The COVID-19 Pandemic:

Nature's Unexpected Reset Button

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With over 115 million cases worldwide and a staggering 2.55 million deaths, the impact of the COVID-19 pandemic on human health has been severe [1]. While the health outcomes of the pandemic are apparent, the global lockdowns aimed at slowing the spread of the disease have negatively affected other areas of human life as well, including mass economic downturns, political polarization, and international border closures [2].

However, a series of environmental silver linings have emerged from the ongoing global disruption. As industry, transportation, and businesses ground to a dramatic halt under the strict lockdown measures that had 2.5 billion people staying at home in 2020, there was an equally dramatic reduction in pollution and greenhouse gas emissions [2-3].

As traffic decreases, air quality improves around the world

A striking example of this can be seen in New York City. Within a month of the March 2020 lockdown, air pollution levels in the city were down 50% compared to the previous year [4]. This could largely be attributed to the massive reduction in city traffic, as motor vehicle exhaust is a significant factor in urban air quality and contributor of greenhouse gases like CO2 [4]. In addition to CO2, the burning of fossil fuels in the form of motor vehicle exhaust produces 80% of the world's NO2 emissions. When NO2 interacts with oxygen and water molecules in the atmosphere, the product is acid rain – a known culprit behind several respiratory diseases in humans [5]. Due to the COVID-19 lockdowns and resulting reduction in car and truck exhaust, NO2 levels decreased by 30-60% across Europe, 25% in the United States, and an impressive 70% in Delhi, India in 2020 [6-8].

The coronavirus lockdowns in India significantly improved the air quality

In addition to motor vehicles, aviation is a significant contributor to air pollution and greenhouse gas emission. Due to the worldwide restrictions on air travel, air traffic decreased by over 90% in 2020 [9]. The positive impact this has had on air quality is clear. In China, decreased international and domestic flights caused a 17% drop in national CO2 emissions [10].

Industry closures reduce greenhouse gas emissions

Transportation is not the only sector which contributes to air pollution. The COVID-19 lockdowns also resulted in the forced shutdown of industries and factories, which produce a significant amount of greenhouse gas emissions [2]. As a result, atmospheric scientists reported steep declines in the levels of greenhouse gases produced by countries with high volumes of heavy industry. For example, levels of N2O have dropped by 50% in China as a direct result of COVID-19 lockdowns. While N2O accounts for only 6.5% of greenhouse gas emissions – compared to 81% from CO2 – it is markedly more potent. The impact of 1 pound of N2O on global warming is 300 times more than 1 pound of CO2 [11].

Greenhouse emissions dropped due to halted flights around the globe

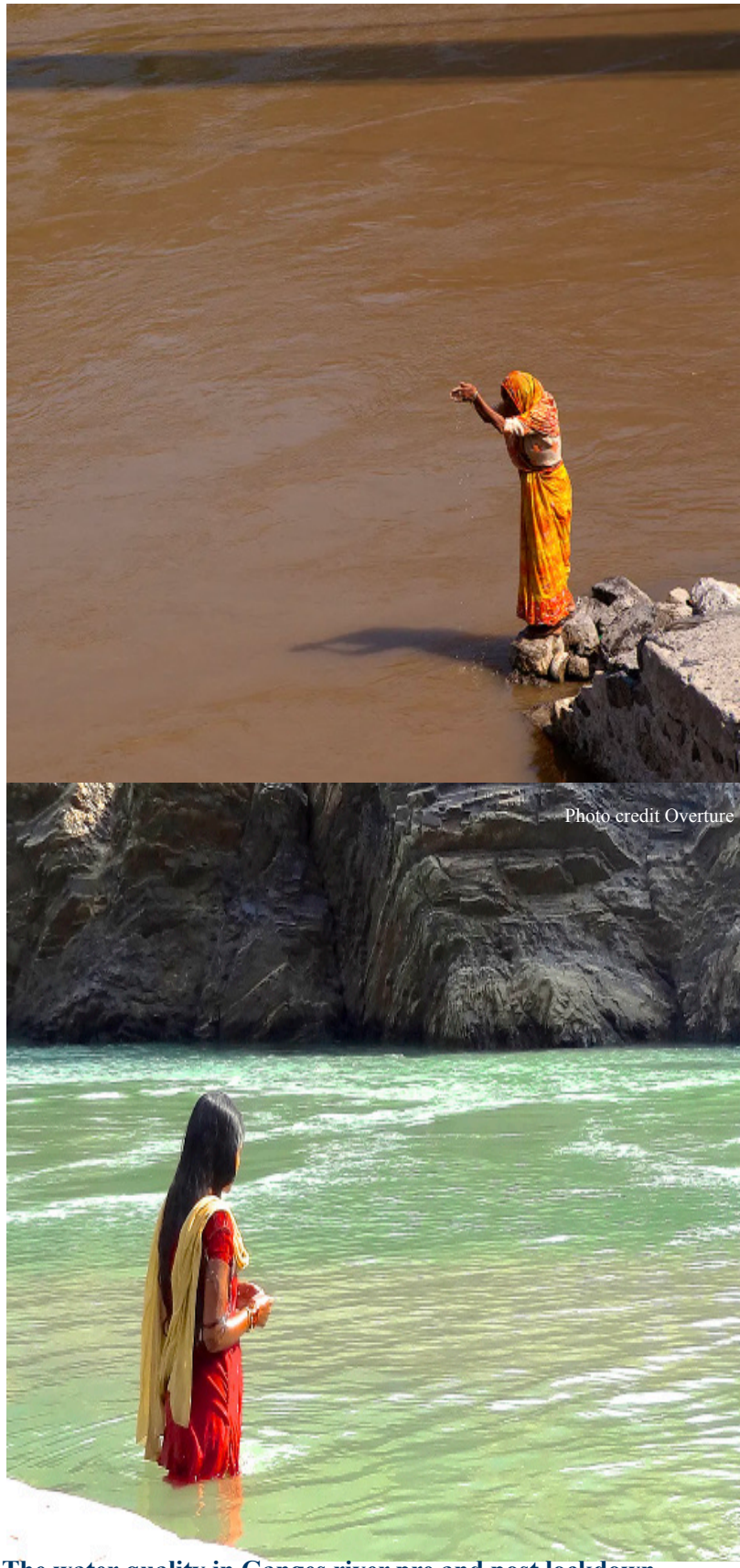
While reducing air pollution and greenhouse gas emissions are critical for combating the effects of cli-

mate change, there are also significant implications for human health. Upwards of 90% of the global population lives in areas with poor air quality, and indeed air pollution is the third leading cause of death worldwide [12]. The decline in air pollution due to reduced emissions from transport and industry also represent an encouraging step towards improving global health.

Water pollution decreases and the rivers run clear

Just as the air quality has improved during the COVID-19 lockdowns, water systems are clearing up as well. Flowing through India and Bangladesh, the Ganges River is one of the largest rivers in the world. The Ganges is a lifeline, providing daily water for over half a billion people, home to 140 species of fish and 90 species of amphibians, and revered as holy by Hindus [13]. However, the Ganges is also famous for being severely polluted with human and industrial waste. Prior to 2020, the bacterial levels in the Ganges were more than 100-fold above the limit for safe drinking water [13]. Due to the COVID-19 lockdowns shuttering factories and reducing the number of visitors to the river, the Ganges has seen a 500% reduction in pollution [14]. For the first time in decades, over half of monitoring stations along the river reported that the Ganges met the national drinking water quality standard [15].

While the Ganges is a landmark example of how quickly water systems can clear up when natural systems are given a respite from pollution, it is not the only place where the water is cleaner. Due to the COVID-19 lockdown reducing water traffic and pollution, the Grand Canal in Italy ran clear for the first time in a decade and many long unseen aquatic species reappeared in the waterway [16]. Reduced tourism and a slowing of the shipping industry resulted in less emission and marine pollution. The beaches of Bangladesh, Malaysia, Thailand, and Indonesia are also showing markedly cleaner water and a return of native species as a combined decrease in tourism and the shipping industry resulted in less emissions and marine pollution [2].



The water quality in Ganges river pre and post lockdown

Tourism declines and ecological restoration improves

The tourism industry accounts for almost 10% of global greenhouse gas emissions, and while travel restrictions have lowered the amount of emissions, the starkest changes are the behaviour of animals around the globe [17]. With the reduced pollution and waterway traffic, dolphins returned to the Bay of Bengal in Bangladesh and the canals and ports of Italy [18-19]. As noise pollution and air traffic also diminished, bird species of all kinds began flourishing, with migratory birds staying longer in sanctuaries and bird populations surging. In Albania, the population of pink flamingos along the coastlines increased 30% between 2019 and 2020 [20]. The waters off of Thailand have seen an increase in the population of dugongs, or sea cows, which are classified as a vulnerable species due to water pollution and detrimental fishing practices [21]. While overall poaching rates in Sri Lanka have increased, the lockdowns did give Asian elephants a reprieve from the criminal act. Elephant kills were down 40% in 2020 compared to 2019, a definite win for Sri Lanka's 7,000 remaining endangered Asian elephants [22].

Deserted St. Mark's Square Venice Italy on May 13 2020

Moving forward: what comes next?

COVID-19 provided nature with an unexpected opportunity to hit the reset button. However, the positive effects of the pandemic on the environment are short-term and indefinite. As international borders and industries begin to reopen as the COVID-19 vaccine becomes available, it is likely that business will resume as usual unless individuals make choices and governments make policies that will maintain the positive environmental outcomes we now know are possible.

Practically, conservation authorities could implement periodic closures of natural spaces with high levels of tourism to decrease the pressure on ecological systems and promote habitat restoration [2]. It could also include improvements in the infrastructure of both municipal and industrial wastewater treatment to maintain the increased health of marine ecosystems [2]. It is now apparent that restricting fossil fuel emissions from both industry and transportation sectors results in a sharp decrease in air pollution. To maintain the improved

Governing bodies should invest in more clean energy resources to maintain improved air quality

air quality in the future, governments should look to invest in and encourage the use of green transport and renewable energy sources as an alternative to fossil fuels like coal, oil, and natural gas [14].

Working together: what COVID-19 has taught us about global efforts

While these may seem like impossible tasks, the global effort shown over the past year to develop a vaccine and mitigate the spread of COVID-19 have demonstrated the power of international cooperation and humanity sharing a common endeavour. Just as COVID-19 represents a threat to human life, so too does the climate crisis. Thus, the positive environmental effects witnessed during the pandemic should encourage us that it is still possible to change the trajectory of the Earth's health and inspire us to seek a sustainable future.

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Countries are coming together and working with each other to sustain the world's health

References

1.Worldometer. Reported cases and deaths by country or territory. Worldometer: COVID-19 coronavirus pandemic. March 2021. Accessed from: https://www.worldometers.info/coronavirus/
2.Rume T. and Didar-Ul Islam SM. Environmental effects of COVID-19 pandemic and potential strategies of sustainability. Heliyon: Cell Press. 2020;6(9)
3.World Health Organization. Rolling updates on coronavirus disease (COVID-19). Events as They Happen. (2020). Available online at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen
4.Henriques M. Will COVID-19 have a lasting impact on the environment? BBC news. 2020. Accessed from: https://www.bbc.com/future/article/20200326-COVID-19-the-impact-of-coronavirus-on-the-environment
5.USEPA . 2016. Nitrogen Dioxide (NO2) Pollution.https://www.epa.gov/no2-pollution/basic-information-about-no2
6.EEA. European Environmental Agency (EEA); Copenhagen: 2020. Air pollution goes down as Europe takes hard measures to combat Coronavirus. https://www.eea.europa.eu/highlights/air-pollution-goes-down-as
7.Berman J.D., Edisu K. Changes in U.S. air pollution during the COVID-19 pandemic. Sci. Total Environ. 2020;739:139864.
8.Thiessen T. How clean air cities could outlast COVID-19 lockdowns. Forbes. Published April 10, 2020. Accessed from: https://www.forbes.com/sites/tamarathiessen/2020/04/10/how-clean-air-cities-could-outlast-COVID-19-lockdowns/?sh=4a3869806bb5
9.Wallace G. CNN; 2020. Airlines and TSA Report 96% Drop in Air Travel as Pandemic Continues.https://edition.cnn.com/2020/04/09/politics/airline-passengers-decline/index.html 09 April 2020
10.Zogopoulos E. Energy industry review; 2020. COVID-19: the curious case of a green virus.https://energyindustryreview.com/analysis/COVID-19-the-curious-case-of-a-green-virus/ 17 April 2020
11.USEPA . 2016. Nitrogen Dioxide (NO2) Pollution.https://www.epa.gov/no2-pollution/basic-information-about-no2
12.Brauer M, Freedman G, Frostad J, van Donkelaar A, Martin RV, Dentener F, van Dingenen R, Estep K, Amini H, Apte JS, et al. Ambient air pollution exposure estimation for the global burden of disease. Environmental Science Technology. 2016;50:79-88
13.Singhal S., Matto M. COVID-19 lockdown: a ventilator for rivers. DownToEarth. In: Somani M., editor. Vol. 11. 2020. p. 100491.https://www.downtoearth.org.in/blog/COVID-19-lockdown-aventilator-for-rivers-70771 (Bioresource Technology Reports).
14.Somani M., Srivastava A.N., Gummadivalli S.K., Sharma A. Indirect implications of COVID-19 towards sustainable environment: an investigation in Indian context. Biores. Technol. Rep. 2020;11:100491.
15.Uttarakhand Pollution Control Board (UPCB) Government of Uttarakhand; India: 2020. Water Quality during Lockdown Period.https://ueppcb.uk.gov.in/pages/display/96-water-quality-data
16.Clifford C. The water in Venice, Italy's canals is running clear amid the COVID-19 lockdown. 2020. https://www.cnbc.com/2020/03/18/photos-water-in-venice-italys-canals-clear-amid-COVID-19-lockdown.html
17.Lenzen M., Sun Y.Y., Faturay F., Ting Y.P., Geschke A., Malik A. The carbon footprint of global tourism. Nat. Clim. Change. 2018;8:522–528
18.Rahman M. Rare dolphin sighting as Cox's Bazar lockdown under COVID-19 coronavirus. 2020
19.Kundu C. Has the COVID-19 lockdown returned dolphins and swans to Italian waterways? The India Today. 2020. https://www.indiatoday.in/fact-check/story/has-COVID19-lockdown-returned-dolphins-swans-italian-waterways-1658457-2020-03-22 22 March 2020.
20.Bar, H. COVID-19 lockdown: animal life, ecosystem and atmospheric environment. Environ Dev Sustain (2020). Bar, H. COVID-19 lockdown: animal life, ecosystem and atmospheric environment. Environ Dev Sustain (2020).
21.Rutz, C., Loretto, MC., Bates, A.E. et al. COVID-19 lockdown allows researchers to quantify the effects of human activity on wildlife. Nat Ecol Evol 4, 1156–1159 (2020). https://doi.org/10.1038/s41559-020-1237-z
22.The Strait Times. COVID-19 pandemic gives Sri Lanka's threatened elephants a reprieve. August 12, 2020. Accessed from: https://www.straitstimes.com/asia/south-asia/COVID-19-pandemic-gives-sri-lankas-threatened-elephants-a-reprieve