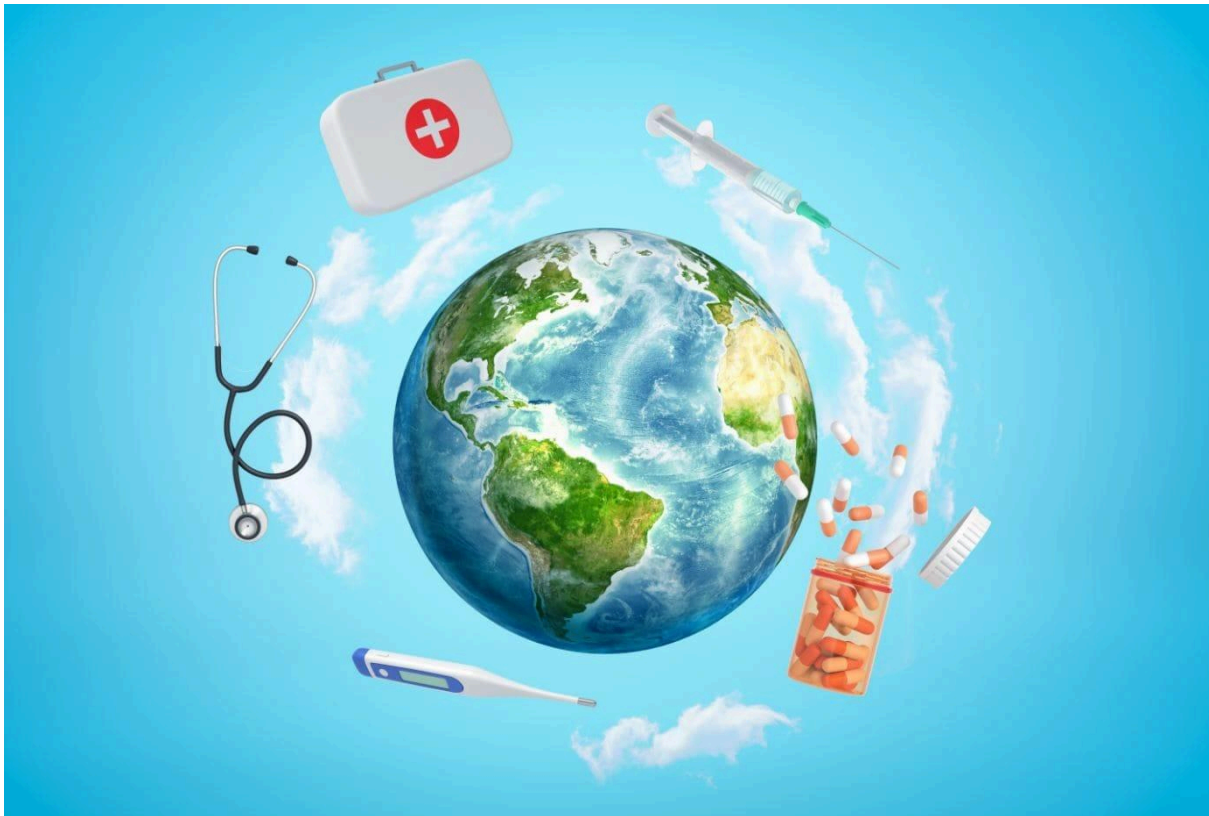


The Effects of Climate Change on Global Health

Climate change is not only threatening the state of our planet, but also the very well-being of humans and the other living organisms who inhabit it

Amirali Banani



The effects of climate change on health is becoming an increasingly serious problem as humanity continues to race against the Climate Clock, scrambling to find solutions that will prevent that clock from striking midnight. According to the World Health Organization, ambient air pollution – a key factor driving climate change – accounts for an estimated **6.7 million premature deaths annually** as a result of stroke, cardiac diseases, acute and chronic respiratory diseases, and lung cancer.

As the Earth warms, events such as heatwaves and extreme storms will become more prevalent, killing thousands, if not millions each year. The warming of the globe can cause intense droughts that result in the deaths of millions of people

as a consequence of dehydration. Water quality will decline, infectious disease outbreaks will increase, and agricultural yields will decrease substantially.

Recently, there have been concerns that global warming is causing new, potentially deadly pathogens to emerge out of Antarctica and the Arctic due to the melting of glaciers, which can obviously pose extremely serious threats to humanity. Why? Because, if they start spreading, these new and unidentified pathogens can potentially result in pandemics much more serious than the current and ongoing COVID-19 pandemic. Issues like these can be extensively debated upon by delegates with the objective of figuring out which solutions can be most effective in diminishing and slowing down the effects of climate change—both on the world and, even more importantly, on the health of humans.

All of these effects are extremely threatening to human health and, whether directly or indirectly, are associated with climate change. Countries around the globe are facing tremendous obstacles that can hinder them from keeping up with climate change, and if world leaders do not take enough action in a short period of time, more and more lives will be lost every year.

Annotated Timeline

1914–1918: During World War I, chemical weapons around the globe—particularly in Europe—precipitated a stark rise in pollution levels. Both this increase in pollution and direct gas attacks lead to an estimated 90,000 casualties. The first large-scale use of poison gas on the battlefield occurred on April 15, 1915, during the Battle of Second Ypres, when German soldiers shocked Allied soldiers along the western front by firing over 150 tons of lethal chlorine gas against two colonial French divisions.

October 1948: Fluoride emissions from the Donora Zinc Works and steel plants owned by the United States Steel Corporation result in the Donora Smog Incident. This incident kills 20 people and causes respiratory problems for 6,000 of the 14,000 people living in Donora, Pennsylvania. The event is commemorated by the Donora Smog Museum, and would eventually become recognized as the worst air pollution disaster in the history of the United States. Additionally, this event is so significant that it leads to the creation of the fields of environmental and public health, draws attention to the need for industrial regulation, and launches a national conversation about the effects of pollution on human health.

1990: President George Bush of the United States amends the Clean Air Act, which constitutes amendments that were designed to curb four major threats to the health of millions of Americans: urban air pollution, toxic air emissions, acid rain, and stratospheric ozone depletion.



These amendments also establish a national operating permits program to make the law more practical and strengthen enforcement to help ensure better compliance. Additionally, the amendments feature several progressive and innovative approaches for effectively achieving the air quality goals and regulatory reform expected from this act.

1995: The signatories of the United Nations Framework Convention on Climate Change gather for the first Conference of the Parties, or COP1, in Berlin,

Germany. The United States pushes back against legally binding targets and timetables, but it joins other parties in agreeing to negotiations to strengthen commitments on limiting greenhouse gasses. The concluding document, known as the Berlin Mandate, lays the groundwork for what becomes the Kyoto Protocol, but it is criticized by environmental activists for not prompting immediate action. It is not until a decade later in February 2005 that binding targets for reducing greenhouse gas emissions finally came into place.

1997: At COP3 in Japan, the conference adopts the Kyoto Protocol. The legally binding treaty requires developed countries to reduce emissions by an average of 5% below 1990 levels and establishes a system to monitor countries' progress. But the protocol does not compel developing countries, including high carbon emitters China and India, to take action. It also creates a carbon market for countries to trade emissions units and encourage sustainable development, a system known as "cap and trade." Countries must now work out the details of implementing and ratifying the protocol.

June-August 2003: Record high temperatures across Europe claim the lives of 30,000 people. The heatwave marks the hottest summer on record in Europe since 1540. Summer temperatures 20–30% higher than the seasonal average are observed over a large portion of the continent, with France experiencing the most severe temperatures. The heat wave leads to serious health crises in several countries and combined with drought to create a crop shortfall in parts of Southern Europe. Most of all, the 2003 European Heat Wave raises concerns over global warming and, in particular, Europe's readiness to battle climate change.

2007: Prior to COP13 in Bali, Indonesia, the UN Intergovernmental Panel on Climate Change (IPCC) releases a new report with its strongest language yet confirming that global warming is "most likely" caused by human activity. This report was revolutionary and serves as a key turning point in our understanding of the factors that drive climate change. During the conference, discussions begin on a stronger successor to the Kyoto Protocol. However, they come to a standstill after the United States objects to a widely backed proposal that calls for all industrialized nations to cut greenhouse gas emissions by a certain amount. United States officials argue that developing countries must also make commitments, and a delegate from Papua New Guinea tells the United States to "get out of the way" if it does not want to lead the international response to climate change. Washington eventually backs down, and the parties adopt the

Bali Action Plan, which establishes the goal of drafting a new climate agreement by 2009.

November—December 2010: The 16th edition of the Conference of the Parties (COP16) is held in Cancun, Mexico. There is increased pressure to reach a consensus in Mexico during COP16 after the failure in Copenhagen at COP25 and NASA's announcement that 2000–2009 was the warmest decade recorded in the history of mankind. Countries commit for the first time to keep global temperature increases below 2°C in the Cancun Agreements. Approximately eighty countries, including China, India, and the United States, as well as the European Union, submit emissions reduction targets and actions, and they agree on stronger mechanisms for monitoring progress on achieving their objectives. The Green Climate Fund, a \$100 billion fund to assist developing countries in mitigating and adapting to climate change, is also established in Incheon, South Korea. The fund is established within the framework for the UNFCCC mainly working to fund initiatives in developing countries to stabilize greenhouse gas concentrations in the atmosphere.

December 2015: One hundred and ninety-six countries agree to what experts call the most significant global climate agreement in history, known as the **Paris Agreement**. Unlike past accords, it requires nearly all countries—both developed and developing—to set emissions reduction goals. However, countries can independently set their own targets and there are no enforcement mechanisms to ensure that they meet them. Under the agreement, countries are required to submit targets known as nationally determined contributions (NDCs).

PARIS CLIMATE AGREEMENT

Historical document that legally binds the whole World to participate in climate change fight.

196 countries

Adopted the Agreement

officially recognizing human influence on climate



Finance

Rich countries will provide minimum of **\$100 billion** to developing ones for climate change adaptation by 2020



Will come into force by 2020

If signed by **55 countries** covering **55%** of global emissions

Goal

Holding the increase in the global average temperature well below

2°C

Pursue efforts to limit the temperature increase to

1.5°C



Climate neutrality 2050

The balance between emissions and sinks should be reached in the second half of XXI century



5 years Ambitious

Every 5 years countries shall revise their emissions reduction targets and measures



Climate damage

For the first time ever the Agreement defines climate loss and damage terms **but** liability and compensation are not mentioned



Clean technologies

The Agreement urges to speed up clean tech development and international technology transfer



Role of forests

The Agreement binds saving and increasing forest area in order to capture GHGs from the atmosphere

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The mission of the Paris Agreement, which came into effect in November 2016, is to keep global temperature rise below 2°C and potentially pursue further efforts to keep it below 1.5°C. However, climate and health analysts argue that much

more action is required, especially by the world's largest economies (and the biggest polluters)—the United States, China, India, and the European Union—to achieve this goal.

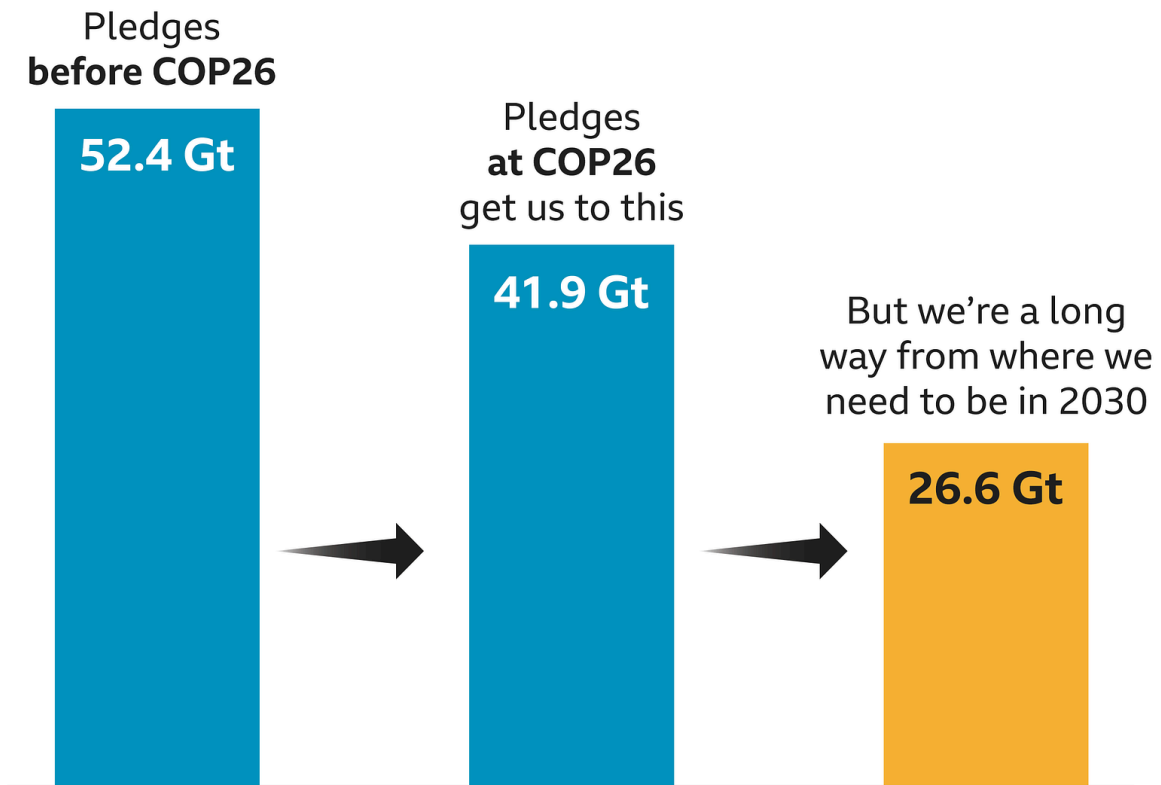
2019: The United Nations Environmental Programme (UNEP) announces the thawing of permafrost, one of the top 10 emerging issues of environmental concern. Permafrost contains trillions of microbes trapped in ice since prehistoric times—most of which are unknown and could potentially be very dangerous—that, if released due to the melting of the permafrost, could pose an extremely serious threat to public health globally. Such potentially deadly pathogens could initiate serious global pandemics several orders of magnitude more serious than the current COVID-19 pandemic. The WHO has warned against such pathogens and there already appears to be some emerging from arctic regions worldwide. At this time, it is also announced that permafrost boundaries in the Arctic have receded northwards by 30 to 80 km—a significant loss in coverage.

2019–2020: The Australia wildfires during the 2019–20 bushfire season came to be known as Black Summer because of its unusual intensity, size, and duration. The fires spanned for a record-breaking 11 months, from June 2019 to May 2020, peaking in January 2020. Aside from the fires' record-breaking size, burning approximately 18,636,079 hectares of forests and wildlife, scientists noted the immense amount of smoke that was circumnavigating the globe. The bushfires destroyed 9,352 buildings—3,500 of which were homes—displacing millions of people. 34 people were directly killed, primarily by fire, while 445 others were killed indirectly, primarily by inhaling highly dense smoke.

October 2021: The COP26 Climate Conference—organized by the United Kingdom and Italy—is held in Glasgow, Scotland. President Alok Sharma mentions that commitments made during the conference to keep the Paris Agreement's goal of limiting warming to 1.5°C are “alive” but have a weak pulse, urging for more intense action to meet the goal. The final agreement, the Glasgow Climate Pact, calls for countries to reduce coal use and fossil fuel subsidies—both of which are firsts for a UN climate agreement—and urges governments to submit more ambitious emissions-reduction targets by the end of the year 2022. In addition, delegates finally establish rules for a global carbon market—which previously failed to be established at COP25 in Madrid in 2019.

Big emissions cuts still needed to limit warming to 1.5C

Projected greenhouse gas emissions in 2030, gigatonnes



Source: Energy Transitions Commission

BBC

Smaller groups of countries make notable side deals on deforestation, methane emissions, coal, clean energy and transport, waste solutions, and more.

However, climate analysts note that even if countries follow through on their pledges for 2030 and beyond, the world's average temperature will still rise to **2.1°C (3.8°F) above pre-industrial levels**, which is beyond the target set out by the Paris Agreement.

Current Situation

Rising Air Pollution Levels

Stark increases in air pollution over the past couple of decades have been linked to an increase in the rates of hundreds of illnesses worldwide. Short-term effects include illnesses such as pneumonia or bronchitis, while long-term

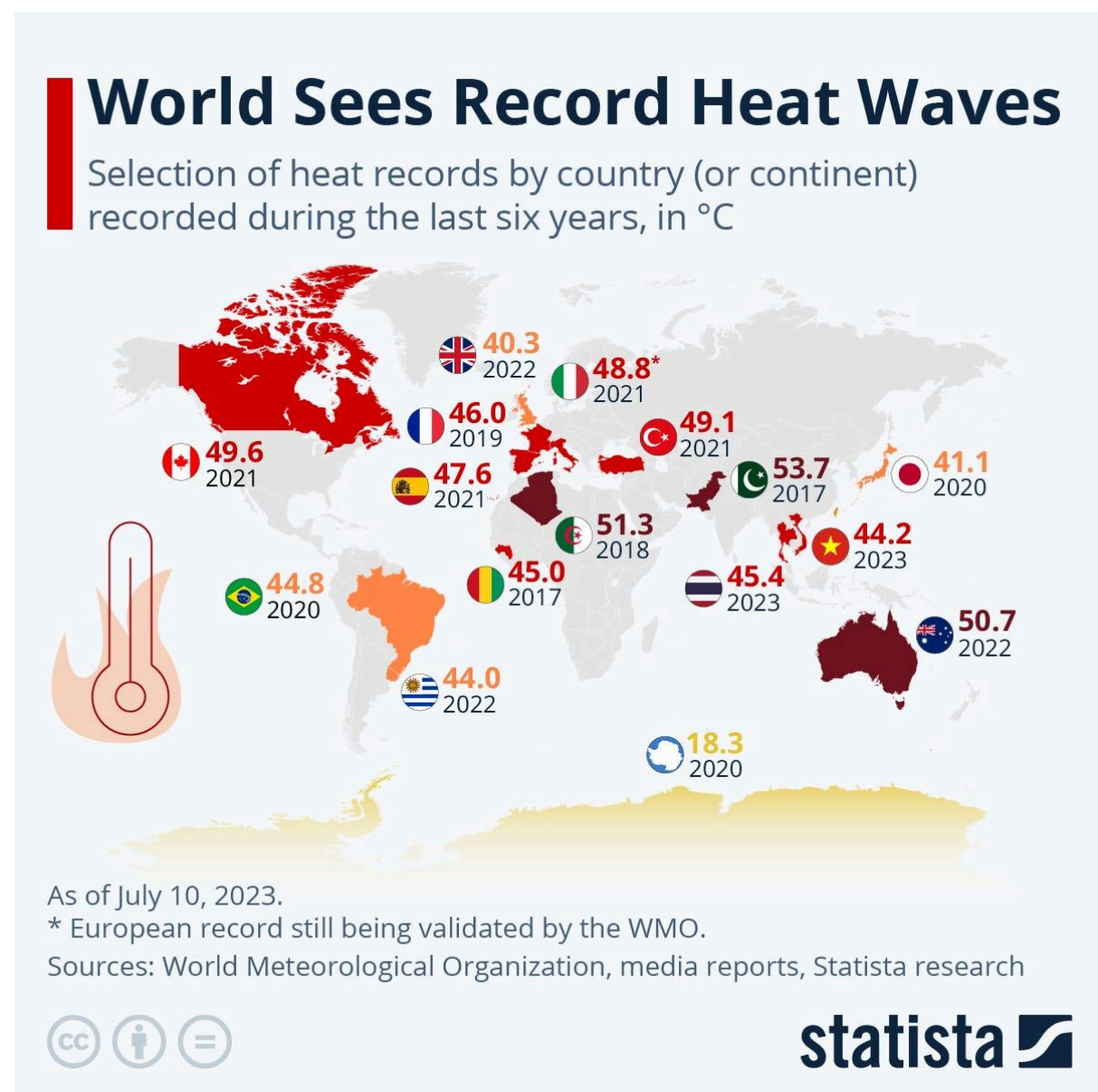
effects of air pollution can last for years or for an entire lifetime, leading to chronic diseases such as heart disease, lung cancer, and respiratory diseases such as emphysema. Air pollution can also cause long-term damage to the brain, kidneys, liver, and other organs, and some scientists suspect air pollutants also cause birth defects.

Nearly **2.5 million** people die worldwide each year from the effects of outdoor or indoor air pollution, and while people generally react differently to different types of air pollution, young children and older adults, whose immune systems tend to be weaker, are often more sensitive to pollution. Existing conditions such as asthma, heart disease, and lung disease can be made much worse by exposure to harmful pollutants in the atmosphere. The length of exposure and the amount and type of pollutants are also factors that can affect a person's physiological reaction to air pollution.

Between 1980 and 2019, air pollution levels increased by 11%, and despite great progress in air quality improvement, approximately **97 million people nationwide lived in counties with dangerous pollution levels in 2020**. This is a year when a major global pandemic struck; when people were forced into isolation and the use of cars and airplanes – two of the greatest sources of pollutants – reduced dramatically. Now, as international travel and society reopen, we are going to face significant consequences from increased emissions unless we take action to make transportation renewable and implement strict restrictions on human litter. According to a recent World Bank publication, air pollution cost the globe an estimated **\$8.1 trillion in 2019**, which is equivalent to **6.1% of the global GDP**. A relatively high proportion of this cost was attributed to treating illnesses caused by air pollution, highlighting the significant need to reduce air pollution levels for the sake of global health.

Unfortunately, **95% of deaths caused by air pollution occur in low-and-middle-income countries**, which highlights a significant disparity between impoverished countries and higher-income countries. There are several factors that contribute to this disparity; among them, minimal renewable energy sources, a lack of laws and regulations surrounding the emission of pollutants, a lack of restrictions on human litter, unsustainable construction, and waste burning. It is no coincidence that so many deaths attributed to air pollution occur in these countries, as air pollution levels are often dangerously high in nations such as India and Bangladesh. The extremely high populations of these countries are very difficult to control when it comes to regulating air pollution, which is another factor that must be taken into consideration.

Collaterally, global temperatures have risen substantially in the past decade, and the main cause for this rise is the increase in atmospheric pollution. The reason for this is the greenhouse effect; as the concentration of pollutants in the atmosphere increases, more and more heat is trapped in the atmosphere, which contributes to the warming of the planet. **A 20-year study has found that extreme heat kills 5 million people a year**—and this number is only rising as temperatures soar. Pollution-induced heat waves with extreme temperatures occurred in many parts of the world in 2021, with Canada, Türkiye, the United States, Morocco, Oman, the United Arab Emirates, Italy, Greece, Taiwan, Tunisia and Dominica all breaking or tying their national highest record, while **107 countries beat their monthly high temperature record**.



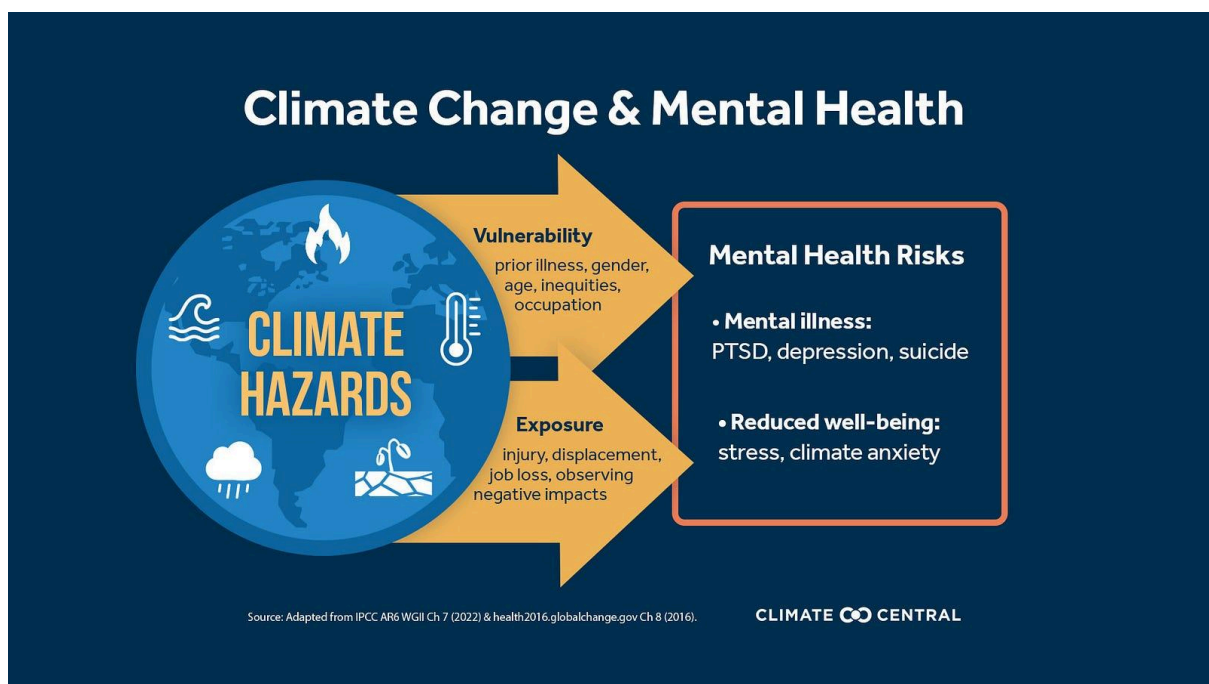
Source: World Meteorological Organization, media reports, Statista research

These are concerning facts, especially considering that it all occurred in just one calendar year. Most of all, however, this shows that air pollution most likely kills many more people than we estimate each year, as a high proportion of these deaths occur by indirect—but air pollution-induced—means.

Toll on Mental Health

The intensification of climate change and related natural disasters is causing a substantial rise in anxiety-related responses as well as chronic and severe mental health disorders. Flooding and prolonged droughts have been associated with elevated levels of anxiety, depression and post-traumatic stress disorders. The trauma and losses from a disaster, such as losing a home or job and being disconnected from the neighbourhood and community, can contribute to depression and anxiety.

Extreme weather events have also been associated with increases in aggressive behavior and domestic violence, and exposure to extreme heat may lead to increased use of alcohol to cope with stress, increases in hospital and emergency room admissions for people with mental health or psychiatric conditions, and an increase in suicide rates. The need for mental health services increases in the aftermath of a climate-related disaster. At the same time, there is often a disruption in services or a decrease in the availability or accessibility of services, which only exacerbates the issue.

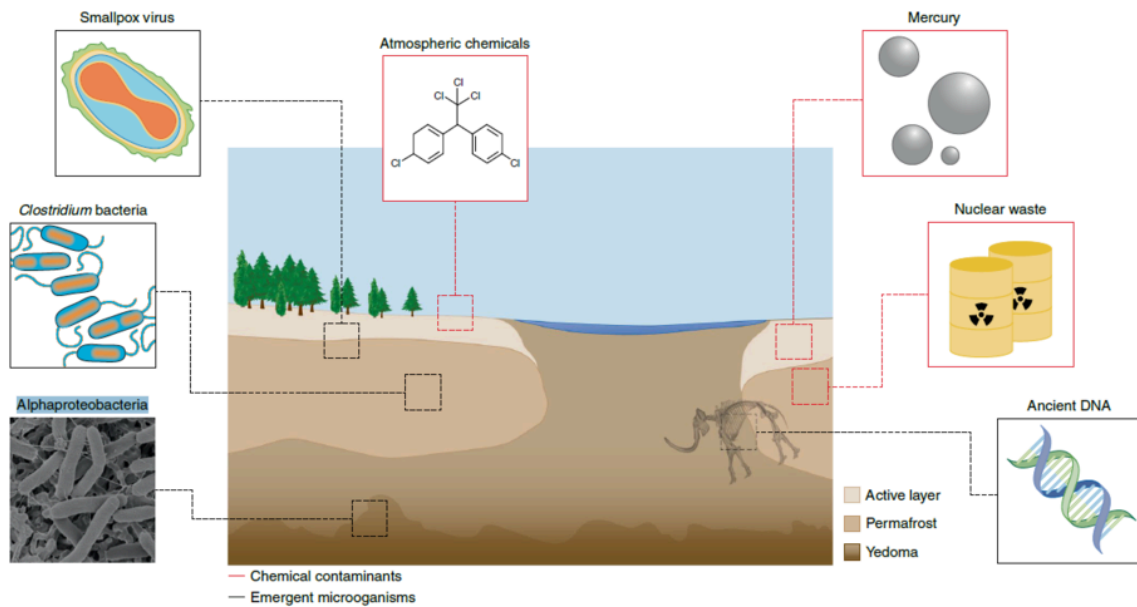


According to data acquired through a global survey performed by Bath University in the United Kingdom in collaboration with five other universities, nearly 60% of young people approached said they felt very **worried or extremely worried**. More than 45% of those questioned said feelings about the climate affected their daily lives. An astonishing 75% of them said they thought the **future was frightening**, with over half (56%) saying that they think **humanity is doomed**. This global survey ultimately illustrates the depth of anxiety many young people are feeling about climate change, and how little feelings of hope exist in this generation. The data demonstrates just how much of a toll climate change takes on the mental health of young people who feel uncertain and rather afraid of the future, and should be a factor for pressure on governments to create a better future for the next generations.

Melting of Permafrost

Evidence of a changing climate can be found everywhere on planet Earth. However, nowhere are the changes more dramatic than in the Arctic. The northern polar region is warming twice as fast as the global average, and the consequences are easy to spot. Arctic sea ice is shrinking significantly every summer, with the Greenland ice sheet becoming unstable and melting into the ocean at an accelerating rate. Many changes in the Arctic are ominous, and some of the most troubling are occurring directly beneath the surface, in the permafrost.

Permafrost is a layer of frozen soil that covers **25% of the Northern Hemisphere**, acting as a giant freezer that keeps microbes, carbon, poisonous mercury, and soil locked in place. As a result of global warming, it is now melting, meaning that long-dormant microbes – some trapped in the ice for tens of thousands of years – are beginning to wake up. These microbes are now releasing equally ancient carbon dioxide into the atmosphere and could potentially come to infect humans with deadly diseases. Thawing permafrost serves as a time bomb: there is more carbon stored in the permafrost than in the atmosphere, meaning that its melting risks accelerating global warming even further.



Permafrost contains deadly viruses and poisonous substances like Mercury that can harm people and the environment if released through melting. | Credit: European Space Agency (ESA)

The UN's Intergovernmental Panel on Climate Change (IPCC) released a 1,000+ page report amassing all the best evidence on how the icy regions of the world and the oceans are threatened by climate change. This extensive report emphasized that, according to trends, permafrost temperatures will continue to rise, painting a grim future—particularly for human health. **Even if the world manages to hit the IPCC target of limiting global warming to 2 degrees Celsius by 2100, around 25% of the permafrost near the surface could be lost**, the report finds. Changes to the permafrost (among other changes in the ocean and cryosphere) “are expected to be irreversible,” the report states. Therefore, the emergence of ancient pathogens that can cause deadly disease in humans is almost inevitable. This is arguably the most concerning climate-related issue for human health.

Possible Solutions

Shifting Towards Renewable Sources for Energy Production

The transition from the use of fossil fuels to clean, renewable sources of energy requires commitment from multiple sectors to achieve. This massive undertaking will not only provide more sustainable methods of energy production, but it will also reduce air pollution levels and global temperatures

significantly. While replacing fossil fuels with mainly wind and solar power is entirely possible by 2030, such a dramatic transformation can not be achieved in the short-term without the full support of policymakers, investors and many other relevant organizations. Wind, solar and hydro power could replace fossil fuels by 2050, but the big question remains: if the world transitioned out of fossil fuels, could we possibly generate the energy needed to power the world on 100% renewable energy?

According to a new study performed by LUT University in Finland and Energy Watch Group, a non profit organization based in Berlin, Germany, **it is feasible**. This nearly five-year-long study simulated a global transition to 100% renewable energy by 2050 across all sectors and demonstrated that a sustainable energy system is substantially more efficient and cost effective than our current energy system. Therefore, not only will renewable energy save hundreds of millions of lives by allowing us to sustain a cleaner and cooler atmosphere, but it will also lead to a more healthy and robust global economy.






Protecting and Conserving Forests

Forests essentially act as cleaners of the atmosphere as they absorb approximately **10 million metric tonnes** of carbon dioxide more from the atmosphere than the amount emitted annually. The vast majority of these forests are trees. Unfortunately and rather shockingly, it is estimated that **15 billion trees are cut down each year**, with the Global Forest Watch project estimating that global tree loss in 2019 was **24 millions hectares**—an area approximately the size of the United Kingdom. Arguably the most severe deforestation has occurred in the Amazon Rainforest, where about **17% of the forest has been destroyed over the past 50 years**, with losses recently on the rise. Amazon Conservation, a non profit organization aiming to conserve the biodiversity of the Amazon basin, reports that destruction **rose by 21% in 2020**—a tremendous loss the size of Israel. With such a vast amount of deforestation occurring annually, combined with increased fossil fuel burning, it is not surprising that carbon dioxide levels have continually been on the rise over the past decade.

There are two actions that we must take to prevent further deforestation and reverse the situation. First, public and private organizations focusing on conservation efforts must work together to ensure that trees are not cut down unrestrictedly and that wildlife is not harmed by logging, placing serious

restrictions on logging practices – particularly in heavily deforested places such as the Amazon. This can be done by consulting with governments to establish legislation that illegalizes logging practices or placing entire bans on cutting down trees in certain areas of the world that are the most vulnerable to tree loss and wildlife damage. Part of this plan would include the development of surveillance infrastructure that monitors illegal activity in forests.

Causes of Deforestation

		
Overpopulation Demands	Logging	Timber Production
		
Agricultural Expansions	Forest Fire	Mining

www.earthreminder.com

Source: Earth Reminder

The second action that must be taken is the planting of trees to compensate for losses caused by deforestation. This is a role that can be taken at both the individual and organizational level, and can virtually be done anywhere in the world with sufficient water, soil, and sunshine. Planting trees is the single easiest task that can be done to restore our planet's carbon dioxide consuming capacity. Not only will planting trees reduce the amount of carbon dioxide in the atmosphere, but it will also result in a slight increase in oxygen levels, which can ultimately result in a lower concentration of greenhouse gases in the air that we breathe. It has been estimated that **by planting 1 trillion trees worldwide, we can capture about 200 gigatonnes (200 billion metric tonnes) of carbon** in the coming decades. Therefore, the evidence of the tremendous efficacy of this

solution is clear. Now it is only a matter of how fast we can attain that goal working against the doomsday clock.

Bloc Positions

Americas

As a global innovation hub, the United States leads the region when it comes to developing new innovations for sustainable energy and transportation, with companies such as Tesla Motors, Solar City, and Beyond Meat calling it home. Such companies are accelerating the world's transition to sustainable energy while reducing the effects of climate change in the Americas region. Coupled with this innovation are non-profit organizations such as the **Caribbean Community Climate Change Centre** that advocate for sustainable development and the preservation of biodiversity by protecting the environment.

Meanwhile, the Brazilian government is aiming to accelerate its timeline to entirely eliminate illegal deforestation in the Amazon Rainforest, seeking zero deforestation by the year 2028. On the other hand, **Canada is investing \$21.9 billion in green infrastructure to reduce greenhouse gas emissions**, ensure safe drinking water and clean air, and promote renewable energy generation. The country, like the United States, is aiming to reach net-zero greenhouse gas emissions by the year 2050 through the **Canadian Net-Zero Emissions Accountability Act**.

Europe

The cap-and-trade program known as the **European Union's Emission Trading Scheme** could play a vital role in fighting global warming. This multinational organization is the largest greenhouse gas emissions trading scheme in the world, and **forms a major pillar of EU energy policy**. It focuses primarily on the proposition of strict environmental policies by governments, the transition to renewable energy production, sustainable transportation, and the reformation of recycling systems throughout the European Union.

Furthermore, the **European Green Deal (EGD)** has been proposed by the European Commission as a mission for **Europe to become the world's first carbon-neutral continent by 2050**. The deal plans to achieve this by advocating for a cleaner environment, more affordable energy, smarter transport, new jobs and an overall better quality of life. The European Commission also promotes

the growth of the market for zero- and low- emissions vehicles – namely, electric and hybrid cars and trucks. In particular, it seeks to ensure that citizens have the proper infrastructure they need to recharge these vehicles both for short and long journeys.

Additionally, from the year 2026, **road transport will be covered by emissions trading, implementing a price on pollution, stimulating cleaner fuel use, and re-investing in clean technologies.** The commission is also proposing carbon pricing for the aviation sector and promoting sustainable aviation fuels – with an obligation for planes to be loaded up with sustainable blended fuels for all departures from airports in the European Union.

To decarbonize the economy through the maritime sector, the Commission proposes to extend carbon pricing to this sector while setting targets for major ports to serve vessels with onshore power, which reduces the overall use of polluting fuels that harm local air quality. With these actions, the European bloc is well on track to achieve its 2050 climate targets while ensuring that the health of its citizens are not compromised as a result of climate change-stimulated events.

Sub-Saharan Africa

While Sub-Saharan Africa has contributed negligibly to climate change, accounting for just about **2-3% of total global emissions**, it stands out disproportionately as the most vulnerable region in the world. According to the Intergovernmental Panel on Climate Change (IPCC) – a United Nations agency which is focussed on advancing our knowledge on human-induced climate change – Sub-Saharan Africa's vulnerability is driven by several factors such as weak adaptive capacity, high dependence on ecosystem goods and services for livelihoods, underdeveloped agricultural production systems, and prevailing low levels of socioeconomic growth in the continent.

Similar to South America, unregulated deforestation is a huge issue in Sub-Saharan Africa. For this reason, institutions such as the Kruger National Park in South Africa, which spends over **\$13.5 million annually on anti-poaching**, have developed some of the most highly-trained and dedicated anti-poaching forces in Africa. This park in particular, for instance, has divided the park into 22 sections, each with its own section ranger and a team of field rangers, using dog tracker packs, helicopters, and other surveillance equipment

to track illegal poaching activity in the park. If such thorough surveillance systems are implemented in parks throughout the region, illegal poaching and even deforestation activities will be significantly reduced. This will in turn result in a more secure food chain and will reduce starvation as well as malnutrition due to a lack of access to food resources caused by climate and human-provoked animal deaths.

Having signed and ratified the Paris Agreement, nearly all African countries have committed to intensifying climate action by reducing their greenhouse gas emissions and building collective resilience. For the continent, especially considering its vulnerability, adaptation to the adverse impacts of climate change is an urgent action that must be taken. The African Union has recently developed the **AU Climate Change and Resilient Development Strategy and Action Plan** to guide, coordinate and support the continent's response to Climate Change for the period 2022–2032. This is a crucial step taken by the region that can accelerate the rate at which it works to achieve its climate targets, working closely with the United Nations Environmental Programme (UNEP) and WHO to ensure that the health of citizens within the region are not compromised as a result of climate-induced extreme weather events and food shortages.

Middle East & North Africa (MENA)

According to a research paper by the International Monetary Fund, climate disasters in the region have injured and displaced an average of seven million people per year, causing more than **2,600 deaths and \$2 billion in physical damage**. If such trends continue, the **MENA region will become virtually uninhabitable by 2050**.

The World Bank Group has proposed the **Roadmap for Climate Action in MENA** which runs from 2021–2025, aiming to accelerate climate action and a green recovery in the region. The roadmap outlines four key transformation areas to build low-carbon, resilient societies.

The first is a climate-smart approach to agriculture and natural resource management in MENA, which is instrumental to achieve food security and preserve biodiversity while ensuring peace and stability.

The second is **decarbonizing** energy and transport sectors through renewable energy sources and clean mobility solutions which can create jobs and **drive economic growth** while **preventing health and environmental risks**.

Third is the development of climate-smart cities and resilient coastal economies through climate-informed urban planning, the strengthening of municipal plans to ensure the continuity of public services, and integrated coastal management which will help improve livability of cities and mitigate risks in the face of increased climate hazards.

Last but not least, the roadmap advocates for unlocking private capital, supporting national budgets and expenditures and strengthening financial institutions for green investments. The MENA Roadmap unites climate action and development, strengthens institutions, overcomes barriers to private sector engagement, fosters regional integration and builds resilient and more inclusive societies, ultimately setting the region on a path towards success.

Asia Pacific & Oceania

The region is investigating implementing taxes on the carbon dioxide released when burning fossil fuels – which can be a highly effective way of reducing emissions – but many Asian countries are reconsidering this solution. Even a gradually introduced and relatively modest **carbon tax of \$25 per ton** would achieve the region's aggregate Paris Agreement target, however Asia's Paris targets, like that of other regions, are well below what is required and models suggest that **\$50–100 per ton of carbon dioxide** is required globally to keep warming **below 2 degrees Centigrade**. According to a global study, abnormally high temperatures are responsible for 2.6 million deaths annually in Asia. Therefore, it is paramount for the region to address rising temperatures more than anything else.

It is not difficult to recognize that what Asia does to fight global warming will literally be felt across the entire planet. Pursuing a green recovery in the aftermath of the COVID-19 pandemic may sound daunting, but it is actually a great opportunity to direct recovery spending into stimulating sustainable jobs and economic growth – surely an opportunity that no nation nor government would want to miss. The near-term extra spending and jobs would strengthen economies, while in the longer-term, Asian economies would become more sustainable and resilient, and could build on their lead in many of the emerging

green technologies—such as nuclear power, biofuels, and green transport (for instance, high-speed, zero-emission bullet trains in Japan).

An organization known as the **Asia Pacific Adaptation Network (APAN)** equips government officials and key players in the energy sector with critical knowledge to design climate change adaptation measures, access financial services and new technologies, and build capacity to integrate climate change adaptation into national development policies. Such organizations have the potential to transform the entire region into a global leader in green technology development and sustainability.

Questions to Consider

1. How might your nation be affected by the effects of climate change?
2. How can your nation benefit from future climate and health agreements?
3. What are some effects of climate change that might be unexpected?
4. Which, if any, solutions are feasible to implement in your country without causing excessive harm?
5. How can we learn from past tragedies to improve responses to future events?

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