

How does COVID-19 impact the environment?

Point-of-View

January 2021



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Executive summary

COVID-19 snapshot¹

~80 million
confirmed cases
worldwide

~55 million
patients
recovered

>1,5 million
deaths
worldwide

220
affected countries
and territories

~20 million
the largest number
of cases was
registered in
the USA

1
the smallest
number of cases
was registered in
Vanuatu

Environmental effects of COVID-19 outbreak

Positive impact



Reduced GHG² emissions



Improved water quality



Reduced noise pollution
and improved air quality



Restored wildlife



COVID-19
pandemic

Negative impact



Increased medical waste



Intensified municipal waste



Increased haphazard
disposal of PPE³



Reduced recycling activities

Although the pandemic resulted in improved environmental conditions, namely less polluted air and water, these consequences could be maintained in the long term perspective only in the event of implementing reasonable protective policies by governmental authorities and international environmental institutions, as well as proactive behaviour of companies, industries, and the public.

Source: National Center for Biotechnology Information – Environmental effects of COVID-19 pandemic and potential strategies of sustainability – [2020]

3 Notes: (1) As of the end of December; (2) Greenhouse gas; (3) Personal Protective Equipment

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Environmental prerequisites of COVID-19 appearance



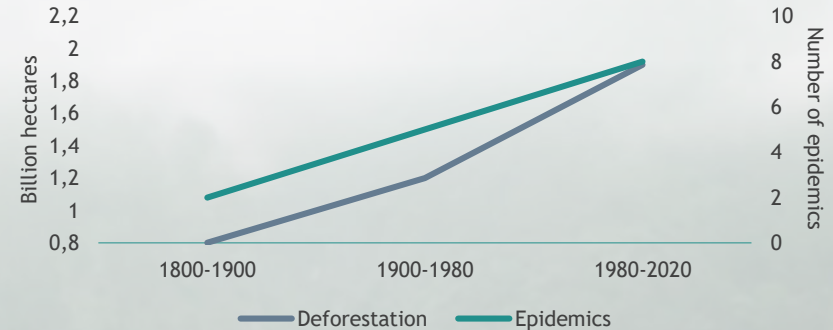
Human activities such as deforestation, wildlife trade, and urbanisation led to the wide spread of different zoonoses, which reached the peak with the spread of COVID-19 that became a global pandemic

Deforestation and urbanisation appeared to be among the factors that impacted the initial spread of COVID-19

Over the past centuries, the human population has been affecting the environment by performing such activities as **deforestation, urbanisation, and trade of wild animals**. The interconnections between these actions and their consequences led to the **creation and global spread of COVID-19**. In particular, the virus is proved to be transferred to humans by bats primarily in Wuhan, China.



Correlation between deforestation and the increasing number of global epidemics



Although the intensity of epidemics has decreased as a result of healthcare and medical treatment progress, their quantity has **risen drastically** over the previous centuries. The **trend is mainly affected by urbanisation**, which forces animals to locate more densely within the limited areas and provokes their interactions. In addition, the correlation between the rise of deforested land and the **number of epidemics becomes higher**, which might demonstrate the **harmful effects of human activities**.

COVID-19 became one of the most widespread zoonoses, which led to 1,5 million deaths in less than one year

COVID-19 is the most recent zoonotic disease¹ in humans and demonstrates how human health and nature are closely intertwined. Interaction with nature could expose humans to a range of animal diseases. In fact, about three to four new infectious diseases occur every year, most of which originate from wild animals. Over the past 30 years, approximately 60-70% of new human diseases have been of zoonotic origin. The growth of zoonotic disease outbreaks is a sign of a breakdown in the relationship between humans and nature and is likely to worsen.

Top-3 zoonotic diseases in terms of number of death (1998-2020)



COVID-19
>1.500.000

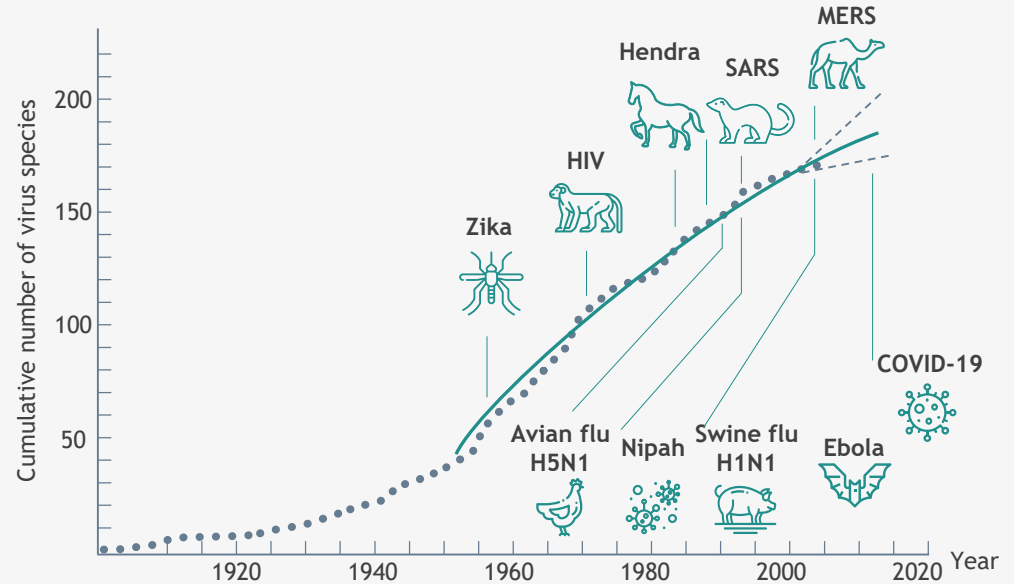


Swine flu H1N1
18.449



Ebola²
13.593

Zoonotic diseases known to infect people



Source: WWF – COVID 19: Urgent call to protect people and nature – [2020]

Notes: (1) A zoonosis is an infectious disease that has jumped from a non-human animal to humans; (2) In the Democratic Republic of Congo, Guinea, Sierra Leone, and Liberia

Negative impact of COVID-19 on the environment



The pandemic made humanity face such challenges as overwhelming medical and municipal waste production, increased risks of natural disasters as well as various effects on both home and wild animals

The drastically increasing amount of domestic and medical waste is one of the key negative outcomes of COVID-19

Coronavirus waste has become a new form of global pollution. The adopted quarantine, isolation, and social distancing led to a corresponding increase in the amount of **solid household waste (15-25%)** and a significant increase in the generation of **medical waste** in healthcare institutions (from **10 to 20** times). To protect themselves from the viral infection, people are using face masks, hand gloves, and other safety equipment, which increases the amount of healthcare waste. Face masks are **non-recyclable**, they are contaminated with body fluids and could potentially lead to indirect infection and transmission of the virus if released into the recycling system.

COVID-19 waste



Masks

129 billion

are disposed globally each month



Gloves

65 billion



Other PPE

84-1.233 Euro

as a PPE littering fine

PPE littering fine for the first offence, Euro



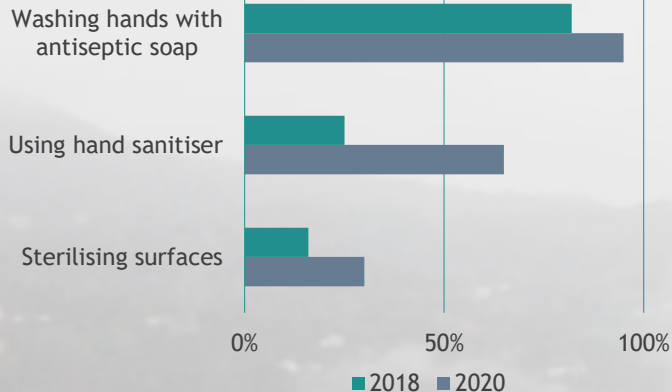
Source: Meuresiduo website; Green Matters website; Venngage – The Coronavirus Pandemic’s Impact on the Environment – [April 2020]; National Center for Biotechnology Information – Impact of COVID-19 pandemic on waste management – [August 2020]; Media overview

Usage of Triclosan, a constituent substance of antiseptics, significantly harms nature as it gets into the water

From the beginning of 2020, a **huge amount of disinfectants** has been applied to **roads, commercial, and residential areas** to exterminate the COVID-19 virus. However, at the same time, these disinfectants **might kill non-targeted beneficial species** and create **ecological imbalance**.

The vast majority of disinfectants and antiseptics, such as hand soap, contain a high percentage of the **hormone-disrupting pesticide Triclosan (TSC)**. Triclosan converts to **dioxin, a highly toxic compound** when exposed to sunlight, which is often found on the surfaces of the aquatic environment.

Comparison of measures taken in 2018 vs 2020 among population¹



Impact of TSC on nature



970 tonnes
end up in global
aquatic system

95%
is washed down
the drain

63%
detection frequency
of TSC in tap water

0,21 nM²
concentration of
TSC in tap water

Source: The Nation website; Guardian website; Nippon website; National Center for Biotechnology Information – Bats, Coronaviruses, and Deforestation: Toward the Emergence of Novel Infectious Diseases? – [2018]; Media overview

Notes: (1) According to a survey of the Japanese company; (2) Nanomoles

The volume of municipal waste generation increased due to less intensified recycling and security control measures

The COVID-19 disease has affected the existing systems of waste management (WM) and led to an increase in the volume of municipal waste. This tendency resulted from reduced recycling as well as further compounded challenges in the collection and disposal of general waste.

Municipal budgets are weakened as a result of increased healthcare costs and implemented social security regulations. Several governments introduced limitations to the volume of recycling activities in order to reduce the risk of virus infection.

Changes in the treatment of waste



Governments' response to waste management

46%
of recycling programmes were restricted by US regulations

Regular health check for WM workers

is provided to ensure no disruptions in WM operations

Increased frequency of collection

is practiced in order to avoid exceeding waste

Positive effects of COVID-19 regarding waste



Slowdown in manufacturing activity



Industrial waste production fell

Source: IFC – COVID-19's Impact on the Waste Sector – [2020]; Association of cities and regions for sustainable resource management – Survey on the impact of the COVID-19 on municipal waste management systems – [2020]; National Center for Biotechnology Information – Environmental effects of COVID-19 pandemic and potential strategies of sustainability – [2020]

The effects of COVID-19 such as lockdowns and increase in unemployment influenced both domestic and wild animals

The dramatic increase in **dog abandonment** in spring 2020 was mainly due to the health, economic, and social problems associated with COVID-19, as well as inconclusive reports of pets that are potential carriers of COVID-19.



60%

increase in the call
for rescue of
homeless dogs since
March 2020



73%

adoption rate for
pets during the
period March-June
2020

Contrariwise, the **number of adopted animals also increased** greatly due to lockdowns as many people, who either were forced to work from home or lived alone, decided to take the animal home and spend time with it.

A sharp **drop in tourist numbers** due to lockdowns could be **devastating** to wildlife. As millions of jobs have been lost due to the COVID-19 crisis, huge swaths of wildlife and habitat are vulnerable to poaching in some areas.



125%

increase in poaching
cases in Africa
during February-
June 2020¹



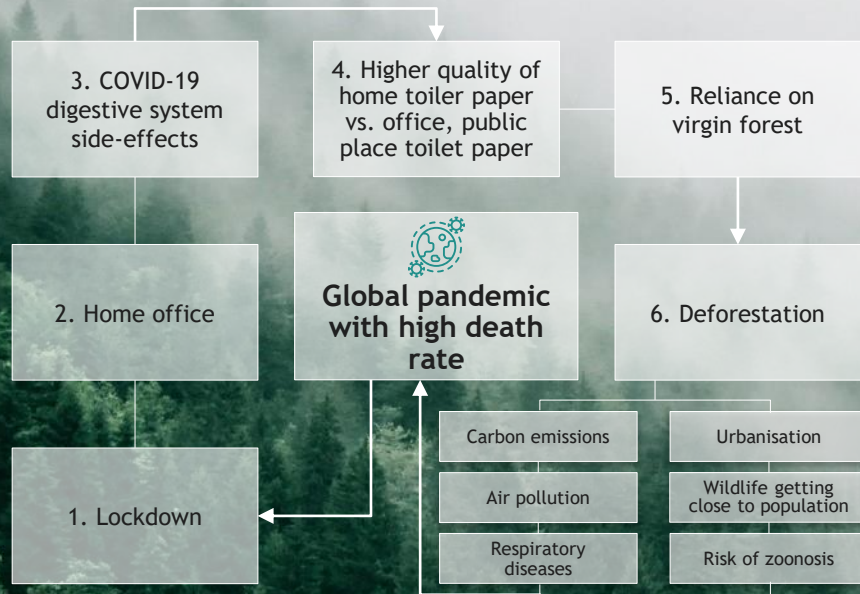
53%

decrease in rhino
poaching in the first
six months of 2020 in
South Africa

The loss of tourism revenue in the long term could lead to an extremely negative trend. Loss of income also means **loss of tolerance for dangerous and destructive animals**, leading to the hunt for wild animals out of necessity in order to get meat, ivory, and horn.

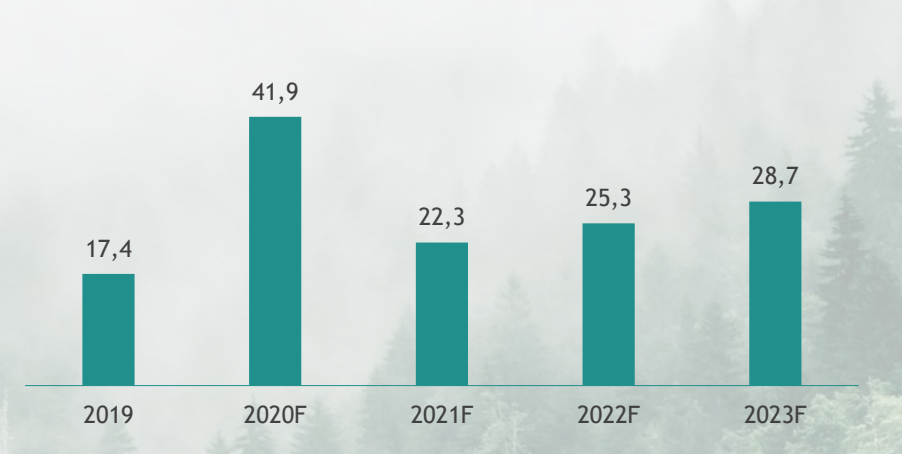
Consumption of toilet paper in 2020 increased by 141% compared to 2019, accelerating the deforestation issue

Toilet paper vicious circle



As a result of COVID-19 lockdowns, working from home has not benefited the forests. Unlike office toilet paper, which is usually made from recycled fibres, most household toilet paper is made from virgin material from clear felling. While a number of companies have seen an increase in the production of recycled toilet paper, the leading manufacturers still depend on 100% natural forest fibre.

Global toilet roll market, Bn Euro¹






Source: Axios website; Fortune – Working from home means softer toilet paper – and a significant toll on the environment – [June 2020]; Media overview

12 Notes: (1) Numbers are converted from USD to Euro due to the exchange rate by ECB

The world is facing challenges in dealing with natural disasters as it strives to slow down the spread of COVID-19

Disaster management organisations are required to take steps to control the spread of COVID-19. These measures become inefficient and costly for mitigating damage and lead to delays.

Shelter	Evacuation	Workforce
		
More shelter space for disaster victims is needed to keep a safe distance	Long travel hours due to movement restrictions	Long travel hours and limited access to some damaged areas
Additional costs arise for sanitisers, protective barriers, etc.	Large queues on registration points due to safe distance measures	Most of the EOC ¹ training shifted online, which can negatively impact the studying process
Some procedures, such as feeding, need to be modified to avoid big crowds		

Examples of COVID-19 impact on the quickness of disaster response



Cyclone Harold

Airports and ports of the damaged islands were not fully operational due to COVID-19 restrictions, which challenged access to the hit area.



Typhoon Hagibis

The shortage of volunteers affected the early recovery process as the Japanese government suspended receiving volunteers to prevent COVID-19 from spreading.



Flooding in Canada in April 2020

Manitoba Province established special sandbagging procedures and emergency barriers to ensure the workers' safety but at the same time slowing the recovery process.

Source: United Nations Office for Disaster Risk Reduction website; National Fire Protection Association website; Research Gate – Managing disasters amid COVID-19 pandemic: Approaches of response to flood disasters – [April 2020]

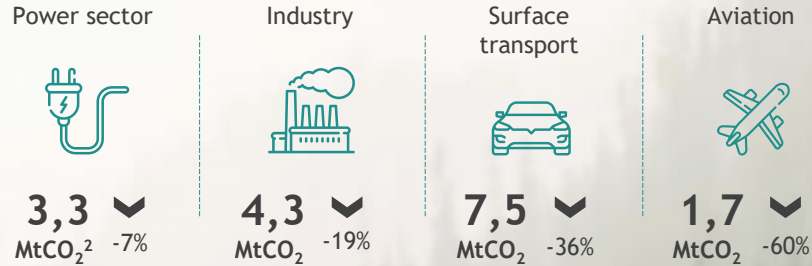
Positive impact of COVID-19 on the environment



*Although there are multiple negative impacts on the environment, the countries **also** experience a range of positive outcomes, such as improved air and water quality, better living conditions for wildlife species, and reduced noise pollution*

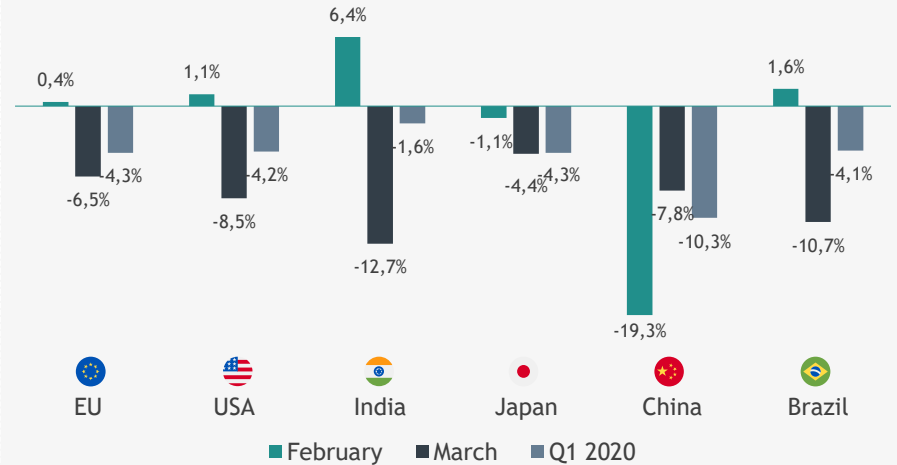
Air quality improved rapidly at the beginning of 2020 due to lower CO₂ emissions associated with COVID-19 measures

Estimated CO₂ emission reduction due to COVID-19 in selected sectors in 2020 in comparison with 2019¹



CO₂ emissions **decreased significantly** during the lockdown period due to less domestic and industrial activities as well as restricted vehicle movements. **Power and industry sectors were the most affected** in absolute terms, accounting for **86%** of the total reduction of global emissions.

CO₂ emissions in 2020 in comparison with 2019



Despite a significant decrease in March 2020, overall CO₂ emissions **started to rebound** to the 2019 levels in most countries by the end of Q1. That is why the positive impact of lockdowns **will not last long** if no other climate protection policies are developed.

Source: Statista website; Nature – Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement – [May 2020]

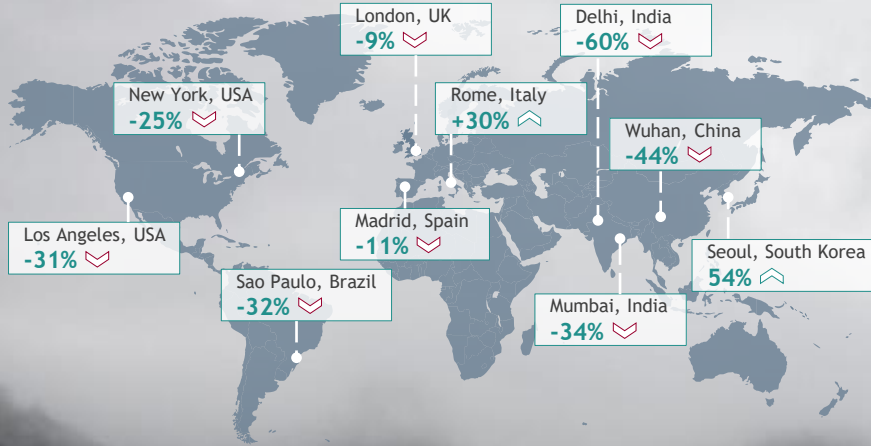
15 Notes: (1) Data is provided from 1 January to 7 April 2020; (2) Metric tonnes of carbon dioxide

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Alongside CO₂, reduced NO₂ and PM2.5 emission levels led to a lower number of pollution-related health cases

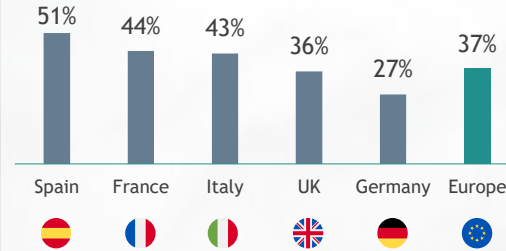
PM2.5¹ levels reduction during the 2020 lockdown period², YOY³



PM2.5 is one of the most dangerous air pollutants for human health, which comes mostly from fuels burning

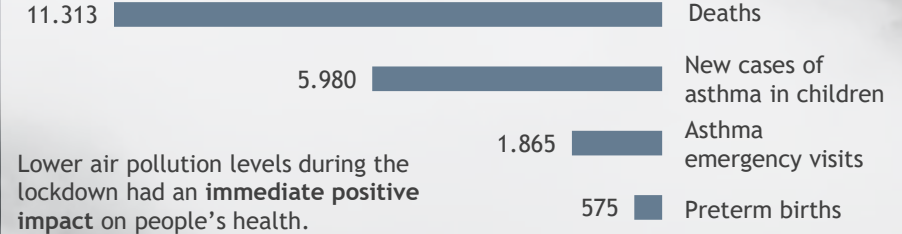
9 out of 10 global cities experienced a 9%-60% reduction in PM2.5 during the lockdown period

NO₂ emissions reduction in April 2020, YOY



An approximately 40% decrease in average NO₂ pollution worldwide in January-April 2020 was achieved through COVID-19 measures, which caused a 37% reduction in coal production and an estimated 1/3 reduction in oil consumption, the most polluting sources of NO₂.

Projected avoided health issues due to lower air pollution in Europe in April 2020



Lower air pollution levels during the lockdown had an **immediate positive impact** on people's health.

Source: Statista website; EEA website; Springer – Coronavirus pandemic and its natural environmental impacts – [September 2020]

Notes: (1) Particulate matter with a diameter of 2,5 micrometers or less; (2) Data is based on a 3-week period for each city during lockdown conditions; (3) Year-over-year

Both travel restrictions and lower economic activity have improved the quality and transparency of water globally

The impact of COVID-19 on the quality of water depends on the urbanisation level of the region and the quality of soil, where emissions could be stored before the release in water systems. However, several researches evidence the improvements in water quality during COVID-19 crisis.

Practical case examples

Vembanad Lake, India

16%

less suspended particulate matter (SPM) concentration on average

90%

zones of the lake experienced the reduction of SPM

55%

zones recorded the lowest level of SPM since 2013

Venice, Italy



Traffic reductions resulted in increased water transparency



Less boat traffic allows sediments to stay at the bottom of canals



Wild fish returned to Venice canals as a result of lower activities

Water quality improvements might be short-term as a result of lower sea traffic during the lockdown. Therefore, provided that the population implements measures towards a better quality of water, the positive effects could be achieved in the long run.

Risk of virus transmission by water

Drinking water supply is essential for the population's existence. Therefore, water waste is regulated by strict legislation. With the spread of COVID-19, the threat of the virus being transmitted through waterways is analysed. However, recent researches state the risk is limited.



World Health Organization

WHO claims that there is no evidence that coronavirus could be transmitted through water systems



CENTERS FOR DISEASE CONTROL AND PREVENTION

CDC considers the risk of the virus being transported via sewerage systems tends to be low

Source: Science of the Total Environment – COVID-19 and surface water quality: Improved lake water quality during the lockdown – [2020]; European Environment Agency – COVID-19 and the environment: Explore what we know – [2020];

With the reduced volume of traffic, the level of noise pollution, which affects human health, decreased



Noise pollution is **3rd**

most dangerous environmental threat in the world



40%

of Europeans are exposed to long-term noise pollution



Cars

are the greatest noise pollutants

The pandemic resulted in **decreased levels of noise pollution** due to restricted land, marine, and air traffic as well as reduced economic activity. Although the reduction of noise pollution during the lockdown would bring positive environmental effects only in case of long-term shortening of human traffic, recent researches demonstrate decreased levels of noise pollution.

Benefits of reduced noise pollution level



Enables to conduct seismological researches



Creates less impact on human health, in particular high blood pressure, annoyance, and sleep disturbance



Allows better communication of particular animal species



USA

According to the research by the University of Michigan for four American states – Florida, New York, California, and Texas¹:

2,6 dB²

average decrease in the four states that were analysed

New York

experienced the greatest decline in noise pollution (3,1 dB)

~50%

less noise was generated on average during lockdown



Ireland

According to the research on the reduction of noise pollution in 12 areas of Dublin during lockdown compared to pre-lockdown period³:

100%

of monitoring stations recorded the reduction in noise pollution during lockdown

~74%

less times on average when the recorded sound exceeded the threshold of 55 dB

Locations with low pre-lockdown levels of noise pollution

experienced the highest reduction

Source: WHO website; European Environment Agency – COVID-19 and the environment: explore what we know – [2020]; Sustainable cities and society – Investigating changes in noise pollution due to the COVID-19 lockdown: The case of Dublin, Ireland – [2020]; Media overview

18 Notes: (1) Data was gathered by the Apple Hearing Studio; (2) Decibel; (3) Data was collected through monitoring stations

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COVID-19 allowed to conduct quantitative and qualitative assessments of wildlife ecosystems based on wide datasets

Due to reduced human mobility both on land and at sea, the environmental conditions enabled scientists to conduct various researches on human impact on wildlife. The efficiency of such researches could be enhanced by a large number of datasets. There are several initiatives towards pooling the data:



COVID-19 Bio-Logging Initiative

- ▶ Focused on the use of bio-loggers to collect data
- ▶ Developed to assess changes in animals' behaviour
- ▶ Aimed at investigating to what extent current movements of animals are affected by humans



PAN-Environment working group research

- ▶ Planned to evaluate the impact of human mobility on particular ecosystems
- ▶ Integrates broad sets of data gathered by sensor networks
- ▶ Works in collaboration with citizen science initiatives

Limited mobility allowed wildlife ecosystems to experience existence with little or no human assistance. This resulted in the natural optimisation of the animal lifecycle and led to improved conditions for wildlife conservation.

Reduced disturbance of animals due to restricted recreational tourism



Higher rates of reproduction



Research in Florida showed that the rate of loggerhead turtle reproduction increased by 61% due to the beach closures.

Still there are some drawbacks of COVID-19 regarding wildlife



Less workforce to look after endangered species



Higher risk of poaching



Reduced capability to conduct field research

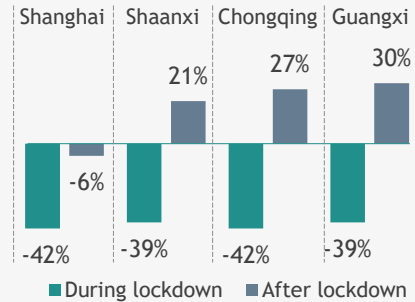
Future perspectives and challenges



Maintaining COVID-19 positive environmental outcomes in the long-term run and minimising the corresponding negative impact will become the key challenge for governments in terms of sustainable environmental growth

Although we can see environmental benefits from COVID-19, they are proved to be short-term if no action is taken

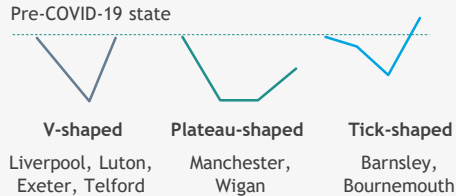
Change in NO₂ pollutant levels in China before vs after lockdown¹



In just 30 days after the lockdown, China's national average NO₂ levels **dropped by 40%**, compared to the same post-holiday period in 2019. However, already in May the pollution **overshoot pre-crisis levels**, even when many economic sectors were still reeling.

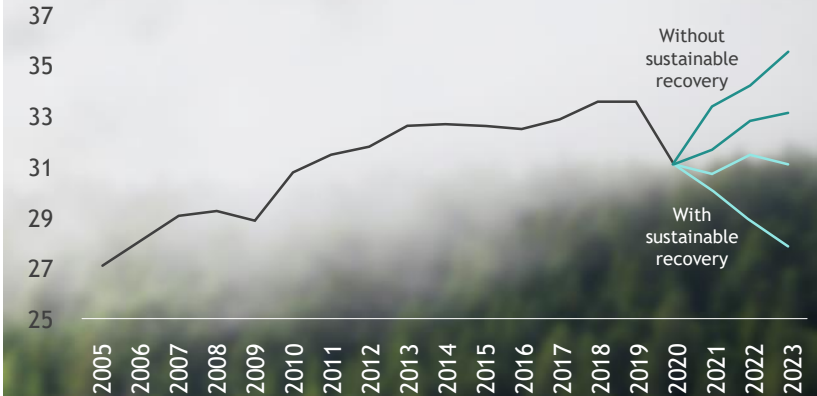
A study by the Centre for Cities shows that in the UK air quality improved dramatically during the lockdown, as NO₂ levels were **reduced by 38%** on average across the 49 cities analysed. However, during the recovery, **39 out of 49 cities** have seen levels **return to or even exceed** pre-pandemic levels.

Types of changes in NO₂ emissions during and after lockdown²



Experience of multiple countries show that, during the recovery, environmental pollution will be back on track reaching its future development curve. It has been proved that the pandemic **does not lessen the need for action** on air quality, as well as water, forests, noise, and **only with proper actions** of the governments and institutions the **sustainable recovery could be achieved**.

Total CO₂ emission trajectories³



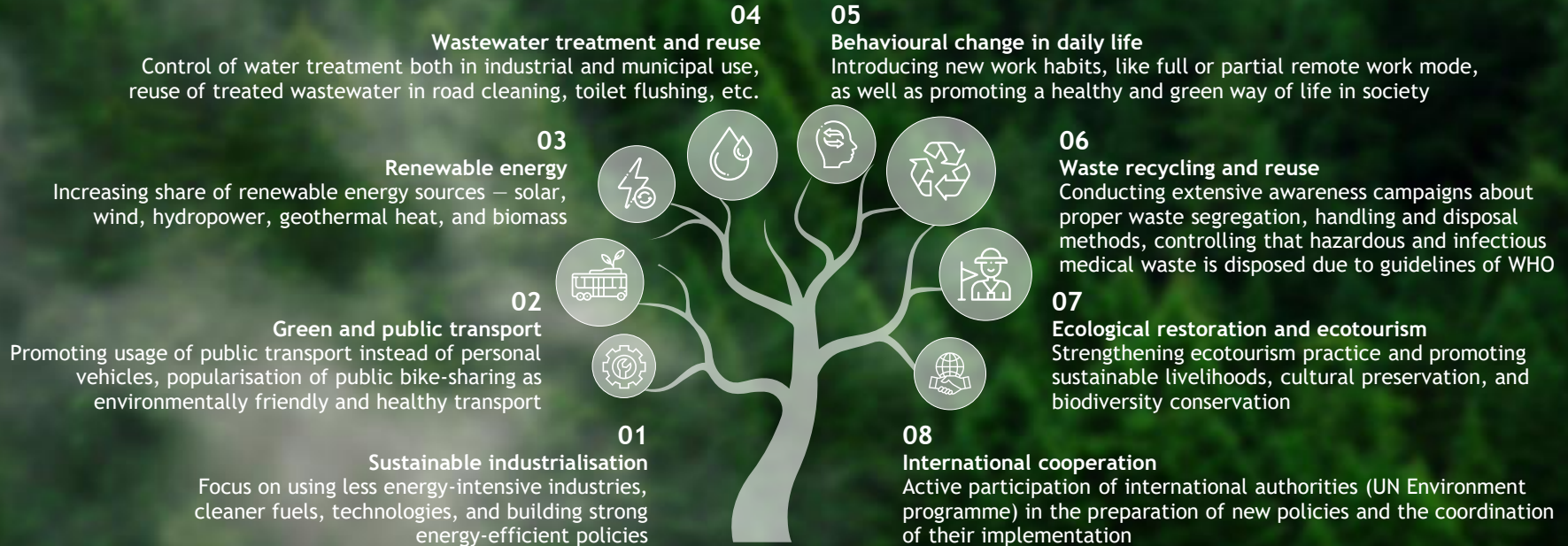
Source: Centre for Cities – How have the Covid pandemic and lockdown affected air quality in cities? – [December 2020]; La Francaise AM – Carbon Impact quarterly report – [October 2020]

Notes: (1) Calculation is based on 30-day averages up to 8 May, year-over-year; (2) Period analysed is January-October 2020;

(3) Figures are in Gigatonne CO₂ equivalent

Proper long-term environmental strategy becomes crucial for countries to retain short-term positive lockdown effects

Possible strategies of sustainable environmental management



A green recovery nowadays is an essential part of returning to sustainable development after the COVID-19 crisis

Regional and national stimulus packages

European Union

750,0 Bn Euro

The 'Next Generation EU' recovery fund will provide **500,0 Bn Euro** in grants and **250,0 Bn Euro** in loans for member states in 2020-2022. **25%** of the fund targets climate action, including **30,0 Bn Euro** to boost the 'Just Transition Fund' for coal-dependent states.



Germany

80,0 Bn Euro

A recovery programme that targets clean energy infrastructure digitalisation and support for green recovery in municipalities such as public transport and cycle paths.



Luxembourg

30.000,0 Euro / household
8.000,0 Euro / electric car

The government helps households make homes more energy-efficient and subsidises the purchase of electric vehicles.



Airlines packages



AIRFRANCE 7,0 Bn Euro

Air France will receive **4,0 Bn Euro** as a bank loan guaranteed from the state and **3,0 Bn Euro** directly from the state to develop a plan for decreasing CO₂ emissions.

United Kingdom

44,5 Bn Euro

The Clean Growth Fund aims to support green start-up companies across the UK to supercharge the development of next-generation clean, low-carbon technologies and achieve net-zero emissions by 2050.

315,0 Bn Euro

A stimulus package for the transport sector to increase safety and provide restoration post-COVID support for trams and buses.



Norway

339,0 Mn Euro

In May 2020, a crisis package was introduced to support green technology projects, including hydrogen, battery technology, offshore wind and low-emission shipping.



Indonesia

2,8 Bn Euro

An investment for SDG Indonesia One platform to drive green growth, one of the first SDG platforms globally. Also, the national Action Plan to reduce plastic pollution was introduced.



Austrian 600,0 Mn Euro

A package is offered on reducing the company's domestic and global CO₂ emissions by **50%** and **30%** respectively by 2030.

Source: The European Commission official website; The UK government website; Air France website; Austrian airlines website; Responses to post-COVID-19 green recovery – [2020];

23 NPAP Indonesia Multistakeholder Action Plan – [April 2020]

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Working from home even one day per week could raise the prospects of long-term emission reduction in the future

Improved air quality not just in large city areas but high-commuting areas such as suburbs as well

Less paper usage, which leads to lower demand and a respective decrease in greenhouse gas emissions

Extra time to make a positive impact on the environment, either via social programmes, which are getting more popular in the post-COVID society, or even in the household

How can remote work improve



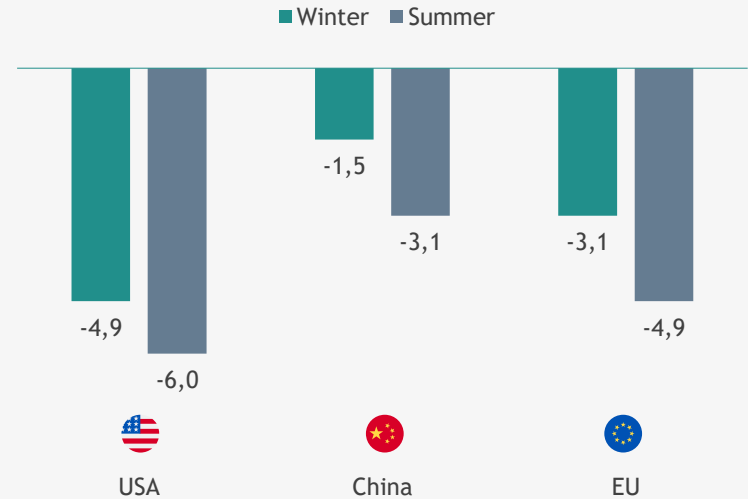
the environment in the post-COVID future?

Global emissions could fall by 24 million MtCO₂¹ a year if everybody able to work from home worldwide did so for just one day a week

Less plastic usage by cooking and brewing coffee at home, drinking water from the tap, etc.

Reduced power consumption as offices consume almost twice as much energy as households

Change in CO₂ emissions for households working from home once a week in 2020²



Actions should be taken by everyone – governments, companies, civil society organisations, and the public

Governments

- ▶ Design COVID-19 economic recovery packages with a **green transition element**, invest in sustainable business models
- ▶ Increase enforcement to **fight illegal wildlife trade**
- ▶ Introduce and enforce legislation and policies to **decrease deforestation**
- ▶ Apply a **One Health approach** – link the health of humans, animals, and the environment **within decision-making** on wildlife and land-use change



Civil society organisations

- ▶ **Support vulnerable communities** affected by the COVID-19 crisis
- ▶ **Work together** with governments and industries to **design sustainable solutions** to decrease illegal wildlife exploitation and transform food systems
- ▶ **Increase accountability** of institutions, governments, and industries **that fail to take environmental action** in the wake of the COVID-19 crisis



Actions
from

Companies and industries

- ▶ Implement and enhance all **voluntary environmental measures** during and after the COVID-19 crisis
- ▶ **Promote sustainable production**, ensure supplier traceability to points of origin
- ▶ **Encourage consumers** to make **sustainable dietary choices**
- ▶ **Support policies** in which production and consumption are **free from deforestation and conversion** of natural ecosystems



The public

- ▶ **Shift personal dietary and consumption habits** to make more sustainable choices
- ▶ **Call on industries** to show leadership by decreasing their negative impacts on society and nature
- ▶ **Interact with government representatives** to ensure that they take action to protect natural ecosystems and strengthen their climate commitments



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nicolai.kiskalt@bdo.de

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