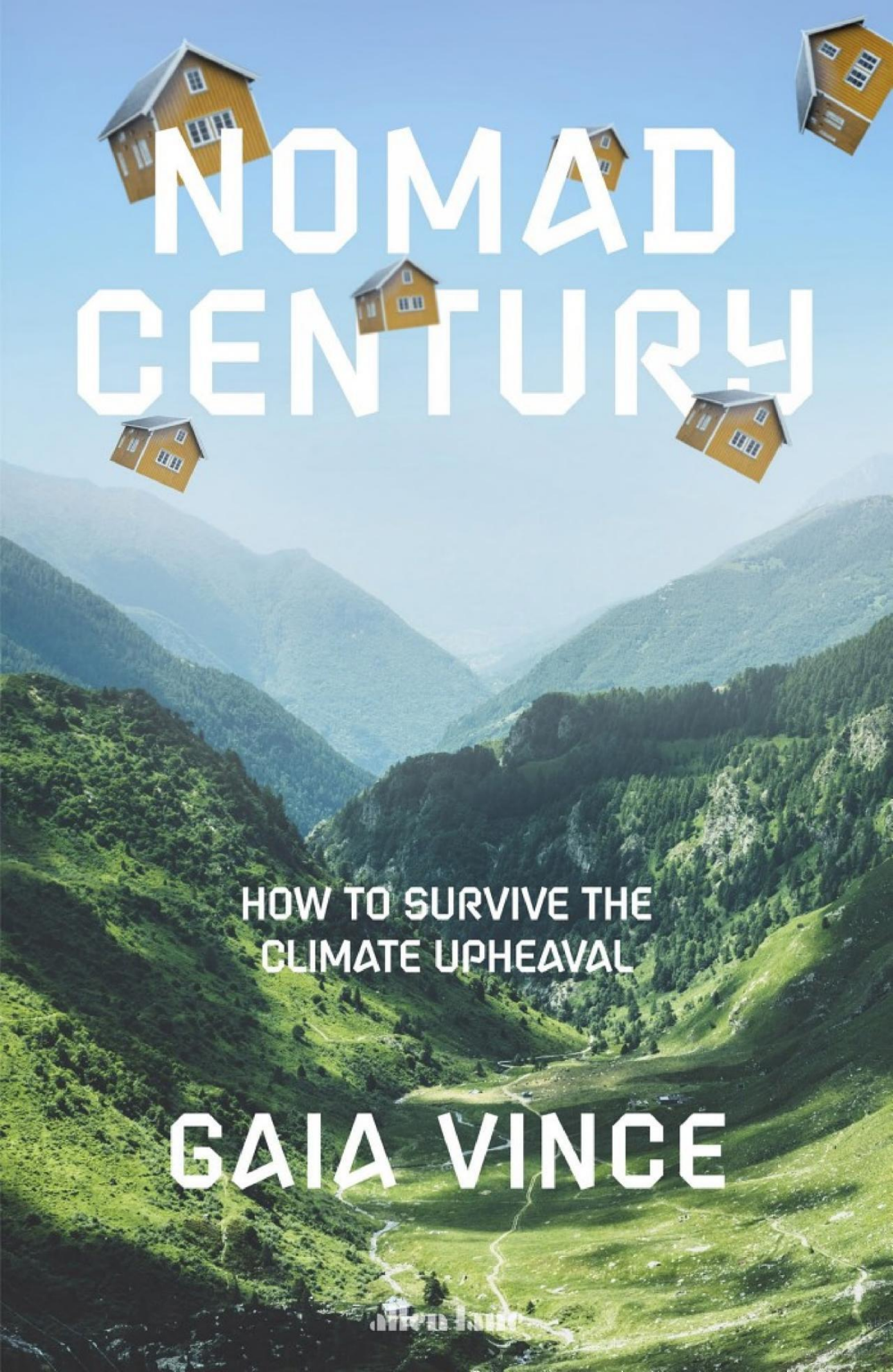
NOMAD CENTURY
HOW TO SURVIVE THE CLIMATE UPHEAVAL
GAIA VINCE

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About the Author

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For my father
And for all those who nurture tropical
flowers under grey northern skies

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Introduction

A great upheaval is coming. It will change us, and our planet.

In the global south, extreme climate change will push vast numbers of people from their homes, with large regions becoming uninhabitable; in the planet's more comfortable north, economies will struggle to survive demographic changes with massive workforce shortages and an impoverished elderly population.

Over the next fifty years, hotter temperatures combined with more intense humidity are set to make large swathes of the globe lethal for 3.5 billion of us. Fleeing the tropics, the coasts and formerly arable lands, huge populations will need to seek new homes; you will be among them, or you will be receiving them. This migration has already begun – we have all seen the streams of people fleeing drought-hit areas in Latin America, Africa and Asia where farming and other rural livelihoods have become impossible. Climate-driven movements are adding to a massive migration already under way to the world's cities. The number of migrants has doubled globally over the past decade, and the issue of what to do about rapidly increasing populations of displaced people will only become greater and more urgent as the planet heats.

Have no doubt, we are facing a species emergency – but we *can* manage it. We can survive, but to do so will require a planned and deliberate migration of a kind humanity has never before undertaken.

People are finally beginning to face up to the climate emergency. However, while nations rally to reduce their carbon emissions, and try to adapt at-risk places to hotter conditions, there is an elephant in the room: for large portions of the world, local conditions are becoming too extreme and there is *no way to adapt*. The world already sees twice as many days where temperatures exceed 50°C than thirty years ago – this level of heat is deadly for humans, and also hugely problematic for buildings, roads and power stations. In short, it makes an area unliveable.

This explosive planetary drama demands a dynamic human response, and the solutions are within our hands. We need to help people to move from danger and poverty to safety and comfort – to build a more resilient global society for everyone's benefit. Human movement on a scale never before seen will dominate this century and remake our world. It could be a catastrophe or, managed well, it could be our salvation.

People will have to move to survive.

Large populations will need to migrate, and not simply to the nearest city, but also across continents. Those living in regions with more tolerable conditions, especially nations in northern latitudes, will need to accommodate millions of migrants into increasingly crowded cities while themselves adapting to the demands of climate change. We will need to create entirely new cities near the planet's cooler poles, in land that is rapidly becoming ice-free. Parts of Siberia, for example, are already experiencing temperatures of 30°C for months at a time.

Wherever you live now, this migration will affect you and the lives of your children. It may seem obvious that Bangladesh, a country where one-third of the population lives along a sinking, low-lying coast, is becoming uninhabitable. (More than 13 million Bangladeshis – nearly 10 per cent of the population – are expected to have left the country by 2050.) Or that desert nations like Sudan are becoming unliveable. But in the coming decades wealthy nations will be severely affected too. Hot, drought-afflicted Australia will suffer, as will parts of the United States, forcing millions from cities such as Miami and New Orleans to seek safety in cooler states like Oregon and Montana. Cities will need to be built to house them.

In India alone, close to a billion people will be at risk. Another half billion will need to move within China, and millions more across Latin America and Africa. Southern Europe's treasured Mediterranean climate has already shifted north, leaving regular desert-like conditions from Spain to Turkey. Meanwhile, parts of the Middle East have already been made intolerable by increasing heat, lack of water and poor soils.

People will begin leaving. They are already on the move.

We are undergoing a species-wide planetary upheaval and it occurs not only at a time of unprecedented climate change but also of human demographic change.

Global population will continue to rise in the coming decades, peaking at perhaps 10 billion in the 2060s. Most of this increase will be in the tropical regions that are worst hit by climate catastrophe, causing people there to flee northwards. The global north faces the opposite problem – a 'top-heavy' demographic crisis, in which a large elderly population is supported by a too-small workforce. At least twenty-three nations, including Spain and Japan, are expected to see their populations halve by 2100. North America and Europe have 300 million people above the traditional retirement age (65+), and by 2050 the economic old-age dependency ratio there is projected to be at forty-three elderly persons per 100 working persons aged 20–64.[1] Cities from Munich to Buffalo will begin competing with each other to *attract* migrants. This competition will become especially acute towards the end of the century, when some of the southern places made uninhabitable by climate change may become once again liveable through geoengineering innovations that reduce global or regional temperatures, through carbon dioxide removal and technological interventions that can cool large areas cheaply. Truly, this is the century of unprecedented, planetary human movement.

We need to plan pragmatically now, adopting a species-wide approach to ensure our human systems and communities have the resilience to weather the shocks to come. We already know which communities will need to relocate by 2050, when I will be in my seventies. We know also which places will be safest at the end of the century, when my children will be in their old age.

We need to look *now* at where these billions of people could be sustainably housed. Doing so will require international diplomacy, negotiations over borders, and adaptation of existing cities. The Arctic, for instance, will become a relatively habitable destination for millions of people, although the current infrastructure there, minimal though it is, is already sinking into the melting permafrost and will have to be rebuilt for the hotter conditions. Preparing for this climate migration means the phased abandonment of major cities, the relocation of others, and the building of entirely new cities in foreign lands. London, the city I live in, is at least 2,000 years old and accommodates 9 million people. We have mere decades to adapt, expand and build such cities. We can build emergency hospitals in a few days,

as we saw during the Covid-19 pandemic; I've no doubt we can build ambitious cities within years. But what sort of cities, and where, and for whom?

The coming migration will be big and diverse. It will involve the world's poorest fleeing deadly heatwaves and failed crops. It will also include the educated, the middle class, people who can no longer live where they planned because it's impossible to get a mortgage or property insurance; because employment has moved elsewhere; because the neighbourhood has become undesirable because those who could have already left for a more tolerable climate. Climate change has already uprooted millions in the US – in 2018, 1.2 million were displaced by extreme conditions; by 2020, the annual toll had risen to 1.7 million people. The US now averages a billion-dollar disaster every eighteen days.[2] A 2021 survey of Americans who were moving home found that half cited climate risks as a factor.

As I write this, more than half of the western US is facing extreme drought conditions, and farmers in Oregon's Klamath Basin are talking about illegally using force to open dam gates for irrigation. At the other extreme, by 2050 half a million existing US homes will be on land that floods at least once a year, according to data from Climate Central, a partnership of scientists and journalists. Those homes are valued at $241 billion. Even if a building doesn't itself flood, if enough local infrastructure is flooded, the neighbourhood becomes unviable and people move away. Those affected will include residents of important cities, such as the 400,000 inhabitants of New Orleans. Louisiana's Isle de Jean Charles has already been allocated $48 million of federal tax dollars to move the entire community due to coastal erosion and rising sea levels. In Britain, the Welsh villagers of Fairbourne have been told their homes should be abandoned to the encroaching sea as the entire village is to be 'decommissioned' in 2045. Larger coastal cities are at risk, too. Consider that the Welsh capital, Cardiff, is projected to be two-thirds under water by 2050.

For you, the coming upheaval may be a sudden, urgent exodus because climate change has devastated harvests, food prices have soared, and your country has been overtaken by violent conflict and become unsafe. Or it may be that a hurricane devastates your town, or ocean waves erode your village. The upheaval will happen suddenly, in the wake of catastrophes, and it will happen slowly, in dribs and drabs. The United Nations International Organization for Migration estimates that there could be as many as 1.5 billion environmental migrants in the next thirty years alone. After 2050, that figure is expected to soar as the world heats further and the global population rises to its predicted peak in the mid 2060s. Disasters already displace up to ten times more people than conflict and war worldwide.

We are making a new and very different world through our environmental changes. As the only sentient beings capable of such audacious planetary transformation, we must have the maturity and wisdom to direct our talents towards saving ourselves.

I've certainly panic-Googled land prices in Canada and New Zealand, seeking a safe place for my children's future with reliable fresh water and greenery for the coming decades. But I have also had to accept that this is not a challenge that we can meet as individuals. For if we approach the greatest migration in a piecemeal way – in which those who can, buy safety in the least affected parts of the world – we risk an inequality of survival that threatens us all. We would face the likelihood of an enormous loss of life, of terrible wars and misery, as the wealthy erect barriers against the poorest. We see this devastating situation occurring in a far smaller way today – we cannot allow such calamitous chaos at the scale expected in a few

decades. Quite apart from the moral abhorrence, there would be no peace for any of us. Instead, we must come together as a global society to address this human-made problem. We are a planetary species, dependent on a single shared biosphere. We must look afresh at our world and consider where best to put its human population and meet all of our needs for a sustainable future.

Doing so requires a radical rethink. The question for humanity becomes: what does a sustainable Promised Land look like? If we manage to achieve a commonwealth of humanity, we will continue to dominate the globe, although we and our food production will inevitably be limited to a relatively small region. We will need to develop an entirely new way of feeding, fuelling and maintaining our lifestyles in this Anthropocene era, while also reducing atmospheric carbon levels. We will need to live in denser concentrations in fewer cities, while reducing the associated risks of crowded populations, including power outages, sanitation problems, overheating, pollution and infectious disease.

At least as challenging, though, will be the task of overcoming a geopolitical mindset, the idea that we belong to a particular land and that it belongs to us. In other words, we will, as refugees of nations, need collectively to transition to a sense of ourselves as citizens of Earth. We will need to shed some of our tribal identities to embrace a pan-species identity. We will need to assimilate into globally diverse societies, living in new, polar cities. We will need to be ready to move again when needed.

With every degree of temperature increase, roughly a billion people will be pushed outside the zone in which humans have lived for thousands of years. We are running out of time to manage the coming upheaval before it becomes overwhelming and deadly. Migration is not the problem; it is the solution.

Migration will save us, because it is migration that made us who we are.

I'll begin by showing you the nomadic soul that perches inside us all. Migration is a valid and essential part of our species' nature. Hundreds of thousands of years ago, our ancestors developed the adaptability to live anywhere. It made us the planetary primate.

Even more unusually, humans don't just relocate themselves but we also migrate the stuff of the planet – other animals, plants, water and materials. We rely on creating networks, exchanging our genes, ideas and resources to thrive. Eventually, these networks became so strong that we didn't need to move ourselves, for we could instead summon the bits of the planet we need: a virtual migration. Unlike any other animal, we survive not on the stuff of our physical location but on these virtual migrations we all make continually. I type this paragraph now using components dug from Congolese rock, wearing clothes made in Vietnam, having lunched on potatoes grown in Peru. Human ecology is planetary. It is reconfiguring Earth.

Over the coming decades we face multiple crises including heat and fires, floods and sea-level rise, extreme weather, and demographic shifts in our growing populations. Underlying every one of these, and turning them from hazards into full-blown humanitarian crises, is social inequality and poverty. Climate change is often described as a threat multiplier – the people most affected are those already experiencing threats to their lives and livelihoods, including degraded environments, income instability, inability to save money or resources, lack of affordable healthcare, inadequate sanitation, poor governance, and a lack of personal agency or ability to change their circumstances. The shocks and stresses of

climate change hit people with the least resilience hardest, pushing them beyond their ability to cope. We are facing a climate apartheid.

In these chapters, we will explore what some of the emerging crises mean for our world and human populations – and to warn you: it's not good. But stay strong, because then we will see that the solutions are already within reach.

This book looks at where it will be safe to live, how and in what numbers. It will look at where food, power, water and other resources can be produced. Even for those people who are receiving migrants, rather than migrating themselves, life will be an upheaval. Cities will have to be repurposed and adapted to the changing environmental conditions and a vastly swollen population in ways that will render them unrecognizable – but seizing the opportunity to become better. The ways in which we all see and understand each other, as citizens, traders and members of a global society, will be transformed by this new world.

How we manage this global process, and how humanely we treat each other as we migrate, will be key to whether this century of upheaval proceeds smoothly or with violent conflict and unnecessary deaths. Managed right, this upheaval could lead to a new global commonwealth of humanity.

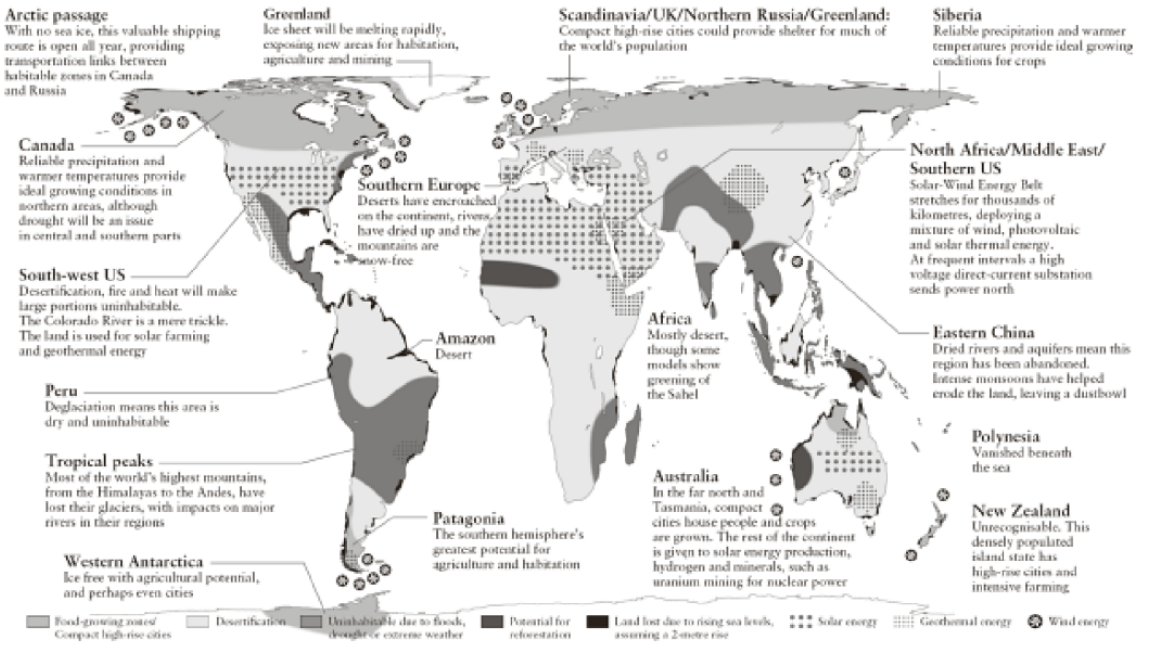
Humans evolved to cooperate, and they also evolved to migrate. The upheaval that awaits us may be unprecedented, but it arises out of a long history founded on this same adaptive behaviour. Now is the time for us to restore this inherent flexibility about where we live.

This a chance to recognize the dependence of all of us on each other, and our species' dependency on the natural world, as we restore its healthy function for the protection of all of us. The final part of the book looks at restoring our planet's habitability so that large human populations can once again live in the tropics. This means reducing the dangerous global temperatures that will characterize this century – something that can be achieved through decarbonizing our energy systems, removing carbon from the atmosphere and by reflecting the sun's heat back to space. I'll look at the latest technological innovations, and the enormous political, social and diplomatic tussles we'll need to reconcile if we are to create a just world for 9 billion of us. As you read this book, I ask you to approach its ideas with an open mind, whichever side of an ideological divide you sit on: quell the impulse to immediately reject radical social solutions as 'implausible' or 'impractical', or technological solutions as 'unnatural' or 'dangerous'. We are social, technological apes – we solve our problems using our exceptional skill in both areas and this, the biggest crisis humanity has faced in the history of our species, will require our holistic toolbox. Neither large-scale technological change nor fundamental social change are easy or comfortable options and both come with significant challenges, but the state that we are in leaves us with few choices. This book is my assessment of our best way forward.

Migration stories moulded my childhood and I have always been drawn to people from other places. As the daughter and granddaughter of refugees and migrants, I have lived on three continents and have travelled widely. On my longest trip, a two-and-a-half-year journey through fifty countries to research my first book, I spoke to princes, presidents and paupers about what it means to lose your home – amongst them, the presidents of the Maldives and of Kiribati, who face tough decisions as their lands disappear with climate change. I have visited the stateless 'char people' who live on the ephemeral mud islets that briefly appear in the Ganges river between India and Bangladesh. And I have spent time living with African and

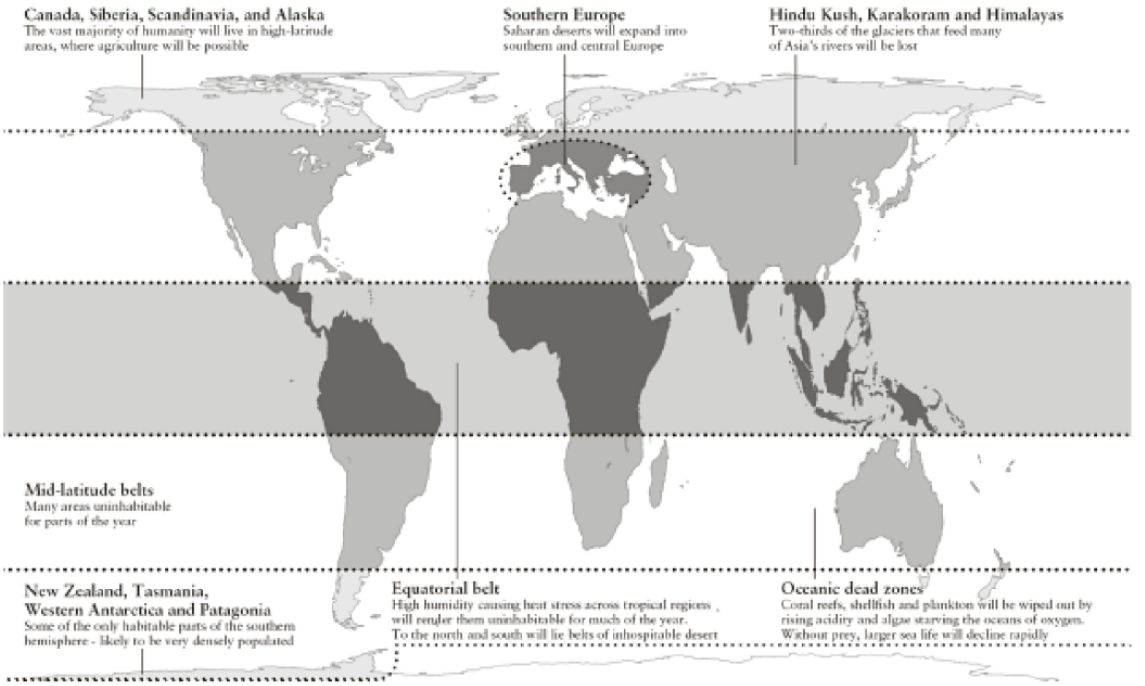
Central American hunter-gatherers, for whom home is never a settled address. Over the past decade, I have been investigating the science of our increasing environmental changes, from the hotter atmosphere to the loss of biodiversity and the growth of farmlands, as we enter the Anthropocene, a world beyond anything experienced in the history of humanity. I have written about the threats and dangers to wildlife and human life, and have made radio and television programmes about how we can adapt to this new world. Yet the most important adaptation for many millions of people – increasingly their only option – is rarely mentioned and seldom advocated: migration.

As a scientist by training, I know that many of the climate changes we face are fixed in place for decades, if not for centuries. The temperature of the planet is already rising, yet even so we continue emitting carbon dioxide. The window for action is closing.



1. **The world: 4°C-hotter***
Conditions across a broad tropical belt make large regions uninhabitable, and rising sea levels drown many islands and coastal settlements.
However, renewable energy production is possible throughout the globe, and enough food can be produced to feed 10 billion people.

(*than the preindustrial average)



2. **Belts of habitability in a 4°C world**

1
The Storm

The forecast is terrible. We face environmental, social and demographic catastrophe: drowned cities; stagnant seas; a crash in biodiversity; intolerable heatwaves; entire countries becoming uninhabitable; widespread hunger; and a global population of some 10 billion humans. A 3–4°C-hotter world is the stuff of nightmares and yet that's where we're headed within decades.

Our problems are systemic and they are feeding into each other to create a catastrophic avalanche for humanity. Polls show that most people around the world are now convinced that we are facing a 'climate emergency',[1] but even this alarming phrase doesn't encompass the sheer scale of disaster, which could be nothing short of global societal breakdown.

The amount of carbon dioxide in the atmosphere, which in 2022 reached 420 parts per million, is already higher than it's been for at least the past 3 million years.[2] It's heating the planet beyond anything humans have experienced during our entire evolutionary history – and fast. As far as we know, only the instantaneous Cretaceous–Palaeogene meteorite impact event, 66 million years ago, caused more rapid global climate change than the current human-induced global heating. During that event, which famously killed off the dinosaurs, about 600–1,000 gigatonnes of carbon dioxide was released (with enormous amounts of other climate-changing gases).[3] Now, *we* are the asteroid, taking just twenty years to release 600 gigatonnes of carbon dioxide.

We have created for ourselves a similarly perilous planetary situation, and we are barely better prepared than the dinosaurs for impending disaster. Collectively, the world has thus far failed to respond to the triple crises of poverty, climate change and ecosystem collapse at the scale and speed so desperately needed by the most vulnerable people.

Take climate change: we know that our carbon dioxide emissions are raising the temperature of the atmosphere and oceans, producing extreme weather events, a rise in sea levels, and altering rainfall patterns across the world. We know this is dangerous, and that we need to stop producing these emissions at a much faster rate – we need not just to match the rate at which carbon dioxide can be removed from the atmosphere, but cut below it. In other words, we need to go beyond 'net zero' emissions and start reducing down to safe levels the amount of carbon dioxide that's already there. We know all this, but the vast, complex human economic, cultural

and technological system – of which we are each a part – is slow to shift. We are continuing to chart a path towards a 4°C rise this century.[4]

The big reason for this heating is that global energy use is increasing (and will continue to do so for many decades), and most of this energy is generated by adding carbon dioxide to the atmosphere because it comes from burning fossil fuels. The obvious options then, determined by the physics of planetary heating, are: to produce much less energy; to capture the resultant carbon dioxide before it enters the atmosphere; or to produce energy without burning carbon. Once this physics equation is embedded into the real human world of socioeconomic and political systems, of course, things get more complicated. Anyone who argues that decarbonizing the world and fixing global warming is easy, is either a fool or a charlatan. This is the most complex problem that human society has faced. It's hard. In addition, we have also made it harder for ourselves – by which, I mean, vested interests in the rich world have made it much harder than it might have been for the rest of the world, particularly for the poorest in the global south, who are also the most vulnerable to a hotter world. We created this problem because we are humans with all the capabilities, flaws and marvels that entails; we will solve it only as humans.

There are lots of encouraging signs that the world is starting to act. To begin with, there is now near-universal acceptance of the human-made global warming crisis. In 2015, the same year the world reached 1°C of global warming above pre-industrial temperatures, governments meeting in Paris pledged to keep the temperature rise to well below 2°C and 'pursue efforts' to limit the temperature increase to 1.5°C by 2100. The Glasgow climate meeting in 2021 began a ratcheting up of national emissions-reductions pledges, and we've also made some other key steps towards meeting the Paris Agreement, most impressively with the phenomenal rise in renewable electricity production. It is now cheaper to install a brand new solar or wind power plant than to continue producing electricity at an existing coal plant. In the UK, renewable power production has already regularly exceeded that from fossil fuels. The plunge in cost of renewables has coincided with an accelerated improvement in their capabilities. We have better, more efficient solar panels, wind turbines, batteries and electric vehicles, and are far more savvy about integrating electricity generated in this way into grid systems. All this will only improve.

However, exciting as this progress is, it represents a mere fraction of what is needed even to stabilize emissions, let alone reduce them. To keep below 1.5°C of heating, we'd have to halve global emissions by 2025, and reach net zero by 2050. Instead, our greenhouse gas emissions are still growing (the annual increase continued even despite the major industrial shutdowns caused by the Covid pandemic), temperatures are rising, ice-melt is accelerating, and climate change is, as scientists predicted, getting worse. Carbon dioxide levels today are more than 50 per cent higher than the pre-industrial average.

Many scientists think it highly unlikely that we will stay below a heating of 2°C by the end of the century, let alone the 'safe' target of 1.5°C. Most countries are not making anywhere near enough progress to meet their pledged emissions reductions – and even if they fulfilled them to the letter, the national targets are so inadequate that it would be far short of what's needed to keep us below 2°C. Many countries significantly under-report their greenhouse gas emissions, so their climate pledges are anyway based on flawed data. China and India, the world's first and fourth biggest emitters, will have higher emissions in 2030 than 2020. In 2021, the Finnish

dioxide. Sea levels rose some 40 metres higher than today: the Amazon River ran backwards, California's Central Valley was open ocean, a seaway stretched from western Europe to Kazakhstan, spilling into the Indian Ocean, and lush forests grew in Antarctica and the Arctic. Atmospheric carbon dioxide rose up to about 500 parts per million, a level that today represents something close to the most ambitious and optimistic scenario possible for limiting our future carbon emissions. However, that global heating took place over many thousands of years, giving animals and plants time to adapt to new conditions and, crucially, the world's ecosystems had not been degraded by humans.

Things look bleak for our 2100 world, with plenty of extinctions as species struggle to migrate and adapt. In the oceans, we're looking at vast dead zones as pollutants combine with warmer waters to produce an explosion in algae that starve marine life of oxygen. On top of this, ocean acidity from dissolved carbon dioxide will cause a mass die-off of shellfish, plankton and coral – reefs will be lost well before 2100, at somewhere between 2°C and 4°C. Without coral reefs, which act as fish nurseries, fish populations will also plummet globally.

Sea levels will be perhaps two metres higher by 2100. We will by then be well on our way to an ice-free world, having passed the tipping points for the Greenland and west Antarctic ice sheets,[9] committing us to at least 10 metres of sea-level rise in the centuries beyond. By 2100, we will also have lost most other glaciers, including those that feed many of Asia's important rivers.

A wide equatorial belt of high humidity will cause intolerable heat stress across most of tropical Asia, Africa, Australia and the Americas, rendering vast areas uninhabitable for much of the year. Tropical forests of heat-tolerant species may well thrive in this wet zone, with the high carbon dioxide concentrations, especially with the disappearance of human infrastructure and agriculture, although the conditions will probably favour vine-like lianas over slower-growing trees.[10] To the south and north of this humid zone, bands of expanding desert will also rule out agriculture and human habitation. Some models predict that desert conditions will stretch from the Sahara right up through south and central Europe, drying out rivers such as the Danube and the Rhine.

In South America, models predict a weakening of the easterly trade winds over the Atlantic, drying the Amazon, increasing fires and turning the rainforest into grassland. The tipping point for the Amazon could well be triggered by deforestation; while the intact forest could cope with some drought because it generates and maintains its own moist ecosystem, areas that have been opened up through degradation allow moisture to escape, pushing it to a savannah state. By 2050, tropical rainforests, including the Amazon, may well be pumping out more carbon dioxide than they absorb.

This will undoubtedly be a more hostile, dangerous world. Heat will make large areas of the globe uninhabitable, and we will struggle to feed ourselves. Many of the places where people grow food will no longer be suitable because of heat stress or drought; despite stronger precipitation, the hotter soils will lead to faster evaporation and most populations will struggle to secure enough fresh water. Global food prices will soar, forcing tens of millions of hungry people onto the streets, into cities and across borders. Higher sea levels will make today's low-lying islands and many coastal regions, where nearly half the global population live, uninhabitable, thus generating an estimated 2 billion refugees by 2100, according to some forecasts.[11]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'It was heavy, hard work, and it was scary,' she says. But she recognizes that this is the new normal. This is what it is to live with fire: the uncertainty, the ever-present rumbling stress, the bag packed, the reliance on community, the acceptance of bad air days, the declining value of your property and steep hike in insurance when that's even possible. After each devastating fire comes an erosion of the community. Some places are simply not viable, the fire risk too great. Small communities are erased from the map, plans for expansion denied. The places where it is safe for people to live are shrinking in Australia.

If it weren't for the global coronavirus pandemic, 2020 would have been the year we woke up – shockingly – to the Pyrocene, a planetary age of fire.[1] Millions of Australians spent the beginning of the year under a filthy pall of smoke, or confronting bushfires of a ferocity and scale never previously imagined. With hundreds of fire fronts burning, and record heat bearing down, more than 100,000 people were advised to leave high-risk zones in the nation's biggest ever evacuation.

Black Summer, as Australia's worst bushfire season has now been termed, was a direct consequence of climate change – 2019 was both Australia's hottest and its driest year – and the impacts will be felt for decades to come, even as such events become 'normal'. People living in the cities, far outside of forests, were overwhelmed by smoke, and suffered months of hazardous pollution. More than 80 per cent of the population was affected, thirty-four people lost their lives, and 6,000 buildings were destroyed. The true toll will be far higher, with estimates that smoke pollution led to 400 premature deaths and probable impacts on unborn and newborn babies too. Smoke killed ten times more people than flames. Australia is a country of migrants and its population is growing, but will people still choose to live in a country where a quarter to half of the year is spent battling intolerable heat and smoke?

The effect of the fires on native wildlife was horrific, and heartbreaking pictures bore global witness to kangaroos and birds attempting to escape, while tree-bound koalas shrieked as they succumbed to the flames. Nearly 3 billion wild animals were wiped out, making it one of the worst ecological disasters in modern history. The enormity of the devastation is so great that Australian scientists describe it as an omnicide, the killing of everything. Even forests populated by trees that flourish on cycles of burn and recovery are becoming less resilient in the face of bush fires that are growing in frequency, spread and intensity.

The extreme fires of Australia's Black Summer reflect a global trend across forests from California to British Columbia, Europe to Asia, the Amazon and Indonesia. Forests are naturally humid, but climate change is creating hot and dry conditions, more igniting lightning strikes, reduced winter snowfall and rain, and boosting invasive pests that turn vibrant trees into tinder. California experienced its worst ever wildfires in 2020, when more than 6,500 square miles burned, 100,000 people were evacuated, and around thirty people died.[2] In areas of high winds, some public utility providers had shut off power to prevent downed or damaged power lines from sparking, leaving families struggling with terrifying conditions in darkness. One-tenth of the world's giant sequoias are thought to have been destroyed by fire in 2020. Fire-weather days – days with high temperatures, low humidity and high wind speed – are projected to double in parts of the state by 2100, and increase by 40 per cent by 2065.

In 2019, fires in the drought-stricken Amazon produced so much smoke that the skies were darkened in São Paulo, thousands of kilometres away on the coast. In


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