

The Environmental Pollution Following COVID 19

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Abstract:

Over the last 30 years, the pollution of the environment has increased progressively with the growth of the economy worldwide. Polluting substances such as Co₂, So₂, Freon, etc., on one hand, and on the other hand, the clearing of forests increased the greenhouse effect and this led to a gradual increase of the temperature in the world. This has led to extreme phenomena around the globe: fires, floods, extremely strong tornadoes, even the displacement of seasons. There are, however, events that cause pollution to decrease. Such a phenomenon is COVID 19.

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Introduction

Human existence is inextricably tied to the natural environment. Ecosystems like water catchments and river systems, wetlands, soil, forests, oceans, and coral reefs that are in good health provide substantial socio-cultural goods and services as well as economic services at local, national and in many cases, global levels. Healthy ecosystems also provide food and fiber as well as natural medicines and pharmaceuticals. In addition, they provide regulating services such as water purification, flow regulation, erosion control, storm protection, soil fertility, pollination and carbon sequestration.

As the global human population grows to a projected nine billion by 2050 (United Nation 2004, <https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html>) the demand for natural resources will also grow proportionally. This demand will place further strains on the world's terrestrial and aquatic ecosystems to power human development (Millennium Ecosystem Assessment - MEA 2005)². The combined effects of anthropogenic threats including impacts of a changing climate are therefore bound to cause a catastrophe to the diversity of life nurtured by healthy ecosystems. Heavy reliance on fossil fuels for energy to power development and high rates of deforestation are leading to very high levels of greenhouse gases like carbon dioxide (CO₂). The current concentration of atmospheric CO₂ is already at an ecological threshold and this requires drastic actions to be taken immediately (IPCC 4 2007, <https://www.ipcc.ch/assessment-report/ar4/>).

Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land. Many things that are useful to people produce pollution. Cars spew pollutants from their exhaust pipes. Burning coal to create electricity pollutes the air. Industries and homes generate garbage and sewage that can pollute the land and water. Pesticides - chemical poisons used to kill weeds and insects - seep into waterways and harm wildlife³.

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² Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-Being: Wetlands and Water Synthesis. World Resources Institute, Washington, DC.

³ <https://www.nationalgeographic.org/encyclopedia/pollution/>

From smog hanging over cities to smoke inside the home, air pollution poses a major **threat to health** and climate. The combined effects of ambient (outdoor) and household air pollution cause about seven million premature deaths every year, largely as a result of increased mortality from stroke, heart disease, chronic obstructive pulmonary disease, lung cancer and acute respiratory infections. Climate change is happening, it is largely caused by human activities, and it presents a serious threat to nature and people now, and in the future. Without ambitious mitigation efforts, global temperature rise this century could exceed 4 degrees Celsius above pre-industrial levels, with catastrophic impacts⁴.

Climate change and global warming have profound implications. It affects the populations and distributions of species, the composition of ecological communities, and nature's provision of goods and services – such as food, fuel and clean water. Climate change also compounds other major threats to biodiversity, such as invasive alien species, habitat fragmentation and overexploitation.

Climate change is the long-term alteration of temperature and typical weather patterns in a place. Climate change could refer to a particular location or the planet as a whole. Climate change may cause weather patterns to be less predictable. These unexpected weather patterns can make it difficult to maintain and grow crops in regions that rely on farming because expected temperature and rainfall levels can no longer be relied on. Climate change has also been connected with other damaging weather events such as more frequent and more intense hurricanes, floods, downpours, and winter storms, see <https://www.nationalgeographic.org/encyclopedia/climate-change/>.

The Earth's climate is changing. 2001-2010 was the warmest decade on record since 1880 and the decade 1991-2000 was the second warmest (United Nations 2011, <https://news.un.org/en/tags/climate-change/date/2011-01>). From 1906 to 2005, temperature has increased, on average, by 0.74 °C per year. Correlated with this warming we have seen the sea level rise, decreases in snow and ice cover and increased incidence of extreme weather events (IPCC 2007). The Stern Review Report on the Economics of Climate Change reports that by 2050, 200 million people may have been permanently displaced due to rising sea levels, increased floods and drought (Stern 2006). It is estimated that, since the 1970s, climate change has been responsible for over 150,000 deaths each year (McMichael *et al.* 2004).

A 1 °C increase in global temperature could easily double this figure (Patz *et al.* 2005). The principal drivers of climate change are variations in atmospheric concentrations of greenhouse gasses (GHG, including water vapor, carbon dioxide, methane, nitrous oxide, and ozone) and aerosols, as well as changes in land cover and solar radiation, all of which alter the energy balance of the Earth's climate. Terrestrial and marine ecosystems currently sequester carbon, acting as 'sinks'. Changes to atmospheric CO₂ concentrations could shift the global carbon cycle towards annual net emissions, turning these ecosystems into 'sources'. Concentrations of other greenhouse gasses, including CH₄ and N₂O, which have similar effects, have also increased markedly as a result of human activities, see <http://www.birdlife.org/worldwide/programmes/climate-change?>

Exceeding the Earth's ecological threshold will lead to the acceleration of species' extinction and affect human well-being. The world's poor are especially vulnerable to climate-induced rising sea levels, coastal erosion, and frequent storms. Around 14% of the population and 21% of urban dwellers in developing countries live in low-elevation coastal zones that are exposed to these risks. Sixty percent of the world largest urban areas with a population over 5 million are located within 100 km of the coast. This includes 12 out of 16 cities worldwide with populations greater than 10 million. It is therefore imperative for those in position to influence decision making on biodiversity and natural resources management to have access to appropriate information to act in the right way now and in the future.

The cause is a primary policy for exploiting human society. Man is a product in terms of the evolution of the sphere; in which it remains integrated for its existence and is indissolubly linked to what is alive on the planet. Due to the number and especially through the mastery of science and technology, it can transform the environment, adapting it to selling needs - unlimited and uncontrolled practical actions. Thus, from a certain degree, overcrowding gives rise to acute problems of consumption of care, either to the depletion of natural resources or to the production of increasing quantities of waste. Both the capacity to regenerate resources and to assimilate waste - a component of establishing a sustainable part in the socio-ecosystem partnership - must be exceeded and irreversible changes must increase.

Air pollution – the combination of outdoor and indoor particulate matter, and ozone – is a risk factor for many of the leading causes of death including heart disease, stroke, lower respiratory infections, lung cancer, diabetes and chronic obstructive pulmonary disease (COPD).

⁴ World Health Organization, https://www.who.int/health-topics/air-pollution#tab=tab_1

1. Pollution and Health

Air pollution is one of the leading risk factors for death. In low-income countries it tops the list. In 2017, it was responsible for an estimated 5 million deaths globally. That means it contributed to 9% – nearly 1-in-10 – deaths. "We invade tropical forests and other wild environments rich in species of animals and plants, which shelter many unknown viruses. We cut down trees; we kill the animals or lock them in a cage and take them to the markets. We disrupt ecosystems and release viruses from their natural hosts. When that happens, they need a new host - often we become that".

Jones *et al.* (2008) calls infectious diseases transmitted by animals an 'increasingly significant threat to global health, safety and economies.' At least 60% of the 335 diseases that occurred between 1960 and 2004 come from animals. Jones (2008) points out that these diseases transmitted from animals to humans are increasingly connected with human intervention on the natural environment: disturbing virgin forests through logging, mining, building roads in the most remote parts of the world, rapid urbanization. In addition, population growth brings people in closer contact with species of animals that they have never come so close to.

2. What Has COVID Meant for Europe in Terms of Pollution?

Natural processes such as bacterial respiration, lightning and even volcanoes produce NO₂. However, we produce most of it: mostly the burning of fossil fuels in internal combustion engines, but with restrictions on mobility in Europe, these emissions have decreased. In fact, almost any connection with human activity is declining, except for internet traffic.

Henk Eskes, of the Royal Dutch Meteorological Institute, said the weather changes are having a 'big impact on nitrogen levels' in the short term: 'Mediating data over longer periods of time allows us to see more clearly the changes in concentrations due to human activity'.

The coronavirus pandemic has affected the entire planet's population. People live in their house, and all this time the level of nitrogen dioxide concentrations has dropped significantly. The images were captured using the Copernicus Sentinel satellite, which belongs to the European Space Agency (ESA).

With the imposition of quarantine in Europe's largest cities, air transport and road traffic have fallen dramatically. On March 29, located in some of the capitals of Europe: in Barcelona, the level of carbon dioxide in the air decreased by 40% in one week and by 55% compared to last year. In the Spanish capital, carbon dioxide levels fell by up to 56% from one week to the next; in Milan, the concentration of air pollutants decreased by 24%, compared to the data provided in the last two months. Compared to this period last year, the data show a decrease in carbon dioxide concentration by 21%. On April 17, Madrid, Milan and Rome saw a 47% to 49% drop in nitrogen dioxide, but the most surprising was in Paris, which saw a 54% drop. These changes in the level of air pollution coincide with the introduction of stricter quarantine measures to slow the spread of the COVID-19 pandemic, according to dailymail.com.uk.

3. Pollution in the City of Craiova

Pollution affects all living structures. For example, dust reduces the ability of the gas to exchange gas in the respiratory system. A plant with dusty leaves has a reduced gas exchange capacity. Also, the electricity transmission poles are affected, because the charging with powders reduces the insulation performance of the cables.

What do we breathe? Toxic particles, sulphates, nitrates, ammonia, sodium chloride, carbonate and mineral dust. These are powders composed mostly of soot particles resulting from the combustion of car engines, apartment plants, industrial activity, along with dust found on all streets of the city. At the same time, the air in Craiova is poisoned by the pestilential odors emanating from the trash pit, located in the southwestern part of the city.

In the context of more and more ecosystems and natural habitats being disrupted or destroyed globally, an epidemic such as the coronavirus that started in China in December 2019 could only be the beginning: other pandemics could be triggered by intensified human interventions on the environment. An increasing number of researchers believe that the destruction of ecosystems creates favorable conditions for the transmission to humans of dangerous viruses that trigger contagious diseases with potential pandemic or high mortality, such as Ebola and Sars.

The traffic, the dusty streets, the baskets of the apartment plants, the industrial activity, the tropospheric ozone and the garbage pit of the city poison the air of Craiova. This results from the data recorded by the five air monitoring stations of the Dolj Environmental Protection Agency.

"The main source of pollution, change in air quality, remains traffic - traffic emissions, such as nitrogen oxides, sulfur oxides and another pollutant, material dust. The traffic generates powders, which result from

combustion processes, in the form of soot and dust. We, the people of Craiova, are not very thrifty; we do not know how to sweep our streets, to remove dust. They become efficient two or three times, in the sense that the first car passes, lifts it into the atmosphere, then it lays down, the second car passes, the dust is lifted and it lays down again, and so on. It affects us because in the field of pollution, two plus two does not equal four, it equals five or six. It is called a phenomenon of synergism: when two or three pollutants are present, they increase each other's effect', said Bala I., the representative of the Dolj Environmental Protection Agency.

Dolj County has five air quality monitoring stations. They are located as follows: DJ1: Calea București - is a traffic station; DJ2: City Hall, urban background station; DJ3: Billa, mixed industrial and traffic station; DJ4: Ișalnița - industrial station; DJ5: Breasta - regional background station.

'We are at a disadvantage related to dust. Craiova is a plain city; It is not situated in the hilly area so that it could be washed when it rains. At the same time, there are some changes. In the 1970s, there were 100,000 cars in Craiova, now there are maybe five million. We do not have a civilized public transportation system; we do not have bicycle lanes. I saw on the Boulevard River that one of them is overgrown with plants', Bala also explained. He believes that spraying the streets is not a solution. It is good to sweep and vacuum the streets and have a lot of greenery, which limits this phenomenon of dust.

We must not blame only the traffic; there are other sources of pollution, such as industrial activity, which, admittedly, in Craiova has decreased steadily. Years ago, Doljchim was blamed, because of the units on the industrial platforms, which no longer exist, but we have two thermal power plants, in Ișalnița and in Bariera Vâlcii. Specialists from the Agency claim that they no longer cause pollution problems, the burners of thermal power plants are with low nitrogen oxides and both have structures for retaining sulfur oxides, the desulphurization station. The direct emissions coming from the first and second thermal power plants of Craiova are acceptable, but from time to time CE Oltenia accidentally poisons our air, as it happened a month ago. 'During 24.05.2017, there was a leak at the flue gas desulphurization installation at an energy block within SE Ișalnița, which led to the flue gas evacuation on the chimney. During the same day, around 17:00, the problem was remedied, and the desulphurization plant operated under normal conditions', said Zamfir, representative of the Oltenia Energy Complex.

Winter heating sources, respectively apartment boilers, are another pollutant. In Craiova we have tens of thousands of power plants, which fully contribute to increasing the level of toxins.

The danger also comes from the ash deposits, the dumps, from where, when the wind blows, the ash is taken both in Craiova and in the neighboring country area of Mischii. 'Following the freeze-thaw cycle, as it happened this spring, the phenomenon of scattering those powders from the dump and from the slopes appears. When they leave, the vegetation protects itself, but in our country, the vegetation sprouts spontaneously in spring, and then the stepping stage appears, the small plants dry up and this phenomenon of dust entrainment is possible. This year we had several cases in the area of Mischii. In previous years, we also had 40-60 cases. These powders affect people with respiratory sensitivity, growing children or the elderly', explained Bala.

Until the 1990s, odors from landfills were tacitly accepted. Now, with the Eco Sud Landfill, 'we don't have a landfill, we have a mountain of garbage with a bad smell. If those systems worked properly, the effects would be insignificant. I mean every cell is covered, but not in the right way. They should metabolize without air, in an airless fermentation and with the capture of fermentation gases. This was proposed in the operating permit, but now it is not implemented, it will work sometime in the future. Things are delicate because the operator Eco Sud wants to make a profit, but us, the citizens, want lower costs, and we are at the beginning of the discussions. Things have evolved positively, but it is not enough. For example, there are numerous birds on the Eco Sud warehouse. They take it from there, spread on a large area all sorts of debris, and can spread this way all sorts of diseases. In Romania, there is no legislation for odor analysis. The smell is based on a mass transfer from the source to the receiver and is necessary for such measurements by a high-performance installation', concluded Bala, talking about the factors that pollute the air in the city of Craiova.

The health problem is no longer a strictly national one. On the contrary, international transport, freight and passenger flows, high mobility of viruses, toxic gases, radioactive, *etc.* 'globalizes' it and imposes it as a global one, so this problem is put in different terms for underdeveloped and developed countries. For the former, including Romania, ensuring the physical and mental health of the population means, firstly, solving other problems, related to malnutrition, malaria, dysentery, AIDS, *etc.*, and only then dealing with diseases associated with industrialization, excessive development of cities, lifestyle changes, risks, *etc.*

Two separate studies - one focusing on the US and one on the Europe - have found a worrying link between the severity of air pollution in a given area and the risk of dying from COVID-19. In an analysis of 3,080 US counties, researchers at Harvard University found that high levels of tiny dangerous particles in the air, known as PM 2.5, are associated with an increased rate of disease deaths. Health authorities have speculated for several weeks that

there is a link between polluted air and deaths or severe cases of Covid-19, a disease caused by coronavirus. The Harvard analysis is the first nationwide to show a statistical link, revealing a 'large overlap' in deaths caused by Covid-19 and other diseases associated with long-term exposure to suspended dust. 'The results of the study suggest that long-term exposure to air pollution increases the vulnerability to experience the most severe consequences of Covid-19,' the authors wrote.

Ogen (2020) found that another type of air pollution, by nitrogen dioxide, was also linked to higher COVID-19 death rate. He looked at satellite data from Sentinel 5P to map the distribution of nitrogen dioxide across Europe in the months leading up to the pandemic, and charted the number of COVID-19 deaths from 66 regions in Spain, Italy, France and Germany up until March 19, 2020.

Nitrogen dioxide is a gas mainly emitted by cars, trucks, power plants and some industrial plants; its emissions have been dropping quite significantly across the world as COVID-19 has spread, triggering lockdowns. 'Results show that out of the 4,443 fatality cases, 3,487 (78%) were in five regions located in north Italy and central Spain. Additionally, the same five regions show the highest nitrogen dioxide concentrations combined with downwards airflow which prevent an efficient dispersion of air pollution'.

Venice is a place where you can see another effect of reducing industrial activity, highway traffic, but also air and sea traffic. Tourists who came here by the hundreds of thousands in March have disappeared due to anti-epidemic measures, and the waters of the Venetian sea and canals, which are no longer furrowed as usual by cruise ships and gondolas, have cleared.

The industries hardest hit by COVID-19, including commercial aerospace, travel and insurance, may see a slower recovery. Within the travel sector, the shock to immediate demand is estimated to be five-to-six times greater than following the terrorist attacks of September 11, 2001 - though recovery may be quicker for domestic travel. The crisis has also amplified existing challenges or vulnerabilities in the aerospace and automotive industries, which will affect their recovery rates.

As supply chains around the world are disrupted, the report warns that the full impact is yet to be felt. Business leaders must prepare for the effects on production, transport and logistics, and customer demand. These include a slump in demand from consumers leading to inventory 'whiplash', as well as parts and labor shortages due to manufacturing plants shutting or reducing capacity.

Conclusions

In this article, we followed an overview of the pollution during the COVID 19 pandemic. The coronavirus epidemic has drastically reduced human activity in the most affected regions of the world, and with it, pollution has decreased. Also, the pollution in Craiova has decreased. A number of industries that employed people in large groups closed for a period of one month, even two. So is the Ford Company from Craiova. Schools closed, part of the population worked from home, therefore, traffic was significantly reduced, by default, street dust has also decreased. Concentrations of air pollutants, especially nitrogen dioxide concentrations, have fallen sharply in recent days, because of emergency and quarantine measures imposed by the coronavirus pandemic. When some of the restrictions in Romania were lifted, traffic increased, but schools remained closed, part of the population working from home, or entering unemployment or technical leave, traffic-induced pollution did not reach the value before the pandemic. Also, part of the industry in Craiova remained closed, all this made the pollution lower than the values before the pandemic.

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