

THE SUSTAINABILITY PUZZLE

HOW SYSTEMS THINKING, CIRCULARITY, CLIMATE
ACTION AND SOCIAL TRANSFORMATION CAN IMPROVE
HEALTH, WEALTH AND WELLBEING FOR ALL



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Chapter Two: Environmental Action—Better than Planet B

WE NEED

CLIMATE ACTION

WE ARE DESTROYING THE ECOSYSTEM WE DEPEND ON



BIODIVERSITY LOSS

RISKING OUR FUTURE

SOLUTIONS

STOP BURNING FOSSIL FUELS



REALISE THE POTENTIAL OF CLIMATE ACTION

TO IMPROVE HEALTH, WEALTH + WELLBEING FOR ALL

WHAT YOU CAN DO

- EAT LESS MEAT • TRAVEL LESS • BUY LOCAL
- INSULATE YOUR HOME
- JUST BUY WHAT YOU REALLY NEED
- GET BACK IN TOUCH WITH NATURE

USE YOUR POWER WISELY!
SWITCH TO RENEWABLE ENERGY

TAKE RESPONSIBILITY FOR YOUR EMISSIONS ALONG THE ENTIRE VALUE CHAIN

WHAT ORGANISATIONS CAN DO

WHAT GOVERNMENTS CAN DO

INCENTIVISE GREEN INVESTMENTS

COMMIT TO ACHIEVING CARBON NEUTRALITY GOALS BY 2030

The final minutes of Planet Earth

When Alice was a 12-year-old high school student, her arts teacher announced that the class would work with a young filmmaker to produce a short animated movie. Each student would be working on one scene, producing a sufficient number of drawings for the filmmaker to turn into moving images (before the digital age, this was of course how animated movies were created). And Alice and her peers did their best to keep their pencils steady, drawing as neatly as possible to prevent the pictures from jumping and showing movement where they should not.

In addition to writing the credits and drawing tears on the edges of the letters of “The End”, Alice’s artistic contribution was to draw a scene set in a traditional Viennese coffee house, similar to the one that gave rise to the Optimist Café 30 years later. In it, we see a beautiful coffee house table and chair, complete with a newspaper on a wooden holder and a coffee mug on the table. We hear the usual chatter and clinking of glasses, making for a relaxed atmosphere. All of a sudden, a wave of water starts rushing in; people scream, and the coffee mug and newspaper fall off the table. The chair and table overturn, and eventually the entire scene is flooded. The next scene we see is a park with a bench and a sandpit for children to play. Birds are chirping in the background. And then the same thing happens as in the coffee house, with a wave of water washing everything away.

With these dramatic images, the students focused on the issue of rising sea levels. But not without showing what was driving them. Before zooming into the coffee house and the park, the students took a bigger-picture look at Planet Earth as seen from space. In this segment, a clock starts ticking, and then we see cars, planes and factories polluting the air, and great patches of waste in the ocean. We see temperatures rising, glaciers melting and then devastation as sea levels rise. We see a coastal city being submerged, and underground stations that start to resemble fish tanks. A few humorous scenes of burping fish and birds playing with human debris follow. But eventually the clock strikes 12, and our civilisation on Planet Earth is a thing of the past. This naively drawn but nonetheless chilling short film went on

to be selected for several student film festivals. Its telling title was *The Final Minutes of Planet Earth*.

We have known about climate change for over a century

If regular school kids in the early 1990s knew about and even made an apocalyptic film about global warming, certainly politicians, business leaders and other decision-makers would have known too. And they did. In fact, the way in which global warming functions was first demonstrated in the 1850s, by a women's rights activist named Eunice Foote. In 1856, Foote filled glass cylinders with different gases and tested the effect of sunlight on them. One of the cylinders contained carbon dioxide, and while exposed to the sun, developed considerable heat. Foote's experiment demonstrated that CO₂ and water vapour trap more heat than other gases. This is the basis of what is today known as the greenhouse effect. Foote submitted her findings to an American scientific society, and her paper was discussed among a group of scientists, but she herself gained little recognition—not least because as a woman, she was not allowed to present the findings herself. Foote's contributions remained buried until 2010, when a retired geologist discovered her work.

From what we know today, many of the climate pioneers who followed the path she had shown were male. They include Guy Callendar, who demonstrated even before the second world war that the planet's warming trend was due to human activity. About 20 years later, so over 60 years ago, Charles Keeling set out to collect reliable data on atmospheric CO₂. He did so at the Mauna Loa Observatory in Hawaii, which remains the world's benchmark site for CO₂ measurements. Keeling's data showed that while atmospheric concentrations of CO₂ show seasonal fluctuations, the overall curve keeps rising each year. This is depicted in the famous Keeling Curve.⁵²

You might argue that since these were scientists having little connection with the real world, it is not surprising that climate change has not been widely acknowledged and publicly debated until recently. And indeed, it is

true that changing mainstream debates takes time. However, the public was informed many years ago. For example, a New York Times article from 1956 was headlined: “Warmer Climate on the Earth May Be Due To More Carbon Dioxide in the Air”⁵³. The article’s prediction that four degrees of global warming “would convert the polar regions into tropical deserts and jungles, with tigers roaming about and gaudy parrots squawking in the trees” may not be entirely correct according to the state of today’s science. However, its main messages were correct: that the warming climate is due to increasing carbon dioxide emissions, and that accumulating greenhouse gases in the atmosphere lead to long-term environmental changes. The article also identified the combustion of fossil fuels (coal, oil and gas) as the main culprits, and pointed to the importance of economic incentives in addressing the problem, a topic that could not be more pertinent today. It concluded that, “Coal and oil are still plentiful and cheap in many parts of the world, and there is every reason to believe that both will be consumed by industry so long as it pays to do so.”⁵⁴

Today we are seeing the toll exacted by a development that has been a matter of public knowledge for decades, if not centuries. Evidence of climate change has become so clear, so strong and so widespread that only few sceptics remain. However, action has not yet followed insight.

A safe operating space for Planet Earth

In understanding just how far we can stretch the planet’s limits without risking our collective health, wealth and wellbeing, the idea of planetary boundaries is useful. This concept sets out the safe operating space for human activity on Planet Earth. Developed in 2009, this concept was based on the insight that humans have put so much pressure on the Earth’s operating system that major disruptions at the global level have become possible in the form of abrupt environmental change. It follows that if human activity transgresses one or more of the planetary boundaries, the impact may be catastrophic.⁵⁵

Planetary boundaries exist in nine categories, with many links between them. In addition to climate change, they include stratospheric ozone depletion, ocean acidification, biodiversity loss and extinction, freshwater use, chemical pollution, land system change (eg, the conversion of forests into agricultural land), biogeochemical flows (nitrogen and phosphorus pollution linked to agricultural fertilisers and soil erosion), and atmospheric aerosol loading.⁵⁶ Two of these, namely climate change and biosphere integrity, have been identified as core boundaries, each of which on its own has the potential to drive the planet into a new state should it be “substantially and persistently transgressed”.⁵⁷ At the same time, multiple environmental threats may negatively interact and exacerbate each other, thus creating an overall environmental effect that is worse than the sum of its parts. Rather than steadily decreasing, ecosystem services may become erratic and subject to sudden change.⁵⁸

It is sometimes maintained that environmental pressures decrease as countries develop, because countries have the motivation and ability to prevent or mitigate environmental change. However, there is no scientific basis for this claim. In fact, more development generally means more pollution. A recent study investigating 179 countries found that small reductions in environmental impact could indeed be measured for countries with increasing per-person wealth. However, the idea that the relationship between environmental impact and per capita wealth is non-linear—that is, that environmental impact, after increasing until a certain wealth level is reached, starts falling significantly as per capita wealth increases further—was proven wrong. In fact, increasing wealth is actually the most important driver of factors with negative environmental effects such as forest loss, fertiliser use, carbon emissions or water pollution. The countries with the highest proportional environmental impact include Singapore, South Korea, Thailand, Denmark and the Netherlands. Countries with the least proportional impact include Tajikistan and Djibouti. This indicates that richer countries do not necessarily perform better than poorer countries, but quite the opposite. It also shows that environmental degradation will not take care of itself as global wealth levels increase.

Navigating towards points of no return

Our civilisation is navigating towards a point of no return, towards one or more tipping points. Tipping points are largely unknown thresholds which, if passed, could send Planet Earth into a downward spiral of runaway climate change thanks to a number of feedback mechanisms. For example, ice caps at the Earth's poles play an important cooling role by reflecting some of the sun's rays back into space. However, when sea ice melts, the dark water underneath is revealed. This dark water absorbs more heat than the icy white surfaces, thus causing greater warming and triggering a feedback loop in which higher temperatures lead to further melting of the ice.⁵⁹ The Earth's ecosystem has proven to be resilient, but if it is pushed beyond tipping points, sudden catastrophic shifts may occur, causing collapse. Such shifts may occur locally or regionally, or may alternately occur on a much broader global scale when planetary tipping points are reached.⁶⁰ The question is thus whether our civilisation will collapse, or whether we will somehow manage to prevent this horrific scenario from happening.

Essentially, temperatures on the planet are increasing because carbon dioxide and other greenhouse gases are accumulating in the atmosphere, shifting the balance of energy coming in from the sun and flowing back out into space.⁶¹ To study the causes and consequences of this process, thousands of scientists from across the globe have participated in the UN-chartered Intergovernmental Panel on Climate Change (IPCC). This body has made it clear that while greenhouse-gas emissions are warming the planet overall, they also threaten to produce a rise in sea levels, changes in the ranges and distribution of disease vectors (such as malaria-transmitting mosquitos, for example), and changes in rainfall patterns. The effects will include more droughts, more wildfires and more floods.⁶² An overwhelming consensus has been reached regarding the gravity of the problem. The IPCC predicts that if climate change continues as projected under current or even slightly reduced emissions levels, health risks to humans will increase, particularly due to more intense heat waves and fires, as well as food- and water-borne diseases. It is also clear that any possible positive effects on global health due to climate

change, such as those associated with warmer winters, would be outweighed by the negative effects.⁶³ Those looking forward to warmer climates might lose their enthusiasm when they realise that they may experience extreme weather events instead.

Climate change is not the only issue

As an existential threat to our societies and our civilisation, climate change has dominated the environmental debate in recent years. However, there are also many other environmental changes that put our health, wealth and wellbeing at risk, and thus warrant urgent attention. Like climate change, they are being caused by humans' increasing pressure on Planet Earth, and are generating negative impacts on human health. They include ozone depletion, deforestation, land degradation, the loss of wetlands and biodiversity, the depletion and contamination of freshwater, urbanisation and its related environmental and social effects, and damage to coastal reefs and ecosystems.

These changes pose a risk to our health and wellbeing in three different ways. First, floods, heatwaves, landslides, water shortages and other such calamities may directly put our lives or health at risk. Think, for instance, of the heatwaves that kill thousands of people in European cities each year. Second, health effects due to changes in the ecosystem will become more frequent, for instance in the form of reduced food yields that impact our diet; changes in patterns of infectious disease transmission that make it possible for viruses like the infamous coronavirus to jump more easily from animals to humans; or the mental health effects associated with increased levels of stress due to pollution or the loss of a beloved landscape, for example due to a bushfire. Third, there are more indirect effects related to livelihood loss (eg, due to agricultural output changes), population displacement (eg, due to land being flooded) or violent conflict (eg, over access to limited water sources).⁶⁴ In the Pacific region, governments are buying up land in other countries to be able to resettle their citizens when their own land can no longer support

them. For example, Kiribati has been buying property in Fiji to allow for a managed retreat of its citizens; this may save their lives and possessions, but comes with new issues of identity, migration and culture.⁶⁵

The loss of tree cover is another pressing problem. In 2018, in the tropics alone, about 12 million hectares of tree cover were lost. Put in more palpable terms, this means losing trees enough to cover 30 football fields (one hectare translates into about one and a half football fields) every minute of every day. Every minute, every day. Tree cover loss is due to deforestation by humans as well as to natural disasters like fires and storms.⁶⁶ Among the 12 million hectares lost in 2018 were nearly four million hectares (almost the size of Belgium) of primary rainforest. This is of particular concern given that primary rain forest contains trees that are hundreds or even thousands of years old, and which cannot be replaced.⁶⁷ Overall, and compared to pre-industrial levels, almost one-third of global forest area has already disappeared.⁶⁸ This is devastating for human health, wealth and wellbeing not just because of the lost aesthetic and cultural value, but also because of the many vital services trees deliver, from regulating temperature, clearing the air and storing carbon, to reducing noise, improving soil health, filtering water, and providing food and shelter for humans and other animals.

The biodiversity house of cards

Biodiversity is essential for human health and wellbeing. Imagine a large house of cards. Each species is one card. If you take out just one card, or one species, the entire biodiversity building may crumble, or collapse. The loss of one species may set in motion the loss of other species. There are about eight million animal and plant species on the planet, 5.5 million of which are insect species. Of the eight million species, up to one million are under threat of extinction, many within decades. More than 40% of amphibian species, almost a third of reef-forming corals and sharks and over one-third of marine mammals are currently threatened. This loss of diversity poses a serious risk to global food security by undermining the resilience of many agricultural

systems to threats such as pests, pathogens and climate change.⁶⁹

Pollination by insects such as bees is an important reproductive mechanism for a significant share of the world's most important fruit, vegetable and seed crops, collectively accounting for more than one-third of global food production every year.⁷⁰ Indeed, for three-quarters of food crops, animal pollination is essential. Bees are one of the better-known species that are under threat. It has been clear for some time that bees are dying in large numbers, and that global bee populations are declining overall. This can be attributed to a combination of several factors, including the use of pesticides and declining genetic diversity due to a human preference for 'peaceful' over 'killer' bees (the latter being much more resistant to parasites and disease than the former). Since people love honey and, more importantly, know that we depend on bees for pollination, many projects have today been launched with the aim of saving bees. These range from information campaigns and educational programmes for young children to individuals keeping bees in their gardens, and restaurants or even museums keeping bees on their roofs.

In cases where natural pollinators such as honeybees are no longer available, humans have already been forced to take drastic measures. For instance, desperate apple and pear farmers in China have employed human pollinators. Using cotton swabs, small brushes or thin wooden sticks with a feathery end, these 'human bees' pollinate one flower after another by hand, thus doing the job that bees could be doing for them if the conditions were right.⁷¹ This practice is a testament to human creativity, and has been made possible by low labour costs; however, it may be difficult to sustain on a large scale as wages rise and crop yields decrease. And indeed, while distinctly ironic, the spectacle of modern humans inventing manual labour to accomplish tasks previously performed by animals may not exactly be considered a sign of progress.

The agriculture spiral

Agriculture is a good example of a complex area in which a lack of big-picture thinking can make matters worse over the long term. In order to keep feeding more people who demand more and more meat and other foods, crop productivity must be improved through irrigation and the use of ever more water and fertilisers, and new agricultural land cleared, often by cutting down forests. This leads in turn to soil erosion, biodiversity loss and pollution as the nitrogen and phosphorus from agricultural fertilisers enter the environment, and so on. As a result, the land may become less productive over time, and the crops it yields may become polluted by fertilisers.

Soil is where almost all (90%) of our food is grown. Yet we often forget that it is a non-renewable resource, at least over human timescales. Soil degradation, which causes substantial reductions in agricultural productivity, is a real problem, with several millions of hectares of agricultural land lost every year, the equivalent of several million football fields. This in turn means that much less food can be grown; those millions of football fields rendered unproductive due to soil degradation correspond to a loss of several million tonnes of grain every year.⁷²

Rising temperatures also affect food crops, leading to decreasing crop yields at a time of growing food demand. The impact of this is likely to be felt most strongly in Sub-Saharan Africa and South Asia. There, according to forecasts, the effects of climate change will increase stunting (that is, impairments in children's growth and development) respectively by about one-quarter (23%) and two-thirds (63%).⁷³

While the quantity and quality of available food is insufficient in some regions, other parts of the world are simply throwing away a full one-third of the food that is produced globally.⁷⁴ In high-income countries, we waste between 124kg and 154kg of food a person a year.⁷⁵ We thus destroy immense material value (amounting to 10% to 25% of households' food expenditures)⁷⁶. This also means that the resources, biodiversity loss, water use and greenhouse-gas emissions going into the production and transportation of this food were simply wasted.

Food happens to be the single strongest lever by which to optimise human health and environmental sustainability on Earth.⁷⁷ For instance, the Planetary Health Diet, as a big-picture approach that allows us to solve several issues at the same time, is an excellent example of systems thinking. It aims to maximise people's health and wellbeing by ensuring that what they eat is both healthy and minimises environmental degradation and climate change. Symbolically represented on a plate, it consists of half a plate of fruits and vegetables, with the other half composed of whole grains, plant proteins (lentils, beans, nuts, etc.), unsaturated plant oils, and modest amounts of meat, dairy, sugars and starchy vegetables.⁷⁸ Eating lots of plant-based foods and fewer animal-sourced foods not only benefits human health, but also helps achieve the goals set out in the Paris agreement. Certainly, in order to reach these goals, we will need a drastic shift in diets, major improvements in food production systems, and drastic reductions in food waste and loss.

No life without water

Water is not called the essence of life for nothing. We are absolutely dependent on this precious resource. However, fresh water makes up only a small fraction of all the water that is in theory available on the planet. While 70% of the world is covered by water, less than 3% of it is fresh water (the remainder being salt water). Moreover, less than 1% of this fresh water is easily accessible, as much of it is trapped in glaciers or snowfields. This means that only 0.007% of the world's total water is actually available to fuel and feed billions of people.⁷⁹ The global distribution of fresh water is far from equal. In some countries, such as mountainous Austria, high-quality water is abundantly available. In Vienna, Austria's capital, people are proud not only of their musical and coffee house traditions, but perhaps even more so of the high-quality tap water they get to enjoy pretty much for free. For the last 150 years, this superbly clean water has been piped into the city directly from a mountain spring.

Not every country is this lucky in terms of having access to an abundant

water supply. Yet every person in every country needs water to drink, wash, clean and grow food. Globally, 2.1 billion people lack safely managed drinking water. This means that close to one-third of the world's population does not have access in their home to a safe and reliable source of drinking water that is free from faeces and at least the most dangerous chemicals. Fully 159 million people still drink water from rivers, streams, ponds or canals.⁸⁰ As a result, unsafe drinking water and improper sanitation number among the top five health risks worldwide.⁸¹

While water is a renewable resource, it is still finite. Consequently, where water demand exceeds supply, there is water scarcity. Water scarcity has become a frequent occurrence: two billion people live in countries experiencing high levels of 'water stress', half a billion people face severe water scarcity all year round, and almost two-thirds of the world's population experiences severe water scarcity during at least one month of the year.⁸² Industry cannot function without enormous amounts of water. For example, it takes 2,700 litres of clean, fresh water to produce a single cotton T-shirt, and 10,800 litres to make a pair of jeans (both of which are likely to end up in landfill after just a few wears, or much earlier if they remain unsold). And even making just a single cotton bud requires 3.6 litres of water,⁸³ probably more than you drink in one day.

Most of the planet's water supply is used by agriculture, which accounts for 70% of global fresh water withdrawals, and over 90% of consumption.⁸⁴ Simply put, the links between food, water and energy are as follows: the world is hungry, and the demands on food production have been increasing exponentially. Between now and 2050 we will need to produce more food than we have in the past 8,000 years combined, or since the beginnings of agriculture. Water is essential to grow this food. In addition, water is needed to grow crops for biofuel. Water is also essential for cooling power plants. Every year, the world uses 580 billion cubic metres of water, enough to fill more than 200 million Olympic-sized swimming pools, just for energy-production purposes. Energy, on the other hand, is needed to treat water and to transport food. Producing one steak takes about 5,000 litres of water,⁸⁵ a process which involves 35 times more energy than the energy you get out

of it when enjoying it.⁸⁶ In a nutshell, these links and complex interactions mean that we must become much more efficient, producing more while at the same time using fewer resources to do so.

Given these figures, it is hardly surprising that some say water may be replacing oil as a key source of conflict. So-called water wars are another grave consequence of water scarcity, with obvious negative implications for human health and wellbeing. Moreover, severe water scarcity could lead to mass migration, displacing up to 700 million people worldwide by 2030.⁸⁷ To be sure, water wars are not a new phenomenon; violent conflict related to the management and use of water can be traced at least back to 3000 BC.⁸⁸ This includes 176 examples of water, or induced water scarcity, having been used as a weapon of war. In most cases, water scarcity per se has not been the only trigger for violent conflict. However, tensions over fresh water management and use, both within and between countries, have the potential to exacerbate existing issues, increase regional instability and cause social unrest. Tensions of this kind are becoming more common due to the combined pressures of population growth, environmental degradation and climate change, increasing the likelihood of violent conflict around water, or, as some scientists put it, “hydro-political interaction”.⁸⁹

Given these risks, it seems clear that it is in our own self-interest both to use less water and to distribute it more fairly. Moreover, there is great potential to improve our health, wealth and wellbeing by investing in sanitary systems and wastewater treatment systems to reduce pollution levels in the water we use.

Political commitment is growing

What does the young couple kissing with their hands glued to the inside of a shop window of a Zara store in Madrid⁹⁰ have in common with the 400 people pouring hundreds of litres of fake blood into the road outside London’s Downing Street,⁹¹ where the UK prime minister resides? And what does this have to do with Zurich’s Limmat River turning a luminous

green,⁹² or the lawn of Cambridge University's prestigious Trinity College being dug up and mud 'deposited' to the local Barclays Bank branch?⁹³ Well, their uniting feature is that these were all actions performed by climate activists associated with the Extinction Rebellion movement. While the lovers in Madrid were drawing attention to our society's love affair with and dependence on unsustainable fast fashion, the fake blood spilt in London stood for the many children dying from the effects of climate change. In Zurich, the activists—some of whom floated motionlessly in the bright green water—wanted to draw attention to the toxic economic system and impending ecosystem collapse, while the young people in Cambridge were highlighting the hypocrisy of institutions committing to climate action in public while continuing to invest in fossil fuels.

Much has changed since Alice and her classmates made that film on climate change in the early 1990s. While mass protests at that time were centred on closing the hole in the ozone layer or stopping nuclear energy projects, climate change is the main focus for today's environmental activists. Today's science has provided an abundance of data on a broad range of aspects of global warming and other environmental issues. This has made it hard for climate-change deniers to remain sceptical, at least in the public sphere. The quality and abundance of this evidence has bolstered activism and helped boost the debates to higher levels, and a number of important political commitments have been made as a result. Two global agreements are particularly important in this regard: the UN-led Agenda 2030, with its 17 SDGs, and the Paris agreement on climate change.

In the Paris agreement, signatory countries committed to combating climate change, and to accelerating and intensifying the actions and investments needed to achieve a sustainable low-carbon future.⁹⁴ The Paris agreement built on a UN Framework Convention on Climate Change that dates back to 1994, and which was focused on preventing dangerous human interference with the climate system. At that time, climate science was far less developed than it is today; but given the importance of the issue, it was noted that countries needed to work together in the interests of human safety, even in the face of scientific uncertainty.⁹⁵ The Convention was rather

revolutionary in aligning all countries under the common goal of fighting climate change; while participants committed themselves to the development of adaptation programmes, the industrialised countries were also persuaded to offer support to developing countries in their efforts, thus putting the onus on developed countries to lead the way.⁹⁶ Several other milestones followed, including the Kyoto protocol, which operationalised countries' commitments under the Convention. However, the Paris agreement's most celebrated outcome was the setting of clear targets. Signatories this time around agreed to keep global temperature increases this century at well below 2C as compared to pre-industrial levels, and to make serious efforts to limit the temperature increase to 1.5C.⁹⁷ In addition, they committed to achieving climate neutrality (that is, the state of having no net effect on the climate, for instance by drastically reducing greenhouse-gas emissions and offsetting or removing the remaining emissions from the atmosphere) by the second half of this century.

The European Union has taken a leadership role in this process. Its Green Deal is a wide-ranging programme designed to accelerate a sustainable environmental transformation, with the aim of achieving climate neutrality in Europe by 2050. Some countries such as Austria and Finland have set their goals even higher, aiming to become climate neutral by 2040 or before.⁹⁸ Importantly, Europe's Green Deal is framed as a growth strategy that will ensure progress in the social and economic spheres as well as the environmental arena. And indeed, the European Union has already been successful in decoupling economic growth from carbon emissions; since 1990, it has achieved a 23% reduction in greenhouse-gas emissions, with GDP growing by 60% over the same period⁹⁹ (a pre-coronavirus figure).

While this is an enormous step forward, there is still much room for improvement in order to get the continent on track to achieving climate neutrality. Having great policies and plans is an essential first step, but it is not a sufficient condition for ensuring progress and positive impact. The real challenges often come when policies must be implemented by politicians motivated by competing priorities, changing electorates and sometimes a misguided self-interest.

Civil society activism remains an essential tool in reminding political leaders of their commitments and responsibilities. In recent years, youth activists have managed to keep sustainability high on the political agenda, while also engaging regular citizens on the issue of global warming. Movements such as Fridays for Future and Extinction Rebellion, and popular heroines like the young Swedish activist Greta Thunberg, have rallied concerned citizens behind their cause. In their campaigns, they have used road blocks, school strikes, fashion shows and other so-called actions to get their message across. They have reproached politicians and business leaders for not taking action, for sacrificing the future. They feel that nothing short of rebellion and even revolution is necessary to get the world to act. “Your house is on fire” is a sentence we have been hearing with increasing frequency. On a rational level, many of us know and understand this. But somehow, we don’t act like it. So why is it that we have not taken action that is commensurate to the problem at hand? The danger is nothing less than the potential collapse of our civilisation. Certainly, without a healthy environment, we cannot lead healthy and happy lives.

Climate porn and apocalypse fatigue: Reasons for inaction

As demonstrated by the film *Alice* made in high school 30 years ago, we have known about climate change and other environmental issues for decades. Yet many of us have yet to grasp a simple fact: the planet itself doesn’t need saving, we need to protect the planet in order to save ourselves. Science has taken great leaps forward, as has political commitment. Many people, though not all, have woken up to the dangers of climate change. Many realise it is a real threat to living a good life on this planet, and even to the very continuation of our species. Some people even suffer from climate anxiety, essentially a chronic fear of the effects of climate change and of environmental doom more broadly. Climate anxiety can have a serious effect on people’s mental health and wellbeing, leaving them feeling powerless.

However, despite this rational and emotional upheaval, concrete action by business leaders, politicians and citizens to address the climate and biodiversity crisis has been insufficient, fragmented and half-hearted. Worse, some have used the pandemic or other excuses to undo critical environmental regulations; the Trump administration in the United States, for example, rolled back more than 100 environmental rules and pulled out of the Paris climate agreement.¹⁰⁰ And even though one of Joe Biden's first moves after taking over the US presidency was to rejoin the Paris agreement, not all that much has actually changed in practice, at least on a scale proportionate to what's at stake.

And there is the crux of the matter. Media reports and the public debate have focused on doom-and-gloom scenarios rather than on opportunities, making climate action appear far less attractive than it actually is. In large part due to this continually negative framing of the issue, most people feel that reducing climate emissions necessarily means sacrifice, hardship and economic loss. While doom-and-gloom messages have a certain attention-grabbing effect, we generally dislike being confronted with scary messages and apocalyptic images. We're tired of hearing about melting glaciers, dying polar bears, hurricanes in America, droughts in Africa, heatwaves in Europe, bushfires in Australia and flooding in Asia. And as we are increasingly saturated with images of devastation, we grow desensitised, needing more and stronger stuff to really shake us up. We may indulge in climate and collapse porn from time to time, but we essentially suffer from apocalypse fatigue.¹⁰¹ We're more than happy to let ourselves be distracted by what seem like more immediate concerns, such as purchasing the latest gadget or getting sufficient reactions on social media.

Another reason for our collective inaction is our individual feeling of powerlessness given the scale and complexity of the issues at stake. We feel that by changing our own actions, by switching from private to public transport, by eating less meat or by using less energy, we cannot make much of a difference. Related to this is the tragedy-of-the-commons problem, the fact that some people, seeing others continuing to eat meat and drive big cars, find it difficult to renounce such perceived pleasures in their own lives.

And let's face it: the complexity of climate change and other environmental issues is often overwhelming. We may understand one or more aspects, but we are all essentially silo thinkers, focusing on a narrow set of interests and sectoral expertise.

The fossil fuel lobby too has played an outsized role in keeping us from taking climate action. For decades, deliberate misinformation of the public has been their stock-in-trade. Since outright denial of climate change has become much harder given the overwhelming evidence, they have turned to emphasising the negative aspects of climate action. Their money and power, used to highlight the downsides of climate action, exaggerate its costs and argue the impossibility of a fossil-fuel-free future, have gone a long way towards keeping politicians, businesses and citizens in the dark about the many benefits and positive aspects of addressing climate change.

The degree to which these power structures are deeply entrenched in our economy has facilitated these campaigns. Very real economic interests—extending well beyond fossil fuel industry—have consolidated themselves over many decades, and today prevent us from doing things differently. Dislodging or transforming any system that has (ostensibly) worked well for centuries is naturally difficult. However, as oil companies have realised that the days of conventional business models are numbered, even they are starting to invest in more future-proof sectors, such as alternative energy and electric mobility. As Andrew Revkin said, our species may be in a “turbulent transition from adolescence to adulthood, resisting admonitions to grow up”. In this analogy, fossil fuels stand in for the surging testosterone of a boy's teenaged years.¹⁰²

The future is already here

For the reasons discussed above, many of us feel that climate change and its effects remain far away, both in time and geographically. We trust that technological progress will sort us out. We think that climate change is a concern for the future, rather than something affecting us right here, right now. We may have a guilty conscience when we think about the future of our

children and grandchildren, but we do not see the immediacy of the issue. We believe that it is somehow possible to continue business as usual, while also sorting out the environmental mess we have gotten ourselves into. But we could not be more wrong.

True, some of the more striking effects of climate change, such as rising seas flooding into New York's Wall Street or London's House of Parliament, will become a reality only towards the end of the century—preventable only if we move to a trajectory that is significantly better than business as usual. However, temperature has already risen globally by more than 1C compared to pre-industrial levels. In many places, including in Europe, temperatures have already increased by two degrees or more.¹⁰³ Around the world, we are already experiencing more pronounced heatwaves as well as more frequent storms, floods and landslides. Many of these so-called catastrophic events are caused by climate change.¹⁰⁴

Geographical distance also plays a role here. Most of us do not live by the sea, so the fate of those forced to leave their homes and villages due to rising sea levels in Asia seems far away. We see hurricanes in the United States and thank God that they are less common in Europe, for example. We see droughts in Africa and think they do not concern us. We follow wildfires, such as the ones that choked major Australian cities including Sydney and Melbourne with dust and smoke during the 'black summer' of 2019-2020, and cross our fingers that these events will stay far away from us. And we often fail to make the link with climate change, let alone with the human actions that cause it.

Yet in these cases too, the comfort provided by distance may be illusory at best. For example, as much as 40% of people around the world do in fact live in coastal zones, or within 100km of the coast.¹⁰⁵ For such people, this may make the issue of rising sea levels, for example, much more immediate.

Pricing the future: Climate action can be profitable

Technically speaking, the solutions are pretty clear. We need to produce and consume less. We need to keep fossil fuels in the ground, and replace them with clean sources of energy. We must eat fewer meat and dairy products, and we need to invest in energy efficiency and technologies to limit carbon emissions. Sadly, there is very little we can do to arrest the rising sea levels. Too much damage has already been done, and even if we pull all possible levers to get global warming below the globally agreed 2C threshold, or even below the 1.5C line we aspire to, sea levels will still have risen by about a metre by the end of this century. To prevent sea level rise, we would have needed to take serious action several decades ago, at the time when Alice and her classmates made that movie.

The good news is that preventing the worst forms of climate change is entirely possible. However, we need to adopt the right mindset and face complexity head-on, while also uncovering and overcoming entrenched power structures. Addressing environmental change and global warming comes with many positive side effects; for instance, it contributes to better health, happiness and wellbeing right now as well as in the future. It also makes economic sense. In other words, it is possible to create triple wins for people, the planet and profits. We can call this ‘multisolving’—that is, addressing many of our era’s most pressing global issues at the same time as we tackle climate change. For example, preventing global warming means preventing old diseases from spreading and new ones from emerging. It means reducing poverty and inequality, and thereby contributing to economic progress and reducing the population growth rate.

One key to success lies in ensuring that everyone understands that nature is the true engine of our economy, one we cannot do without. A second key rests in the application of true-cost thinking and true-cost pricing. Yet as long as kerosene and marine diesel fuels are tax-free, as long as drivers continue to avoid paying the full cost of the infrastructure and space they use and the societal damage they are responsible for, this goal has not yet been achieved.

At the same time, we must understand that climate action can actually be

profitable. Responding to the coronavirus pandemic has come with enormous costs to the economy and society. Fighting climate change also entails costs, at least initially. In the medium term, however, such action will actually save us money. Not acting will actually be more costly than acting now. Air pollution already costs economies more than USD 200 billion annually in lost labour income. Yet this is rarely factored into economic and political calculations. Moreover, 6.5% of global GDP is spent on subsidising dirty fossil fuels¹⁰⁶ whose effects contribute to early deaths and add financial strain to overstretched public health systems. Redirecting this USD 370 billion in subsidies towards investments in clean energy would benefit the environment and human health alike.¹⁰⁷ In a nutshell, the climate investments needed to keep global warming within the 1.5C limit would actually pay for themselves, with even the health-cost savings related solely to air pollution reductions more than offsetting them.¹⁰⁸

It is not just society that benefits from a greener economy. Businesses can benefit too, including those in the energy sector. Take the example of Danish company Ørsted (formerly DONG Energy), which until 2008 made its money mainly from fossil fuels including coal, oil and gas, and was responsible for half of Denmark's CO₂ emissions.¹⁰⁹ Around the time of the 2008 financial crisis, Ørsted was facing declines in the company's fossil fuel businesses, presenting a real risk to its future profitability. The company consequently decided to transform itself, and did so very successfully.¹¹⁰ Since that time, it has undergone a remarkable transition, shifting its focus to renewable energies. In 2016, it went public with the largest-ever IPO in Denmark and the second-largest in the world that year. In 2017, it sold its upstream oil and gas business, concluding its strategic transformation. It today develops, constructs and operates offshore wind farms, bioenergy plants and waste-to-energy solutions, and additionally provides customers with smart energy products.¹¹¹

Yet more work remains ahead; by 2023, the company has committed to a 96% reduction in its greenhouse-gas emissions from energy production vis-à-vis a 2006 baseline, and by 2032, expects to halve its carbon emissions from energy trading and supply-chain activities as compared with 2018. If

everything goes according to plan, the company will thus achieve carbon neutrality by 2040, fully 10 years ahead of the global target.¹¹² The Ørsted example shows that ambitious and rapid decarbonisation is possible, and that it can be done profitably. Other oil and gas giants should take notice.

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