased from 550-600 kg/day in the earlier time section of the shutdown to about a thousand kg/day(12). COVID-19 has resulted in the generation of about 206 million tonnes of scientific garbage each day in Dhaka (the capital of Bangladesh)(35). Furthermore, notable cities like Manila, Kuala Lumpur, Hanoi, and Bangkok have had expert-related expansion, producing 154-280 million tonnes of scientific waste each day more than during the previous years. The local waste management authorities have been tasked with a big burden as a result of the rapid surge of hazardous garbage and its appropriate treatment. The SARS-CoV-2 virus is said to survive on cardboard for a day and on plastic and stainless steel for around three days, according to recent studies (26). As a result, hospital waste (e.g., needles, syringes, bandages, face masks, hand gloves, used tissue, wasted pharmaceuticals, and so on) must be properly handled to avoid new infections and environmental damage, which is now a global problem(1).

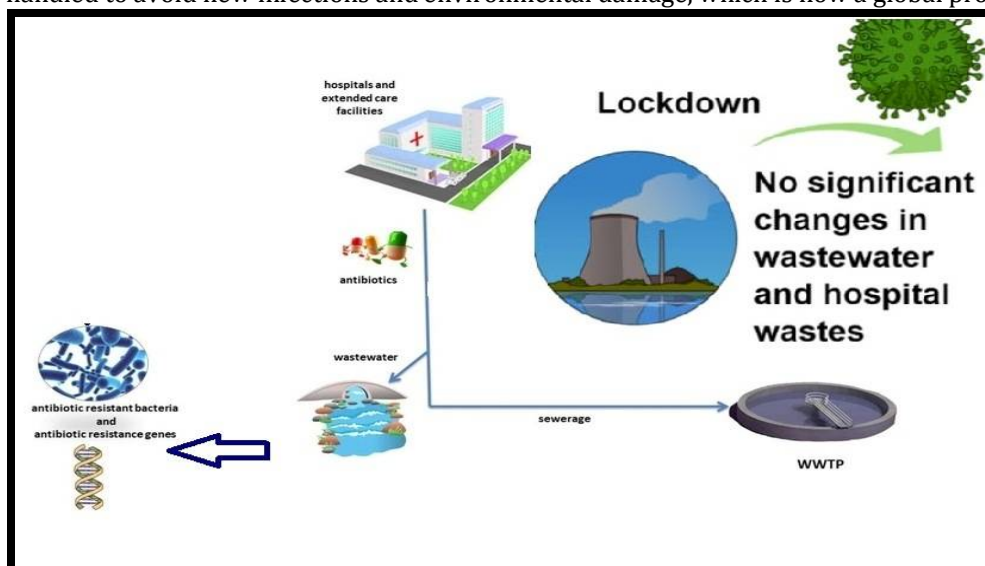


Fig. 4.1- Effect of biomedical wastes generated from hospitals on environment throughout the pandemic.

Security apparatus and unsystematic disposal:

People nowadays use face masks, hand gloves, and other protective equipment to protect themselves from viral illnesses, which adds to the quantity of healthcare waste. According to reports, the amount of waste produced in the United States has been growing as a result of increased personal protective

equipment (PPE) use at home (36). Since the emergence of COVID-19, the production and usage of plastic, particularly primarily-based personal protective equipment (PPE), has surged all over the world (17). For example, China increased daily medical mask manufacturing to 14.8 million in February 2020, a huge increase over prior years(1). It is, however, caused by a lack of awareness regarding infectious waste management. The majority of individuals discard these items (e.g., face masks, hand gloves, etc.) in public places and, in certain cases, alongside domestic rubbish (35). As a result, depositing these materials at random causes congestion in the rivers, worsening environmental air pollution(17,31). Face masks and other plastic-based protection devices are thought to be the most readily available source of micro-plastic fibre in the environment(15). N-95 masks are usually made of polypropylene, and Tyvek is used to cover gloves, suits, and therapeutic face guards, which can last longer and emit dioxins and harmful compounds into the environment (17).

Municipal solid waste generation and depletion of recycling:

Increased urban trash creation (both organic and inorganic) has immediate and indirect environmental implications, such as air, water, and soil contamination. Because of pandemic, there has been a rise in the quantity of family garbage from supplied bundle materials due to an increase in the demand for online shopping for home delivery, which has resulted in an increase in the quantity of family trash from shipped bundle materials (1). Waste recycling, on the other hand, is an effective approach to reduce pollution, save energy, and protect botanical resources (37). However, owing to the outbreak, several countries postponed garbage recycling operations in order to limit viral infection spread. Concerned about the possibility of COVID-19, authorities in the United States have prohibited recycling applications in several places (approximately 46 percent) (12). Infected inhabitants were also barred from sorting their trash in the United Kingdom, Italy, and other fantastic European areas(31). As a result of event interruptions, municipal garbage management, waste recovery, and recycling activities increase landfilling and environmental pollutants internationally(1).

Some other effects on environment

To combat the SARS-CoV-2 virus, disinfectants have been widely used on highways, commercialized areas, and populous regions recently. Such widespread antiseptic usage may also result in the extinction of non-target, very beneficial organisms, thereby causing an ecological imbalance (1). In addition, the SARS-CoV-2 virus has been reported in COVID-19 patients, sewage, and municipal waste water in a number of countries(9,16,38). As a result, extra steps in wastewater treatment, which are difficult to create, are required. Except for remediation, countries like Bangladesh release city effluent into adjacent aquatic habitats and rivers (1).To prevent the SARS-CoV-2 virus from spreading through wastewater, China has already enhanced its disinfection system (with increased chlorine use). However, excessive chlorine usage in water might have hazardous side effects (31).

CONCLUSION

This article is a collection of papers related to COVID 19 and its surrounding areas. The environment contained in the WOS database is to pursue the current situation and evaluate environmental issues of developing countries. Places around the world that have a great impact on the world environmental conditions and environmental monitoring, I reached the main thrust of human survival. In terms of the number of articles, research institutes, and researchers, developing countries have made significant contributions to COVID 19 and environmental research. COVID-19, which began in Wuhan around eight months ago, infected many people all over the world and turned out to be a godsend for nature and the environment by giving nature a short time to mend and recover itself. As a result, we now realise that the destruction brought by man to nature is not completely irreversible, as practically everyone has observed over the previous two years. This review is principally targeted the changes that arise in nature throughout social control of lockdown. During the lockdown, the environment began to cure itself as industry, transportation, and alternative micro manufacturers ceased output, carbon emission rates were decreased, and air and water quality improved unexpectedly. The air quality index of major contaminated cities, not solely of the Republic of India but additionally all across the globe is currently in two digits, that reflects a modesty sensible quality of air. Satellite pictures of the atmosphere also show an analogous fashion of a decrease in air pollution. The most important rivers of India like the Ganga, Yamuna, and so on are now cleaner and are supporting various numbers of aquatic lives. The aquatic plan is once again regenerating, beaches are becoming clean, and there has been a significant drop in global pollution levels. It is now clear that COVID-19 has delivered worry for people and grown to be a malediction to mankind however for nature it has to appear as protection against impersonation.

FUTURE PROSPECTS

Learn acceptable disposable practices for this protective equipment (masks, needles, gloves, medicines, etc) as no longer participating in the release of toxic chemical compounds into Earth's atmosphere. Choose the product which can be reused easily. Spread less amount of waste or buy your own personalized face mask, use biodegradable material clean to disinfect. Buy face masks from eco-friendly companies. As a replacement for using disposable masks, buy a biodegradable face mask, and it would be great if you take the help of a store/artist near you that sells them. By identifying how to use biodegradable gadgets to keep safe yourself and others throughout this pandemic, choosing not to spread waste will have a higher quality effect on the environment. Recyclable cloth masks help to restrict the huge number of microplastics that are present in replaceable masks which are increasing the pollution. There is a strong desire to make environmental issues more important in order to protect the planet from at least those human activities that might need to be controlled. These worries should concentrate on each brief word and lengthy-time period goals. Other measures that may be done by the government, the business community, and society at large to control the destruction of the environment include self-censorship on the part of the business community, monitoring of businesses by a variety of NGOs and government agencies, applying pressure to the businesses to continually improve over time, and government rules that are established to control and monitor the business community (13).

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