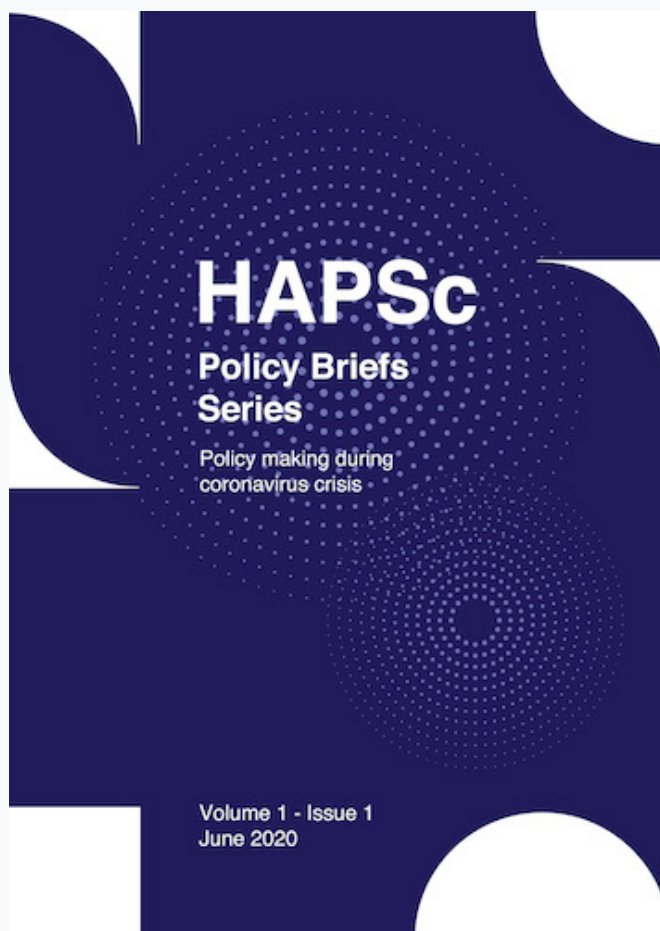


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### What are the effects of COVID-19 on the environment?

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## What are the effects of COVID-19 on the environment?<sup>1</sup>

Michail Melidis<sup>2</sup>

### Abstract

Contrary to the socio-economic aspects of the coronavirus crisis, the environment has comparably attracted lesser attention. To the question, if there is a silver lining to the global pandemic, existing data and studies show that the environment is an unanticipated beneficiary that gives a glimmer of hope for the post-COVID-19 period. Acknowledging the difficulties in conducting in-depth evaluations over the environmental impacts as the pandemic still unfolds, some preliminary inferences can be drawn. The aim of this paper is to outline and analyse the indirect effects of COVID-19 on the environment for a better understanding and knowledge during the lockdown at the international level. Indicatively, some of the positive effects are met in the decrease of GHG emissions, the fall of fossil fuel consumption, the improved air and water quality, and the re-emergence of wildlife. On the other hand, key challenges lie in the significant increase in medical waste, waste management, and environmental pollution.

### Introduction

The intensity and spreading of COVID-19 around the world showed emphatically the serious problems of national health systems and economies. The halting of the economic activity, the disruption of transport networks, the issuing of travel bans, and the adoption of social distancing measures evidence the magnitude, depth, breadth, and response of national governments to the pandemic (Chakraborty and Maity, 2020). The highlighting of nations' underlying problems through a rapidly evolving multifaceted crisis overshadowed the environmental domain (Helm, 2020). In this setting, the environment has unexpectedly seen significant improvements that merit further attention (Saadat et al., 2020; Zambrano-Monserrate et al., 2020). The analysis of the indirect effects of the pandemic seeks to shed light on the main improvements and challenges in a turbulent period (Hamwey, 2020). Hence, the paper is structured as follows. It starts with the development of the methodological steps of this research, then analyses the effects of COVID-19 and, lastly draws some conclusions and policy recommendations.

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## Methodology

Methodologically, this paper draws on a range of different sources such as academic papers, newspaper articles, environmental reports, studies, and impact assessments with a view to providing a clear picture of the indirect effects of the global pandemic on the environment internationally. It should be mentioned that as the pandemic unfolds short-term impacts may be difficult to calculate, however, there are certain sectors that can be measurable and draw useful conclusions and policy recommendations. To avoid misconceptions all the data used here derive from the period January-April 2020. Importantly, some of the limitations of this research include the lack of data availability on a country level despite the blossoming literature.

## Indirect effects

### *Reduction of GHG emissions*

One of the most noticeable improvements is found in the sharp drop of carbon emissions worldwide from February to March 2020 in comparison to the same time period in 2019 (Carbon Brief, 2020; National Geographic, 2020; World Economic Forum, 2020). For example, estimates show that China as the world's largest emitter (30% of CO<sub>2</sub> emissions on an annual basis) saw a fall of 25% of its carbon emissions as a result of the reduction of industrial activity and coal consumption (CREA, 2020). Indicative of that are the satellite images taken by NASA (NASA Earth Observatory, 2020) and the European Space Agency (ESA, 2020) that depict the decline in NO<sub>2</sub> emissions from the industrial areas, power plants and vehicles during the period January-February in major Chinese cities. It is telling that pollution levels and clouds of toxic gas hovering over the main industrial power stations and urban centers vanished. In the US, the city of New York had a reduction of almost 50% in carbon monoxide (CO) emissions from vehicles in the first weeks of lockdown. Finally, data from the Copernicus Sentinel-5P Satellite display a decrease of air pollution, particularly a decline of NO<sub>2</sub> concentrations over Italy (especially Northern Italy) as a result of the lockdown (ESA, 2020).

### *Consumption of fossil fuels drops*

The industrial and economic activity has been heavily affected by the coronavirus pandemic and contributed to a remarkable fall in carbon emissions. Notably, the decline of crude oil, steel production, and flights (70%) have significantly impacted the reduction of emissions (Carbon Brief, 2020). However, one of the determinants is the nosedive of China's use of coal (Meller, 2020). The use of coal amounted to 59% of China's energy needs in 2018 and while serving the large production

base composed of many heavy industries and powerhouses, it largely accounts for the only domestic source of heating across the country (CREA, 2020). Indicatively, the coal consumption between February and March felt a reduction of 36% in relation to the same period last year. This decline is attributed to the low demand for electricity which affected the demand side of the economy (IEA, 2019). Correspondingly, the EU shows a significant decline in manufacturing and lower power demands which translates into a drop of 9% of the overall EU emissions target in 2020 (European Environment Agency, 2020).

### *Air quality*

Arguably, the decline of CO<sub>2</sub> emissions had a positive effect on air quality with a cleaner atmosphere and less pollution in major cities. There have been observed serious reductions around 50% in the concentrations of air pollutants such as nitrogen oxide (NO<sub>2</sub>) in many urban areas around the world such as Europe and China (EEA, 2020). Some of the main causes lie in the reduced traffic and transportation networks and the fall in industrial activity and economic output. For instance, in major cities such as Milan, the average concentrations of NO<sub>2</sub> before 25 March were reduced by 24% compared to four weeks earlier and 21% between 16-22 March in relation to the same week last year. In Madrid, the average NO<sub>2</sub> levels were cut down by 56% gradually between each week and by 41% compared to the same week in 2019. Finally, in Lisbon the average NO<sub>2</sub> levels declined by 40% between each week, and by 51% compared to the same week in 2019. Also, a notable reduction of NO<sub>2</sub> emissions (10-30%) observed in Central China (Wuhan) since January. Satellite images released by the European Space Agency (ESA – Copernicus Sentinel-5P) exhibit that in February the NO<sub>2</sub> levels in the atmosphere have seen a reduction between 20% to 30% in comparison to the same month in 2017, 2018 and 2019.

### *Clearer skies*

While aviation has been one of the most affected industries with a dramatic fall in passenger traffic and huge financial losses, the grounding of airplanes and the decline in air traveling had a positive effect on the environment with improving air quality, lower pollution levels, and clearer skies due to fewer exhaust emissions. Interestingly, air traffic in Europe saw a significant plummet due to the cancellation of many flights by the airlines as the coronavirus spread out. At the international level and more specifically global hubs such as Switzerland, Hong Kong, and the UK were confronted with an air traffic reduction of more than 90% compared to the same period last year (FlightRadar24,

2020). According to ACI Europe's impact assessment (2020), the losses amount to 67 million fewer airport passengers who did not fly in the first quarter of 2020.

### *Increased waste*

The spreading of the pandemic and lockdown measures have contributed to the significant rise in waste. Particularly, the shift in consumer needs with extensive use of online shopping and home delivery services has resulted in an acute increase in household waste (BBC, 2020). Also, significant problems noticed in meeting recycling targets with the burning of household recycling due to the lack of manpower in recycling centers in Wales (The Guardian, 2020). Medical waste has also seen a sharp uptick during this period. Indicatively, the production of clinical waste such as protective equipment, masks, and gloves in Wuhan (China) populated by more than 11 million people was on average 240 metric tons per day in comparison to the average of less than 50 metric tons in a normal period. Consequently, high pressures on the existing waste management facilities were generated. The destination of the discarded single-use plastic-based masks, water-resistant gloves and other medical waste such as sanitizers is often landfilling and oceans. For example, evidence from NGOs (Oceans Asia, 2020) shows that Hong Kong is experiencing an environmental crisis with a large amount of garbage and medical waste (masks) spotted on the ocean surface are being washed up to its seashores and beaches (Saadat et al., 2020). The impact of those on fauna and flora seems to be wide-ranging as the animals living in both land and sea in search of food could accidentally eat them with devastating consequences for their lives. Additionally, environmental pollution and contaminated areas from medical waste could jeopardize the breeding of many species and subsequently the whole food chain.

### *Clearer waters and cleaner beaches*

The curtailment of tourist flows and waterborne traffic during the pandemic seems to have brought about an improvement in the water quality of Venice's sinuous canals (McFadden, 2020). The empty canals from motorboat taxis and tourist boats have given a breather to the main waterways to become clearer (The Guardian, 2020). Studies have shown that the contamination of canal waters and surrounding ecosystems is related to the emissions from the boat engines. With the lack of waterborne traffic, the boats are no longer churning up the mud of the canal floors. An immediate effect is the clarity of waters, the return of swans and ducks, and the visibility of the fish and plant-life of the lagoon (Ball, 2020). Also, the condition of the Ganges River shows a serious improvement since the enforcement of lockdown in India which resulted in a decrease in the disposal of industrial waste into

it according to the Central Pollution Control Board data. The improvement of water quality shows the suitability of the Ganges River for bathing and diffusion of wildlife and fisheries (The Economic Times, 2020). Many beaches in the world provide to coastal areas and communities economic benefits, however, they constantly undergo environmental pressures due to overexploitation and pollution. The slashing of tourist numbers and the strict lockdown measures conducted to a better condition of the beaches around the world which are now appearing cleaner and clearer. Indicative examples are the beaches of Acapulco (Mexico) and Barcelona (Spain) (Evening Standard, 2020).

### *Wildlife*

The enforcement of lockdown and the lack of traffic prompted the return of wildlife to towns, city centers, and suburban streets. The halting of economic activity and the absence of human presence constituted a great opportunity for the wild species to venture into urban and rural environments and wander in once-bustling streets, busy parks, and crowded beaches (Cortlett et al., 2020). Examples such as the roaming of deers in Nara, a Japanese city in search of food, the trotting of boars in Barcelona's buzzing avenues, the capture of a wild puma in Chile's capital Santiago empty centre in the midst of a night-time curfew and the wandering of a heard of Kashmiri goats in Llandudno's deserted streets in North Wales indicate that when people's presence declines wildlife takes over (Evening Standard, 2020). In doing so, the natural world manifests its quick adaptability, resilience, and thriving in people's absenteeism (Helm, 2020).

### **Conclusions**

This paper aimed to provide an overview of the indirect effects of COVID-19 on the environment at the international level. In spite of the uncertainty caused by the pandemic due to the unprecedented circumstances, there have been some glimmers of hope and positive signs that the environment can be temporarily benefitted from the unexpected outcomes and short-term improvements such as the reduced GHG emissions, the falling consumption of fossil fuels, the better air quality and clearer atmosphere, the improved quality of waters and cleaner beaches, and liberated wildlife. On the other hand, the mounting problem of waste and environmental pollution reveals the challenges many national governments are confronted with. From the above analysis, it is clearly manifested the interaction between the economy and environment as well as the resilience, adaptability, and quick recovery of the natural world when granted space. Furthermore, a taste of the scale of challenges and actions required in a post-pandemic setting for a greener future is given. These environmental

improvements inject some optimism but do not permit celebrations as this positive picture may look short-lived when the wheels of the economy start reeling again.

### **Policy recommendations**

The positive picture of the environment that comes out of the pandemic plausibly creates some expectations about the sort of improvements and actions needed for a greener future (Aletta and Osborn, 2020; Blum and Neumärker, 2020). Acknowledging the pressures exercised to governments to soften or lower their environmental ambitions in a bid to ramp up their economies are raised significant questions about their reactions. There are two paths to be followed here. The first is to return to the business as usual model with subsidies to heavy and carbon-intensive industries for a quick fix of the economy that overlooks the scientific community recommendations about climate action and ultimately comes at the expense of the environment. The second is new and sees the pandemic as a great opportunity to change the current growth model by reflecting upon the way we live, consume the natural resources, and treat the environment overall (GLOBSEC, 2020). Undoubtedly, the latter paves the way for a more sustainable model which takes into account not only the current but also the future generations and vulnerable groups. The answer is not to just pump money into the economy and achieve a quick recovery but to invest in human capital and knowledge and build an economy that has at its core the environmental values. The provision of finance packages and fiscal stimuli to step up the transition to a carbon-free economy would be useful but the aftershock of COVID-19 may hold the national governments on a defensive line due to tight budgets. Faced with strong public pressure to address unemployment, the temptation to use of fossil fuels, especially with the current low oil prices, to simply restore their economies would be a clear setback with significant implications for all.

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