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FAQs: COVID-19 and ...

air pollution

- **How has the COVID-19 crisis affected air pollution?**

One of the most evident short-term effects of COVID-19 lockdowns was the dramatic improvement in air quality, especially in some of the world's most polluted cities. Although air quality levels appear to be returning to near-pre-lockdown levels in many parts of the world as stricter lockdown measures are lifted, this period has given a glimpse of some of the benefits that could be achieved from a lasting and sustainable reduction in air pollution.

A decrease in activities led to a decrease in emissions and subsequent levels of air pollution. This is particularly evident in terms of transport. Private use of vehicles declined during lockdowns and this was reflected in lower NO₂ concentrations in many cities. The EEA's [Air quality and COVID-19 viewer](#) tracks average weekly and monthly concentrations of NO₂ and particulate matter (PM₁₀ and PM_{2.5}). Data show how concentrations of nitrogen dioxide (NO₂) — a pollutant mainly emitted by road transport — decreased in many European cities where lockdown measures were implemented. The

extent of reductions varied considerably, with the largest reductions of up to 70 % seen in urban centres in those countries most affected by COVID-19 in the spring of 2020, namely Spain, Italy and France. It also shows that with resumption of social and economic activity, concentrations of these pollutants are increasing, and already in some cases returning to pre-pandemic levels.

• **Is there a link between exposure to air pollution and COVID-19 infections?**

Researchers are exploring the role that air pollution may play in influencing the severity of COVID-19. Exposure to air pollution is associated with cardiovascular and respiratory disease, both pre-existing health conditions identified as risk factors for death in COVID-19 patients (Yang et al., 2020). As such, long term exposure to air pollution might be expected to increase susceptibility to COVID-19 in individuals, with previous studies having, for example, demonstrated a role for exposure to particulate matter (PM) in worsening the impact of respiratory viruses (Sciomer et al., 2020). Some recent studies have explored the evidence for links between air pollution and high mortality rates for COVID-19. An Italian study argued that since long-term exposure to air pollution, including PM, ozone (O₃) and sulfur dioxide (SO₂), weakens the immune defences of the upper airways, this would facilitate entry of the SARS-CoV-2 into the lower airways resulting in infection with COVID-19 (Conticini, et al., 2020). There are, however, a number of significant limitations with these early studies and so findings need to be interpreted with care.

An additional public health question, also currently being researched, is whether particulate matter can transport the virus. In Italy, genetic material from the SARS-CoV-2 virus was detected on PM samples from the city of Bergamo in Northern Italy (Setti, et al., 2020). While there are some concerns that air pollution could carry the virus over longer distances and drive infection, at this stage it is not known whether the virus remains viable on pollution particles. Again, further research is required.

chemicals

• **What does COVID-19 mean for our exposure to chemicals?**

Chemical exposure has been indirectly linked to vulnerability to COVID-19. Certain chemicals are associated with health impacts such as obesity, cardiovascular diseases, immunotoxicity and respiratory diseases that have, in turn, been found to increase susceptibility to COVID-19.

In terms of chemical exposure, the pandemic-induced confinement increases indoor exposure to other types of pollutants originating from our built environments. Concerns with the overuse and/or misuse of disinfectants, and other indoor chemical exposure have been raised in scientific communities.

Further research is required into these assumptions.

climate

• Will COVID-19 be good or bad for GHG emissions and climate change?

The precipitous drop in economic activity caused by COVID-19 lockdowns resulted in reduced greenhouse gas emissions over this period. However, as activity resumes, it is clear that any benefit will be short-lived, and unlikely to have any significant impact on meeting longer-term GHG emission targets.

The COVID crisis has a direct impact on global and EU greenhouse gas (GHG) emissions, although we will only be able to fully quantify its magnitude after 2020. The Commission's forecast for the year 2020 estimates a 7.6 % contraction in GDP for the EU as a whole. Due to the effect of COVID-19 on the economy, we could expect an unparalleled reduction of GHG emissions in 2020 in the EU compared to 2019. While this short term reduction in emissions may make 2020 targets achievable, any longer-term goals will require political decisions that prioritise recovery measures which contribute significantly to climate change mitigation.

• Is there a link between climatic conditions and occurrence of COVID-19?

Some early scientific studies suggest that relatively low temperatures (5-11 °C average) and low absolute humidity favour the spread of COVID-19 whereas relative humidity was a weaker predictor. One of these studies has been used as the basis for the Monthly climate explorer for COVID-19 recently published by the Copernicus Climate Change Service.

Observations in the coming months and years regarding the seasonality of COVID-19 in different climate zones and further research will provide crucial information to understand the links between climate factors and virus spread.

consumption and resource use

• Will COVID-19 affect efforts to reduce consumption levels and resource use?

After the last financial crisis in 2008, material use decreased, mainly as a consequence of the breakdown of the construction sector in several countries. This is not the case for the COVID-19 crisis. Recovery packages that have a focus on building renovation and infrastructure development

may lead to higher material consumption.

The COVID-19 pandemic has caused significant changes in the production and consumption of plastics, and in plastic waste. The pandemic led to a sudden surge in global demand for personal protective equipment (PPE) such as masks, gloves, gowns, bottled hand sanitiser, etc. During early efforts to stop the spread of the virus, the World Health Organization (WHO) estimated that 89 million medical masks per month were required globally, together with 76 million examination gloves and 1.6 million sets of goggles.

As a result of lockdown measures across most of Europe, coupled with stringent hygiene requirements, COVID-19 has had a significant effect on the consumption of single-use plastic packaging and products. As most restaurants in Europe were closed for on-site dining, many shifted to offering take-away and delivery services using single-use plastic containers. Several large coffee retailers stopped allowing customers to bring refillable containers, using disposable cups in their place. Meanwhile, online shopping outlets have seen a surge in demand, with many products packed in single-use plastic.

While disposable plastic products have played an important role in preventing the spread of COVID-19, the upsurge in demand for these items may challenge EU efforts in the shorter term to curb plastic pollution and move towards a more sustainable and circular plastics system. The production, consumption and disposal of additional single-use plastics will have led to greater impacts on the environment and climate, such as increased air pollution and greenhouse gas emissions, waste generation and risk of littering.

In addition to the direct effects stemming from increased demand for single-use plastics, other factors related to the pandemic are important to note. Reduced economic activity has seen sharp falls in global oil prices. In turn, this has made it significantly cheaper for manufacturers to produce plastic goods from virgin, fossil-based materials rather than using recycled plastic materials. The economic viability of the European and global plastics recycling market is presently under significant pressure. Lower market demand for recycled plastics has also complicated the efforts of many of Europe's local municipalities to manage their waste practices sustainably, with less desirable waste disposal methods now being required for significant quantities of plastic waste.

Some existing strategies to reduce resource use such as the sharing economy and mass or shared transport solutions have virtually collapsed during the COVID-19 crisis.

The ongoing **IT-intensive technological revolution** may well be intensified and/or accelerated by the COVID-19 crisis as, for example, options for physical communication are reduced, IT-reliant practices such as teleworking are extended, and systems designed to track people in response to contagion are deployed. This may have long-term effects on **travel patterns**.

nature

• Is there a link between environmental degradation and COVID-19?

Evidence points to COVID-19 being a zoonotic disease that jumped from animals to humans. The emergence of such zoonotic pathogens is linked to environmental degradation and human interactions with animals in the food system.

About 60 % of human infectious diseases are of animal origin (Woolhouse and Gowtage-Sequeria, 2005), while three quarters of new and emerging infectious diseases are transmitted to humans from animals (Taylor et al., 2001). These include viruses responsible for significant global mortality, such as the human immunodeficiency viruses (HIV) HIV-1 and HIV-2 that cause acquired immune deficiency syndrome (AIDS) and emerged from wild primate populations, the Rift Valley fever virus that jumped from infected livestock to humans, as well as influenza viruses that have emerged from domestic animals, in particular pigs and poultry, such as bird flu and swine flu.

Novel viruses have emerged from intensive systems of domestic livestock rearing. The intensive production of animal protein involves rearing concentrated populations of genetically similar animals in close proximity, often in poor conditions, fostering vulnerability to infection (UNEP, 2020). More than 50 % of zoonotic infectious diseases that have emerged since 1940 have been associated with measures to intensify agriculture (Rohr et al, 2019). Deforestation and land use change, including the conversion of natural ecosystems for agriculture or urban development, have also been found to impact species diversity and abundance, favouring animal species that act as reservoirs for zoonotic disease, in particular rodents, bats and passerine birds (Gibb et al, 2020).

Beyond the causes of COVID-19, the period of lockdown in many countries has given us a glimpse of how animal and plant species react to decreased human disturbance, both in rural, and especially urban settings. During the Europe-wide lockdown, many anecdotal stories have appeared concerning the changing behaviour of wildlife. There have been many studies since the 1970s on the impact of human disturbance on wildlife, in particular on breeding birds. Less disturbance in urban, but also in remote areas (less recreational tourism), gives threatened ecosystems and habitats the chance to recover, and for species to occupy new spaces and niches. New research is looking into how urban nature areas increase the resilience of cities, maintaining well-being in urban populations, while also enabling social distancing. Maintaining or increasing space for nature in cities should increasingly be part of the sustainability agenda.

• Is nature recovering as a result of the COVID-19 crisis?

Since the Europe-wide lockdown, many anecdotal stories are appearing about changing behaviour of wildlife. Some of these are better documented than others.

There have been many studies since the 1970s on the impact of human disturbance on wildlife, in particular on breeding birds. Less disturbance in urban, but also in remote areas (less recreational

tourism), gives threatened ecosystems and habitats the chance to recover, and for species to occupy new spaces and niches. The outbreak of foot and mouth disease in animals in 2001 required significantly less restrictions on human movements than the current COVID-19 crisis, but still had a noticeable impact on biodiversity.

However, lockdown restrictions also mean less recreational tourism, less volunteers to help and less revenue for parks. All this could lead to less support for “managed nature”. At the same time, people are seeking other kinds of recreation and may come to value their urban and peri-urban green areas more in the future.

noise pollution

• Are we benefitting from less exposure to noise thanks to COVID-19?

It is likely that there has been a significant drop in noise levels during the COVID-19 lockdown, as noise pollution from traffic is typically correlated with NO₂ levels. While we have grown accustomed to unhealthy noise levels in cities, the short-term reduction in noise during lockdown allowed people to experience the immediate benefits of quieter cities. Several sources have also documented a dramatic fall in ground vibrations generated by human activities such as road traffic and industrial activities across the EU.

Environmental noise levels are reported over a prolonged period of time, as health effects appear when exposure is long-term. It is safe to say that a reduction in noise levels over a few months would not significantly reduce the annual noise level indicator used to measure the effects of noise, unless societal responses to COVID-19 result in longer-term reductions in traffic levels, air transport and other noise-producing activities.

Long-term exposure to the levels of noise observed in many urban areas can cause health effects such as annoyance, sleep disturbance and heart problems. We have grown accustomed to unhealthy noise levels in cities, because it is what we are used to hearing every day. However, the short-term reduction in noise during lockdown has allowed many people to experience the immediate benefits of quieter cities, and this may have implications for future behaviour and policy.

recovery policies

• What does COVID-19 mean for the environmental agenda, policy and legislation?

The COVID-19 crisis represents a dramatic shock to the global economy that will affect progress on

environment and climate change in different ways. The biggest driver of the long-term impact on climate is through fiscal recovery packages, along with possible shifts in power within and across national and international institutions. Green fiscal recovery packages are essential to help decouple economic growth from environmental and climate impacts and reduce existing welfare inequalities that will be exacerbated by the pandemic in the short-term and climate change in the long-term.

Short-term reductions in air pollution and GHG emissions resulting from lockdowns will themselves have minor long-term effects, unless they facilitate deeper and longer-term human, business, and institutional changes. Urgent rescue packages have been necessarily focused on preserving liquidity, solvency, and livelihoods, but their climate and environment impact also needs to be positive.

As we move from the rescue to the recovery phase of the COVID-19 response, policymakers have an opportunity to invest in productive assets for the long-term. Such investments can enhance the shifts in human habits and behaviour already under way. In the lead up to COP26, recovery packages are likely to be examined on their climate impact and contributions to the Paris Agreement (UNFCCC, 2015).

• **What has the European Union proposed to help Europe recover?**

In the European Green Deal, the European Commission had already proposed an ambitious and just transition towards long-term sustainability, placing environment and climate concerns at its centre. These priorities are also clearly reflected in the multi-annual EU budget proposal of EUR 1.1 trillion for 2021-2027. As part of a recovery plan from this economic crisis, a new, additional financial instrument called 'Next Generation EU', amounting to EUR 750 billion, was recently proposed by the European Commission. Framed within well-defined policy targets, these funds can help Europe transform its economy while achieving climate-neutrality and sustainability and addressing social inequalities.

urban life

• **How has COVID-19 changed the way we think about cities?**

More than three quarters of European citizens live in cities, and city life has changed dramatically due to COVID-19. While millions of citizens were asked to stay at home and respect social distancing rules, many city planners and authorities have been looking at how to make cities more sustainable under these new circumstances as the recovery from the economic and social impacts of this current shock starts. Cities around the world already face multiple challenges, including the need to adapt to a changing climate. Recovery plans need to seize the opportunity to align environment and climate objectives to society's resilience to current and future shocks.

New research is looking into how urban nature areas increase the resilience of cities, maintain well-being in urban populations, while also enabling social distancing. Cities around the world need to find

ways to function better during these disturbances. Thus, maintaining or increasing space for nature in cities and keeping it accessible to the public should be part of the sustainability agenda as a priority.

Digital innovation will play a key role in helping authorities and communities to shape the cities of the future. For example, data from the Copernicus European Earth Observation programme will help to measure progress and monitor environmental policies, as well as to formulate future policies by providing models and outlining future climate impacts.

water pollution

• What does COVID-19 mean for water quality and pollution?

The supply of clean drinking water and treatment of waste water are critical services which continue to be provided by the water sector. Ensuring quality standards are met for drinking water and discharged waste water is a key priority, both for Europe and individual Member States. Water utilities have contingency plans to deal with emergencies.

Lower economic activity during lockdowns is likely to lead to lower emissions to water from industry, while emissions from schools and workplaces are likely to shift towards households. There may be less water stress in specific areas in Europe depending on the impacts on agriculture and energy production.

Reduced tourism is also likely to lead to lower emissions to water at European coasts and other tourist destinations.

• Is it safe to swim at European bathing sites?

Effluents of waste water to coastal areas and other sensitive areas are subject to very strict standards of treatment (including disinfection) in the EU under the Urban Waste Water Treatment Directive. The World Health Organization states that there is no evidence that the COVID-19 virus has been transmitted via sewerage systems with or without wastewater treatment (WHO, 2020a; WHO, 2020b), while the Centers for Disease Control and Prevention of the United States (CDC) suggests that, based on the available information, the risk of transmission of the virus SARS-CoV-2 through properly designed and maintained sewerage systems is thought to be low (CDC, 2020).

Information about the safety of bathing sites and safety measures in place at respective open bathing sites should be sought from the beach operators, beach managers and/or competent national and local authorities. According to current evidence, the COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes (WHO, 2020c). The risks of spreading COVID-19 at the beach depends on the number of people visiting the site, and the implementation of the guidance provided by the national authorities (e.g. social distancing, hygiene measures such as hand cleaning).

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