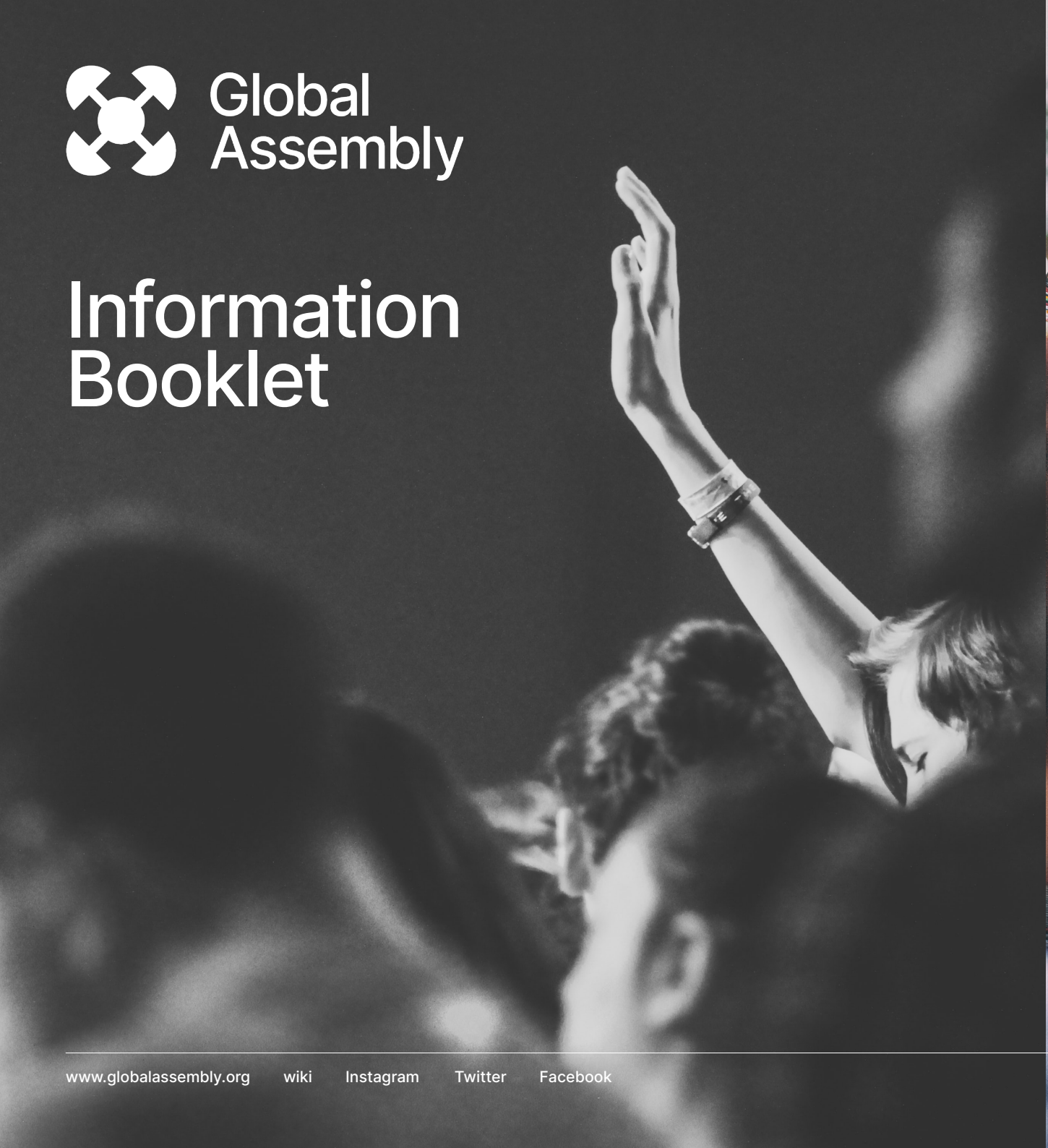
Global Assembly

Information Booklet



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Contents

The Global Assembly is a gathering of people from across the world to discuss the climate and ecological crisis.

Introduction

What is a citizens' assembly?

A citizens' assembly is a group of people from different walks of life, who come together to learn about a certain topic, to deliberate on possible action, make proposals to governments and leaders and generate ideas to galvanise wider change. Members of a citizens' assembly represent a miniature version of the place in question (say, a country or city, or in this case the world), based on demographic criteria such as gender, age, income and education level.

What is the Global Assembly?

The 2021 Global Assembly consists of: a 100-person Core Citizens' Assembly; local Community Assemblies that anyone can run anywhere; and cultural activities to engage more people.

Later this year, there will be two major United Nations conferences of world leaders: the Conference of the Parties on climate change (COP 26) and the Biodiversity Conference (COP15). In the lead up to these COP negotiations, the Core Assembly is bringing together a group of 100 people, representing a snapshot of the population of the planet to learn about the climate and ecological crisis, to deliberate and share their key messages to be presented at COP26 in Glasgow in November 2021. This year, the Global Assembly will deliberate on the following question: "How can humanity address the climate and ecological crisis in a fair and effective way?"

Introduction to the learning materials

This information booklet is part of a series of resources that will support the learning and deliberation phase of the Global Assembly. The purpose of these learning materials is to provide information and data so that you can form your own opinions on the climate and ecological crisis.

Our hope is that this document is a springboard to ongoing lines of inquiry that you will follow for perhaps years to come; and we actively encourage you to challenge any elements contained within and bring those questions or conclusions to the Global Assembly.

The climate and ecological crisis is a complex topic and the result of many interconnected historical, social, economic and political factors. Although it can sometimes seem like a very modern problem, the roots of it go back many generations and at least two centuries.

This booklet is an introduction to some of the most important themes related to the climate and ecological crisis. To create these materials, a committee of experts was brought together to contribute their knowledge and wisdom. Details about the drafting process of this information booklet are available on the Global Assembly's website[1].

There are many windows into the climate and ecological crisis and we have done the best we can to give a snapshot into the dominant themes, facts, and figures in a way that is concise and readable.

There is no pressure to read it all in one go. It is intended as a reference guide, and we hope it will

Footnotes

1 Global Assembly website

be useful for you in your engagement with the Global Assembly, to support your learning and deliberation on the climate and ecological crisis.

To complement this information booklet, further resources such as: videos, animated presentations, artistic creations and testimonials of lived experience will be available on the Global Assembly website. Contextualisation of this information booklet and translation in several languages will be available on the Global Assembly wiki [2].

More detailed meanings for the words highlighted in **bold** can be found in the Glossary section at the end of the booklet. Throughout this booklet temperature is given in the measurement of degrees Celsius (°C). Please refer to the glossary for translations to Fahrenheit (°F).

Footnotes

2 Global Assembly wiki

What will the world be like in the year 2050?

Summary overview

What will the world be like in the year 2050?

Every child born today will face the consequences of human-induced climate change and degradation of nature. It's no longer a question of 'if', but 'how much'. The extent to which people alive today and future generations will be affected depends on what we do now. Although a certain amount of warming and biodiversity loss are 'locked in' for the future, there is still time to limit further changes in climate and the loss of biodiversity, and to avoid the worst possible impacts of the climate and ecological crisis.

The causes of this climate and ecological crisis are rooted in history, and can be connected to the worldviews that have shaped the way that many societies operate today. Humans are part of nature and extremely dependent on nature to survive.

Climate change, loss of biodiversity, land degradation, and air and water pollution are highly interconnected. The quality of life of people living in all parts of the planet, and the prospects for current and future generations, depend on the action that is taken today to address these issues. Switching to renewable energy systems, conserving and restoring ecosystems and finding new, and better, ways to relate to nature will all be extremely important steps in the years to come. A recent survey[3] has found that a majority of people in all regions of the world support action on climate change, even as the COVID-19 pandemic continues to affect daily life.

Key points:

- **Human activities, such as the burning of fossil fuels, are causing the world's temperature to increase. Rising global temperatures are affecting our climate and weather patterns in some ways that are irreversible[4] – but some of the worst future consequences can be avoided depending on action taken today.**
- **As a result of pollution, climate change, destruction of natural habitats and exploitation, one million species of plants and animals are now threatened with extinction[5].**
- **Climate change and the loss of biodiversity threaten food and water security and human health.**

Climate change is mostly being driven by an excess of greenhouse gases in our atmosphere. Carbon dioxide (CO_2), the most important human-produced greenhouse gas, is produced when humans burn fossil fuels for energy and transport, and when forests are destroyed. In the past two centuries this has caused the planet to warm by 1.2 degrees Celsius (°C) or 2.16 degrees Fahrenheit (°F). Scientists have found that global warming of 2°C (3.6°F) will be exceeded during the 21st century, unless there are significant reductions in carbon dioxide and other greenhouse gas emissions in the coming decades. Although it doesn't sound like a lot, this means the loss of lives and livelihoods of several hundred million people[6].

Footnotes

3 UNDP Peoples' Climate Vote
4 IPCC
5 UN Report: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'
6 Climate Change Could Force 100 Million People into Poverty by 2030

Rising temperatures means the Earth is now experiencing more frequent and intense heat waves, forest fires and crop failures. It also means big changes to rainfall, with much more rain in some places and less in others, leading to droughts and flooding.

Human activities on Earth are having a devastating impact on plants, animals, fungi and microorganisms. As a result of pollution, climate change, destruction of natural habitats and exploitation, one million out of the Earth's eight million species of plants and animals are now threatened with extinction[7].

A lack of species diversity weakens ecosystems, making them more vulnerable to diseases and extreme weather and less capable of providing for the needs and wellbeing of humans.

— **Biodiversity loss is less severe on land that is managed by indigenous peoples.**

Much of the world's biodiversity exists on the traditional and ancestral lands of **indigenous peoples**. Indigenous cultures have managed to live in harmony with nature for millennia, and possess valuable knowledge for conserving and restoring ecosystems and cultivating biodiversity. However, a long history of colonization and marginalization means that many of these communities have been forced or impelled to leave their livelihoods and ancestral lands, or become climate refugees due to climate change related disasters. As a result, these unique cultures, knowledge systems, languages and identities are also under threat.

— **Not all countries are equally responsible for climate change, rich countries have historically generated more greenhouse gases.**

Burning fossil fuels is linked to economic development. As a result of this, rich countries like the United States of America, the United Kingdom, and countries in the European Union have produced the largest amount of greenhouse gases over time. Now, as the world population grows and countries like China and India follow the same development path as rich countries, more and more people are dependent on burning fossil fuels every year.

— **Unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, we will not be able to limit warming to less than 2°C (3.6°F). This will have significant impacts on human wellbeing.**

Living with climate change means living with uncertainty. One of these uncertainties is around the idea of a 'tipping point'. Climate tipping points are a 'point of no return', when the combined effects of climate change result in irreversible damages that would 'cascade' across the world, like dominos. Once a tipping point is reached, a series of events is triggered, leading towards the creation of a planet that is inhospitable for many people and other life forms. Science cannot predict with certainty when a tipping point might be reached.

Footnotes

7 UN Report: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'

— **In 2015, world leaders met in Paris and agreed to limit global warming to well below 2°C, preferably 1.5°C.**

— **According to the Intergovernmental Panel on Climate Change (IPCC), 1.5°C of warming is likely to be reached by 2040. However, the 2°C target is still very dependent on the level of CO_2 emissions produced over the next several decades.**

— **If all the current pledges by countries around the world (so-called 'nationally determined contributions') to reduce greenhouse gas emissions are met – and we don't know yet if they will – this is likely to result in at least 3°C (5.4°F) of global warming[8], despite the goal of the 2015 Paris Agreement to limit warming to well below 2°C.**

— **Many of the commitments of the Paris Agreement by poorer countries may not be implemented because they are dependent on financial support from abroad. So far little international support has materialized.**

Countries are expected to increase their commitment every five years. Since Paris, some progress has already been achieved. However, things are not moving fast enough to limit warming to 1.5°C. At the current rate, warming will reach 1.5°C by 2040, or earlier, and continue thereafter to increase if additional actions are not taken now.

— **Nearly two-thirds (64 percent) of people in 50 countries across the world now believe that climate change is a global emergency[9].**

— **To keep the goal of limiting warming to 1.5°C within reach, the 2020s need to be the decade of significantly reducing emissions globally.**

World leaders will meet in Glasgow later this year to talk about what to do about the climate crisis, and in China to talk about the ecological crisis. It is vital that governments start to recognise the interactions between these two crises, and develop mutually compatible goals, targets and actions.

Now that the goals of the Paris Agreement have been set, the Glasgow climate talks should be about creating a more detailed roadmap of how to achieve them. Some important considerations will include how to agree on more effective near-term emission reductions. For example, transitioning away from fossil fuels, improving the use of energy, limiting deforestation, and converting net-zero pledges into action.

Footnotes

8 Lenton. Climate Tipping Points too Risky to Bet Against

9 UNDP Peoples' Climate Vote

What is the climate crisis?

In this section, we explore the phenomena known as “climate change”. What is it? What’s causing it? And why is it urgent?

01

Climate change is linked to the long-term warming of the planet. This happens because large amounts of **greenhouse gases** are being released into the atmosphere.

The atmosphere is an invisible layer around the Earth which contains many different gases. “Greenhouse gases” are a specific group of gases that can change the thermal balance of the atmosphere and warm the Earth. The main greenhouse gases include carbon dioxide (produced by burning fossil fuels and deforestation), methane and nitrous oxide (both produced from energy and agricultural practices).

One way to picture the relationship between greenhouse gases and temperature is to imagine a small, enclosed room on a very hot day. The scorching sun is beating down on the roof, but inside the room there are no windows or doors for the heat to escape from. Because it has nowhere to go, the heat builds up in the room. Similarly, when there are too many greenhouse gases in the atmosphere, excess heat is created.

The main greenhouse gas emitted by humans is carbon dioxide (CO_2). Human activities have also degraded or destroyed many of the parts of nature that remove it from the atmosphere, such as forests and soil. Since people in rich countries started to burn fossil fuels around 200 years ago, global surface temperatures have risen by 1.2°C (2.16°F)[10]. Although it doesn’t sound like a lot, the last 20 years have been the warmest multi-year period in more than 100,000 years[11].

This seemingly small difference in temperatures (1.2°C or 2.16°F) is already having far reaching impacts on the lives of many. Rising temperatures means people are now experiencing more frequent and intense heat waves, forest fires and crop failures. It also means big changes to rainfall, with much more rain in some places and less in others[12], leading to droughts and flooding.

Floods, droughts, heatwaves and hurricanes happened before climate change too, but climate science tells us that climate change makes these kinds of extreme “weather events” more likely or intense, putting millions of people in all regions of the world at risk of losing their homes, being killed or injured or not having enough food to eat or clean water to drink.

Footnotes

10 IPCC A.1
11 IPCC Sixth Assessment Report
12 IPCC Sixth Assessment Report

What is the ecological crisis?

What impact are human activities having on the other species we share our planet with? In this section we take a look at why biodiversity is so important for human health and flourishing, and the role of indigenous communities across the world.

02

Humans are part of a web of life that is much larger than our species alone. Human health is intricately interconnected with the health of animals, plants and the shared environment. As a result of how humans – particularly people in the world's richest countries – interact with nature, some animal and plant species are becoming **extinct**. The pace of extinction is much faster today compared with the rest of history[13].

Biodiversity refers to all the varieties of life that can be found on Earth, such as plants, animals, fungi and microorganisms. Each individual species has a specific role to play in the health of the ecosystem. However, as a result of pollution, climate change, invasive alien species, destruction of natural habitats and **exploitation** (such as overfishing), one million of the world's estimated eight million species of plants and animals are threatened with extinction.

There are many reasons for this. Forests across the world are home to the majority of the world's different tree, bird and animal species, but every year huge patches of forest are destroyed when the land is converted for humans to use for agriculture, or other activities[14].

The food/agriculture system is one of the biggest drivers of biodiversity loss, with agriculture alone being the identified threat to 24,000 species at risk of extinction[15]. Currently the world's entire food supply primarily depends on very few plant species[16]. In the last centuries, there has been a focus on producing more and more food at lower and lower costs. This intensive agricultural production has come at the expense of the Earth's soil and ecosystems, making soil gradually less fertile over time[17].

Current food production depends heavily on fertilisers, pesticides, energy, land and water, and on unsustainable practices such as monocropping (farming of only one crop intensively) and heavy tilling (disruption to the soil structure with tools and machinery). This has destroyed the homes of many birds, mammals, insects and other organisms, threatening or destroying their breeding, feeding and nesting places, and crowding out many native plant species[18].

A lack of species diversity weakens ecosystems and makes them more vulnerable to diseases and extreme weather, and less capable of providing for the needs and wellbeing of humans[19]. Many important drugs used for treating illnesses like cancer are natural or are synthetic products inspired by things found in nature[20].

The world population is increasing year on year, which means more and more people will be reliant on ecosystems to meet their basic needs. Loss of biodiversity is anticipated to accelerate in coming decades, unless urgent action is made to halt and reverse the degradation of ecosystems and to limit climate change. This is why it is referred to as a crisis.

— The role of indigenous people in conserving biodiversity.

On average the trends of biodiversity loss have been less severe in areas held or managed by indigenous peoples and local communities[21].

Footnotes

13 UNEP 2021, Making Peace with Nature, Executive Summary
14 UNEP "As the world's forests continue to shrink, urgent action is needed to safeguard their biodiversity"
15 UNEP "Our global food system is the primary driver of biodiversity loss"
16 The German Federal Agency for Conservation
17 Chatham House Report, "Food system impacts on biodiversity loss"
18 Chatham House Report, "Food system impacts on biodiversity loss"
19 UNEP 2021, Making Peace with Nature, Executive Summary
20 UNEP 2021, Making Peace with Nature, Executive Summary
21 UN Report: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'

It is estimated that there are more than 370 million indigenous people spread across 70 countries worldwide. Living responsibly and in reciprocity and harmony with nature is a core value of many indigenous cultures, and these values are often distinct from those of the dominant societies in which they live.

Spread across the world from the Arctic to the South Pacific, indigenous people are the descendants - according to a common definition - of those who inhabited a country or a geographical region at the time when people of different cultures or ethnic origins arrived. The new arrivals later became dominant through conquest, occupation, settlement or other means[22].

Comprising less than 5 percent of the world's population[23], indigenous peoples protect 80 percent of land-based biodiversity[24]. For example, in Cusco, Peru, a community of Quechua people are currently conserving more than 1,400 native varieties of one of the world's staple crops – the potato[25]. Without this safeguarding of species diversity, many of these varieties might have gone extinct forever.

There are still many species of plants, animals and insects which are undocumented or unknown by science. Most of this biodiversity likely exists on the traditional and ancestral lands of indigenous people. Indigenous cultures have managed to live in harmony with nature for millennia, and possess valuable knowledge for conserving and restoring ecosystems and cultivating biodiversity[26].

Yet across the world, indigenous communities have had to leave their livelihoods and ancestral lands due to a loss of land because of large-scale development projects, or become climate refugees due to climate change-related disasters[27]. For example in Alaska, the US state with the largest indigneous population, rising sea levels and increasing wildfires has forced the relocation of some of these communities[28].

Due to centuries-long history of marginalization and colonization, indigenous peoples are nearly three times as likely to be living in extreme poverty compared to their non-indigenous counterparts[29]. The crisis in biodiversity is also entangled with the future of these unique and diverse cultures, knowledge systems, languages and identities.

Footnotes

22 UN Forum on Indigenous Issues
23 The World Bank
24 "Protecting indigenous cultures is crucial for saving the world's biodiversity" The Conversation
25 Biocultural heritage territories
26 Indigenous Rights: A Solution. UN
27 IPCCA
28 Relocation in Alaska: A brief history of how climate change is affecting native villages
29 UN

Why are we in a climate and ecological crisis?

In this section we explore how some of the dominant ‘worldviews’ of the past centuries have shaped an attitude to nature that underlies the climate and ecological crisis today.

03

The climate and biodiversity crisis is a complex problem and the result of many intersecting political, economic and social issues. One of the factors underlying the difficulty in meeting this challenge is some of the "worldviews" underpinning the climate and ecological crisis.

A worldview is a bit like a pair of glasses we use to see the world around us. Our worldview represents our core values and beliefs, and it shapes how we think and what we expect from the world. It's influenced by our own personal experiences, the beliefs and values passed to us from our families and teachers, and the beliefs and values of the culture we grew up in. Our worldview affects how we see and act in the world.

Today "**economic growth**" is often used as a marker of progress and an indicator that standards of living are improving. However, the idea of economic growth is often coupled to a worldview that humans dominate and **exploit** nature[30]. This "worldview" is at the heart of many high-polluting nations, and many believe has its roots 400 years ago, in a time period that's known as the **Scientific Revolution**. Intellectuals of the time wrote about how mankind was superior to nature[31], and how it was the right of humans to dominate over nature. The ideas that were first spread around this time were extremely influential over the following centuries, and helped to inform the laws, technologies, ways of life, customs and cultures that are still present in rich countries today. Many of these ways of life have since been passed on to, or imposed on, other countries across the world.

Since the **Industrial Revolution**, advancements in science and technology distanced people living in rich countries further away from their direct dependence on nature. Millions of people moved to the city and started working in factories, where they operated machines, instead of making things with hand tools and working on the land. In this period new technologies like the steam train, the automobile and the electric lightbulb rapidly transformed people's lives – much like how mobile phones, personal computers and the internet have changed life today compared with 50 years ago. While some technological changes have undoubtedly benefited people - for example through shaping modern medicine - new technologies allowed people to dominate and extract from nature in a way that had not been possible before.

The Industrial Revolution allowed for the mining of fossil fuels on a mass scale. Burning fossil fuels has been the dominant source of energy for over 100 years, and this has driven economic development. As a result of this, rich countries like the US, the UK, and the countries in the EU have produced the largest amount of greenhouse gases over time[32]. Now, as countries like China and India follow the same development path as rich countries, more and more people are dependent on burning fossil fuels every year[33]. With its rapidly growing economy, China is currently the world's largest emitter of greenhouse gases[34]. Historically the US has been the largest emitter, meaning that it has emitted the most amount of greenhouse gases over time[35]. Within the five top contributors to emissions, the US also has the highest CO_2 emissions per person[36].

Footnotes

30 Alberro, Heather Humanity and nature are not separate – we must see them as one to fix the climate crisis
31 Descartes, R. (1637). Discourse on the Method
32 UN Emissions Gap Report 2020 - Executive Summary
33 UN Emissions Gap Report 2020 - Executive Summary
34 Fossil CO2 and GHG emissions of all world countries - 2019 Report
35 Statistica
36 The Truth Behind the Climate Pledges

The climate and ecological crisis is a multidimensional problem, and it is impossible to find one single narrative about why this is happening, or why there has been a failure to address it. What's more, it is very difficult for people to comprehend the scale and implications of the climate and ecological crisis, and this limits people's ability to act as decisively and urgently as is necessary.

Ways of living that are detrimental to nature and emit carbon are deeply embedded in modern societies. Some call the climate and ecological crisis a "crisis of relationship" between humans and nature. In order to transition to a more sustainable future, they say we need to "make peace[37]" with nature and transform our economic, financial and productive systems accordingly[38]. In 2021, a group of researchers identified nine interlocking reasons for our collective failure to address the climate crisis over the past three decades. They argued that in order to adequately address this crisis, there is a need to question many of the core worldviews at the heart of industrialized, wealthy societies[39].

Human beings are biological animals, and Planet Earth is our habitat. Rather than being separate from nature, we are actually part of nature and dependent on it for our survival[40]. Microorganisms in our gut aid digestion, while others compose part of our skin. Pollinators such as bees and wasps help produce the food we eat, while trees and plants absorb the CO_2 we expel and produce the oxygen that we need to breathe[41].

Despite many decades of climate action, wealthy societies have not yet managed to imagine desirable ways of living that are not intertwined with fossil fuels, or dependent on economic growth as a signal of development and progress[42].

A healthy environment is a prerequisite for a sustainable economy. It is becoming commonly accepted that economic production – **gross domestic product** (GDP) – as a measure of economic growth must be complemented with "inclusive wealth" (the sum of produced, human and natural capital), which takes into account the health of the environment and is a better measure of whether national economic policies are sustainable for the youth of today and future generations[43 44].

Footnotes

37 UNEP 2021, Making Peace with Nature, Executive Summary
38 UNEP 2021, Making Peace with Nature, Executive Summary
39 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
40 UNEP 2021, Making Peace with Nature, Executive Summary
41 Alberro, Heather Humanity and nature are not separate – we must see them as one to fix the climate crisis
42 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
43 UNEP 2021, Making Peace with Nature
44 The Economics of Biodiversity: The Dasgupta Review

International negotiations

World leaders will meet in Glasgow later this year to talk about climate change, and in China to talk about the ecological crisis. In this section we learn about what the goals of these negotiations are, and how they are being met so far.

04

What have climate negotiations achieved so far?

Scientists have been predicting human-induced climate change for decades. **The United Nations Framework Convention on Climate Chang**e (UNFCCC) was signed in Rio de Janeiro in 1992, and **Conferences of the Parties** (COP) have been held every year since 1995. The purpose of the conferences is to discuss what to do about climate change, and to propose the measures to be taken by participating states to address climate change[45].

In 2015, world leaders met in Paris for the COP21 conference. The results of that conference were that, for the first time, world leaders reached an agreement on large-scale action against climate change. Some 196 participating states around the world agreed to limit global warming to well below 2°C, preferably 1.5°C[46]. Nearly all countries made a commitment (a pledge or a "**nationally determined contribution**", NDC) to limit their greenhouse gas emissions and lower their contribution to climate change. These pledges are to be updated every five years.

There are two goals associated with limiting climate change in the Paris Agreement:

1. **Limit global warming to a maximum of 2°C by the end of the century (2100), and preferably 1.5°C.**
2. **Reach net-zero emissions by 2050.**

If we are able to significantly reduce greenhouse gas emissions globally by 2030, the next stage would be for countries to reach "net-zero" emissions by 2050. Net zero means removing greenhouse gases from the atmosphere at the same rate as they are emitted, or simply eliminating emissions altogether[47]. This could be achieved through carbon dioxide being removed or 'captured' from the atmosphere by forests, soil and the ocean, and through (not yet fully developed) carbon-capture technologies.

Over the past few years...

- **China's CO_2 emissions increased by 80 percent between 2005 and 2018 and are expected to continue to increase for the next decade, given its projected rate of economic growth[48].**
- **The EU and its member states are on track to cut greenhouse gas emissions by 58 percent by 2030[49] relative to 1990.**
- **India's emissions increased by about 76 percent between 2005 and 2017 and, like China, are expected to continue to increase until 2030 due to economic growth[50].**
- **The Russian Federation, the fifth largest greenhouse gas emitter, submitted its first NDC in 2020 aiming to cut emissions by 30 percent by 2030[51].**
- **The US has recently pledged to reduce its emissions by 50-52% by 2030 relative to 2005, when emissions peaked.**

Footnotes

45 UNFCC COP
46 UNFCCC The Paris Agreement
47 IPCC Glossary
48 The Truth Behind the Climate Pledges
49 The Truth Behind the Climate Pledges
50 The Truth Behind the Climate Pledges
51 UNFCCC All NDC

Taken together, the NDCs determine whether or not the world will achieve the long-term goals of the Paris Agreement[52]. If all the current goals to reduce greenhouse gas emissions were met – and we don't know yet if they will – this is likely to result in at least 3°C of global warming, despite the goal of the 2015 Paris Agreement to limit warming to well below 2°C[53].

Because the current NDCs are not sufficient to meet the goals of the Paris Agreement, new NDCs are submitted every five years to the UN. The intention is for each country to get more ambitious in its targets, based on the goals of the Paris Agreement. Each country establishes different goals. For example, the EU has committed to reducing its greenhouse gas emissions by 55 percent by 2030[54] and the UK by 78 percent by 2035[55]. France and the UK are among countries that have made reaching net zero by 2050 a legal requirement. Japan, South Africa, Argentina, Mexico and the EU have all announced goals to reach net zero by 2050[56]. China pledged to reach 'peak emissions' by 2030[57] before transitioning to net zero by the end of 2060[58].

Since Paris, some progress has already been achieved. However things are not moving fast enough. A recent analysis by the UN concludes that if all the NDCs were to be met, it may still lead to a temperature rise of about 2.7°C by the end of the century[59].

At the current rate, warming will reach 1.5°C by around 2040 – possibly earlier[60] –and continue to increase if action is not taken now. Evidence has shown that the risks associated with a 2°C increase in global temperature are higher than previously understood[61].

Since the COP21, two reports from the **Intergovernmental Panel on Climate Change** (IPCC) in 2018 and 2021 have stressed that the difference between 1.5°C and 2°C of warming will be the loss of lives and livelihoods for millions[62], with even greater adverse consequences for higher levels of warming.

Research has shown how fossil fuel companies have lobbied to weaken climate policies around the world and have continued to do so while claiming to support the Paris Agreement. Political lobbying by fossil fuel interests also explains why the Paris Agreement makes no explicit mention of decarbonization or the reduction of fossil fuel use, despite the scientific evidence that holding to 1.5–2°C of warming requires most fossil fuels to remain in the ground[63].

What's more, many fossil fuel–exporting countries have obstructed the decision making process by stalling negotiations, exacerbating political tensions and avoiding any reference to fossil fuels as the main cause of climate change. Countries rich in fossil fuel reserves, such as Saudi Arabia, the US, Kuwait, and Russia, have been particularly notable for obstructing the negotiations and disputing the science on climate change[64].

Rich countries have failed to decisively lead in addressing climate change, both in achieving significant emission cuts and providing adequate and predictable finance. Failure from the wealthiest

Footnotes

52 UNFCCC Nationally Determined Contributions (NDCs)
53 Lenton. Climate Tipping Points too Risky to Bet Against
54 EU 2030 Climate & Energy Framework
55 UK enshrines new target in law to slash emissions by 78% by 2035
56 UN Emissions Gap Report 2020 - Executive Summary
57 China sticks to goal of having carbon emissions peak by 2030
58 UN Emissions Gap Report 2020 - Executive Summary
59 Full NDC Synthesis Report: Some Progress, but Still a Big Concern
60 UNEP 2021, Making Peace with Nature, Executive Summary
61 UNEP 2021, Making Peace with Nature
62 IPCC Livelihoods and Poverty
63 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
64 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?

nations to properly lead on this issue has created mistrust, enabling vested interest groups such as the fossil fuel industry to gain a foothold in some developing countries and thereby further embedding high-carbon development, rather than low-carbon alternatives[65].

The lack of quick and decisive action on climate change will generate significant financial costs for governments across the world. There are estimates that extreme weather as a result of human-induced climate change could cost $2 billion per day by 2030. In addition to the cost, weather events and patterns will continue to change, and will adversely affect human health, livelihoods, food, water, biodiversity and economic growth[66].

What have biodiversity negotiations achieved so far?

Biodiversity has important economic, biological and social value, but for a long time only the market economic value has been considered.

The Convention on Biological Diversity (CBD) was opened for signing in Rio De Janeiro in 1993. The convention recognized for the first time in international law that the conservation of biodiversity is a "common concern for humankind"[67]. The agreement covers ecosystems, species and genetic resources, such as seeds.

In 2010, parties to the Convention on Biological Diversity (CBD) adopted the Strategic Plan for Biodiversity 2011–2020, a ten-year framework for action by all countries to protect biodiversity and the benefits it provides to people. As part of the strategic plan, 20 ambitious but realistic targets, known as the Aichi Biodiversity Targets, were adopted[68].

However, none of the Aichi Biodiversity Targets were fully met by the target deadline of 2020, and analyses show that there has been moderate or poor progress for most of the targets aimed at addressing the causes of biodiversity loss. As a result, the state of biodiversity continues to decline.

In 2021, the 15th Conference of the Parties to the Convention o n Biological Diversity (CBD COP15) will be initiated in Kunming, China, and completed in 2022, to agree on a new framework for biodiversity, with a set of goals and targets.

In addition to the Convention on Biological Diversity there are five other biodiversity-related conventions, including the Ramsar Convention on Wetlands, the Convention of Migratory Species of Wild Animals (CMS), the Convention on Trade in Endangered Species (CITES), International Treaty on Plant Genetic Resources for Food and Agriculture, and World Heritage Convention (WHC). Despite these many international conferences on biodiversity loss, none of the goals in the international agreements have been fully met[69].

It is vital that governments start to recognise the interactions between the two issues of climate change and biodiversity loss, and develop mutually compatible goals, targets and actions.

Footnotes

65 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
66 The Truth Behind the Climate Pledges
67 The Common Concern of Humankind
68 Making Peace with Nature Report, p.71
69 Making Peace with Nature Report, p.70

What is the impact of climate change and the ecological crisis on...

In this section we take a broad look at the scale and impact of climate change and ecological crisis on human health and livelihoods, ecosystems and biodiversity in regions across the world. These effects will be more or less severe depending on the level of action taken now.

05

... human health and livelihoods?

Climate change is damaging to human health. It increases climate-related stress[70] and leads to a greater risk of diseases, malnutrition, injuries and death due to extreme weather such as drought, hurricanes and flooding[71]. This risk increases with increased warming.

Changing weather patterns can increase the likelihood of infectious diseases. Risks from some diseases that can be passed from animals or insects to humans, such as malaria and dengue fever, are projected to increase with warming from 1.5 to 2°C and increase even more with higher temperature changes, including potential shifts in where these diseases will appear[72]. For example, studies have shown that climate change is associated with increasing rates of Lyme disease in Canada[73].

Pandemics can be minimized by using a "one-health" approach. Diseases that jump from animals to humans, such as Covid-19, can be prevented by limiting human-wildlife and livestock-wildlife interactions. In a "one-health" approach, professionals with a wide range of experience and expertise – such as public health, animal health, plant health and the environment – join forces to achieve better public health outcomes[74]. A "one-health" approach can be used to prevent human health disasters e.g. like Covid-19.

Halting and reversing ecosystem degradation, such as deforestation, will protect plants that are valuable to medical research and also reduce the risk of zoonotic disease pandemics.

Climate change has an impact on economic growth in all regions. Countries in the tropics and Southern Hemisphere subtropics are expected to experience the largest impact on economic growth due to climate change if global warming increases from 1.5 to 2°C[75], and even more with greater levels of warming.

Many people across the world are living in regions that, by 2015, had already experienced warming of more than 1.5°C for at least one season[76]. The impact of climate change falls disproportionately on the poorest and most vulnerable. Limiting global warming to 1.5°C, compared with 2°C, could reduce the number of people exposed to climate-related risks by up to several hundred million by 2050[77].

We are increasingly seeing evidence of climate change-induced migration[78]. According to the UN Refugee Agency, refugees, internally displaced people (IDPs) and the stateless are on the front lines of the climate crisis[79]. Many are living in climate "hotspots", where they typically lack the resources to adapt to an increasingly hostile environment. Hazards resulting from the increasing intensity and frequency of extreme weather events, such as unusually heavy rainfall, prolonged droughts, desertification, environmental degradation, or sea-level rise and cyclones are already causing an average of more than 20 million people to leave their homes and move to other areas in their countries, or leave their countries entirely, each year[80 81].

At the end of 2020, around seven million people in 104 countries and territories were living in displacement as a result of disasters that happened not only in 2019, but

Footnotes

70 IPCC 2018 Global Warming of 1.5oC, B2
71 IPCC AR5
72 PCC Report B.5.2
73 Chapter 26 Pg.1465
74 World Health Organisation
75 IPCC B5.5
76 IPCC 1.2.1, 1.2.2
77 IPCC B5.1
78 UNEP 2021, Making Peace with Nature, Executive Summary
79 UNHCR, Climate Change and Disaster Displacement
80 UNHCR, Climate Change and Disaster Displacement
81 UN Chronicle "Will There Be Climate Migrants en Masse?"

also in previous years[82]. The top five countries with the highest number of IDPs due to disasters were Afghanistan (1.1 million); India (929,000); Pakistan (806,000); Ethiopia (633,000), and Sudan (454,000)[83]. In 2017, some 1.5 million US Americans migrated in the face of natural disasters, temporarily or permanently, to other parts of the country[84].

... food security?

Food security means that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life[85].

Food security is threatened by the loss of pollinators and fertile soil as a result of the ecological crisis, and the Earth's capacity to sustain growing needs for nutritious food will continue to weaken in the face of ongoing environmental declines.

Climate change has already affected food security due to warming, changing rain patterns and a greater frequency of extreme weather. Changes in weather means that in recent years crop yields have declined in some regions, and increased in others. Climate change is affecting food security in drylands, particularly those in Africa, and high mountain regions of Asia and South America[86].

Climate change effects will interact with other risks and social and political factors. One example of this can be found in parts of West Africa. In the Sahel[87], desertification means that cattle herders are migrating southward with their livestock in search of grazing pastures. This has led to increasing violent clashes between these herders and farmers in the south, whose crops are being destroyed and consumed by the trespassing cattle of the nomadic herders. As a consequence, farms and farmlands are being abandoned from fear of violence, creating food shortages and threats to food security.

Reductions in food availability are expected to be more significant at 2°C compared to 1.5°C, and even greater with larger temperature changes, especially in the Sahel, southern Africa, the Mediterranean, central Europe and the Amazon[88], with smaller yields of maize, rice, wheat and other cereal crops, particularly in sub-Saharan Africa, Southeast Asia, and Central and South America.

Crop and livestock production is projected to decrease and may even have to be abandoned in parts of Europe's southern and Mediterranean regions due to the increased negative impacts of climate change[89].

With rising temperatures it's expected that livestock will be affected, depending on the extent of changes in available animal feed, spread of diseases, and water resource availability[90]. There is also evidence that climate change has resulted in changes to agricultural pests and diseases[91].

Climate change risks to food security and access are expected to become high between 1.2-3.5°C of warming, very high between 3-4°C warming,

Footnotes

82 IDMC, Global Displacement Report
83 IDMC, Global Displacement Report
84 IDMC, Global Displacement Report
85 United Nations' Committee on World Food Security
86 IPCC 2019 Special Report on Land SPM Section A
87 The Time
88 IPCC Section B5.3
89 EEA "Climate Change Threatens Futures of Farming in Europe"
90 IPCC Section B5.3
91 IPCC Summary for Policy Makers

and catastrophic at 4°C and above. Rising CO_2 concentrations are expected to reduce the protein and nutrient content of major cereal crops, which would further reduce food and nutritional security[92].

... water security?

Water security is measured by water availability, water demand and quality (levels of pollution) in water sources.

Pressure on ecosystems as a result of the ecological crisis has resulted in the depletion or degradation of freshwater sources.

About 80 percent of the world's population already suffers from serious threats to water security[93]. It's clear that climate change can affect the availability of water and threaten water security due to changes in rain patterns. In general, rain is increasing in tropical and high-altitude regions, and decreasing in the sub-tropics due to climate change[94]. In 2017, around 2.2 billion people did not have access to safely managed drinking water. More than 2 billion people globally live in river basins suffering water stress, where the need for freshwater exceeds 40 percent of what is available. In some countries in Africa and Asia, needs exceed 70 percent of the freshwater available[95].

Lack of access to clean water is also a food security issue, as the primary use of freshwater worldwide is for watering crops (irrigation), currently accounting for 70 percent of freshwater withdrawals[96]. About 1.2 billion people live in areas where severe water shortages and scarcity challenge agriculture[97]. Over the last century, population growth, industrial and agricultural activities and living standards have created more demand for water across the world[98].

Wetlands are being lost globally, threatening water quality in many regions of the world.

... land-based biodiversity and ecosystems?

Ecosystems are the planet's life-support systems, for the human species and all other forms of life. Over the past decades, humans have changed natural ecosystems rapidly and extensively. This transformation of the planet has resulted in benefits for human wellbeing (for example, increased lifespan) and economic development, but not all regions and groups of people have gained from this process, and many have been harmed. The full costs of these gains are only just becoming apparent[99]. Economic, social and technological advances have come at the expense of the Earth's capacity to sustain current and future human wellbeing[100].

As we have already covered in section two, species are currently going extinct tens to hundreds of times faster than the normal extinction rate[101][102]. Climate change increases the risk of some species becoming extinct, with 20 to 30 percent of plant and animal species at greater risk of extinction under 2°C warming, and even higher numbers with greater warming[103]. It is estimated that more than half a million species have insufficient habitat for their long-term survival, and are committed

Footnotes

92 UNEP 2021, Making Peace with Nature, SPM Background Section 3.7
93 IPCC
94 IPCC 2014 WG II SPM A1, and Assessment Box SPM2 Table 1
95 UNEP 2021, Making Peace with Nature, SPM Section 4.2
96 UNEP 2021, Making Peace with Nature, Executive Summary
97 Food and Agriculture Organization of the UN
98 UNEP 2021, Making Peace with Nature, SPM Section 4.2
99 WHO Ecosystems and Human Wellbeing
100 UNEP 2021 Making Peace with Nature, pg.21
101 IPBES 2019 Global Assessment SPM Key Messages A5, Background Paragraph 6
102 UNEP 2021, Making Peace with Nature, SPM Section 3.2
103 UNEP 2021, Making Peace with Nature, SPM Section 3.7

to early extinction, many within decades, unless their habitats are restored[104].

It's projected that at 2°C of warming, 13 percent of ecosystems will transform from one ecosystem landscape to another — for example from a rainforest to a savannah ecosystem[105].

There is a high confidence that rising global temperatures will result in shifts of climate zones, with new, hot climates being created in tropical regions[106], longer fire weather seasons and increased risk of fires in drought-prone regions[107].

In 2020, less than a quarter of the global land surface still functions in a nearly natural way, with its biodiversity largely intact. This quarter is mostly located in dry, cold, or mountainous areas, and thus far has a low human population and has undergone little transformation[108].

... oceans and marine life?

The ocean is the home of biodiversity ranging from microbes to marine mammals, and a wide range of ecosystems. Two thirds of the oceans are now impacted by humans. Detrimental human activities include overfishing, coastal and offshore infrastructure and shipping, ocean acidification and waste and nutrient runoff. One third of wild marine fish stocks were overharvested in 2015, and depletion of fish stocks due to overfishing is a huge risk to food security. Fertilisers entering coastal ecosystems have produced more than 400 "dead zones" totalling more than 245,000 km2 – an area bigger than the Ecuador or the UK[109]. In 2021, a leak at an abandoned fertiliser plant in Florida caused an "algal bloom" that resulted in the death of tonnes of marine life[110].

Plastic pollution in the oceans has increased tenfold since 1980, constituting 60–80 percent of waste found in the oceans. Plastic can be found in all oceans at all depths and concentrates in the ocean currents. Ocean plastic litter causes ecological impacts including entanglement and ingestion by marine life and animals. The risk of irreversible loss of marine and coastal ecosystems, including seagrass meadows and kelp forests, increases with global warming[111].

At the moment, the Earth's oceans are absorbing 30 percent of the global CO2 emissions and almost all of the excess heat in the atmosphere, leading to warming sea temperatures. Since 1993, the rate of ocean warming has more than doubled[112], resulting in the destruction of coral reefs and extinction of some marine life. Coral reefs are particularly vulnerable to climate change and are projected to decline to 10 to 30 percent of former cover at 1.5°C warming, and to less than one percent of former cover at 2°C warming (that is, 99 percent of coral reefs would be lost at 2°C warming)[113]. The accumulation of heat in the oceans will persist for centuries and affect many future generations[114].

Approximately 40 percent of the global population live within 100km (60 miles) of the coast. Around 10 percent of the world's population live in coastal areas that are less than 10 meters above sea level[115]. As a result of climate change, sea levels are rising, the ocean is

Footnotes

104 UNEP 2021 Making Peace with Nature, pg.71
105 IPCC Summary for Policy Makers
106 IPCC Chapter 2: Land-climate interactions
107 IPCC Chapter 2: Land-climate interactions
108 UNEP 2021 Making Peace with Nature, pg.71
109 UNEP 2021 Making Peace with Nature, pg.16
110 The Guardian 1, 2
111 UNEP 2021 Making Peace with Nature, pg.16
112 IPCC 2019 Special Report The Ocean and Cryosphere in a Changing Climate, SPM A2
113 IPBES 2019 Global Assessment
114 UNEP 2021 Making Peace with Nature, pg.22
115 UN Fact Sheet People and Oceans

warming and seawater is becoming more acidic due to carbon dioxide intake. Even if warming is kept well below 2°C, there is a high confidence that communities in all regions of the world – especially coastal communities – will still have to adapt to these changes in the world's oceans[116].

As a result of ocean temperatures warming, many marine species have changed their behaviour and location, bringing them into contact with different species, causing disruption to ecosystems and increasing the risk of spreading disease[117].

Many changes due to past and future greenhouse gas emissions are irreversible for centuries to millennia, especially changes in the ocean circulation, ice sheets and global sea level.

Scientists say that unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, this situation will soon become too severe to meet the Paris targets[118] – this is why what we are experiencing now is a climate and ecological crisis.

Footnotes

116 IPCC 2019 Special Report The Ocean and Cryosphere in a Changing Climate
117 IPCC 2019 Special Report The Ocean and Cryosphere in a Changing Climate, SPM A4, A5 & A6
118 IPCC Sixth Assessment Report

Scenarios and pathways

What are the different temperature rise scenarios and climate mitigation pathways for the future, the challenges and uncertainties ahead?

06

A. Climate models & projected changes in greenhouse gas emissions and atmospheric temperature

"Climate models" are sophisticated computer simulations that are used to analyze the future impact of changes in greenhouse gas emissions on the Earth's climate. They can also be used to investigate how policies and technologies can be used to mitigate climate change. Climate change **mitigation** refers to efforts to reduce, or prevent, the emission of greenhouse gases.

The latest IPCC report[119] provided five possible scenarios for climate change based on scientific models. These outline the level of warming that can be expected in "very low" to "very high" emissions scenarios, depending on the level of CO_2 and other greenhouse gases emitted in the next decades.

The scenarios also vary depending on changes in population, land usage, trade and investment policies, our personal diets, and the efforts taken now to control emissions.

- **In a "very high" emissions scenario, where the world continues on a carbon-intensive pathway, we would see CO_2 emissions roughly tripling from current levels by 2100 and warming of between 3.3-5.7°C by the end of the century.**
- **In a "high" emissions scenario, where very little action is taken to curb CO_2 emissions, we would see CO_2 emissions roughly doubling from current levels by 2100 and a warming of 2.8-4.6°C by the end of the century.**
- **In an "intermediate" emissions scenario, where CO_2 emissions remain at around current levels until the middle of the century and then decrease slowly, we would see warming of 2.1-3.5°C by 2100.**
- **In a "low" emissions scenario, where the world starts to take action in the 2020's to limit CO_2 emissions, CO_2 emissions would reach net zero by 2075 and a warming of between 1.3-2.4°C by 2100.**
- **In a "very low" emissions scenario, CO_2 emissions decline rapidly from the early 2020s and reach net-zero around the year 2050, we would see a warming of 1.0-1.8°C by the end of the century.**

In all the scenarios outlined by the IPCC, 1.5°C of warming is likely to be reached by 2040, representing increased risk to natural and human systems compared to the present time However, even keeping to within a 2°C target is still very dependent on the level of emissions produced over the next decade and 2°C of warming is only avoided in the low emissions scenarios.

Footnotes

119 IPCC AR6

B. Challenges and trade-offs

Without far-reaching policy, technology and behaviour changes, the world is on course for 3°C of warming or higher. A 3°C world is very different from the current one: with extremes of temperature come more pronounced risks of heat waves and drought, violent storms, rainfall and flooding, that will have serious consequences for ecosystems and societies around the world.

Deciding how to address the climate and ecological crisis is fundamentally about seeking to understand the challenges and trade-offs inherent in any scenarios.

In order to better understand these challenges and trade-offs, here we explore the internationally agreed Paris Agreement target to limit global warming to 1.5°C.

To limit global warming to 1.5°C, current global emissions of carbon dioxide need to be cut in half by 2030, reaching net-zero CO_2 emissions globally around the year 2050, as well as achieving large reductions in other greenhouse gas emissions such as methane and nitrous oxide. Taking **equity** into account means that richer countries should cut their emissions much more than poorer countries.

One concern is that large reductions in energy use could reduce living standards in industrialized, rich countries, as well as limit our ability to improve the living standards in poor countries. Improving living standards in poor countries will in some cases require increases in energy use and investment in efficient technology and public services[120].

Recent estimates show that decent living standards for all could be achieved while reducing global energy demand[121], as long as overconsumption is drastically brought down. Some of the ways in which this can be addressed include the need to:

1. **Increase production of clean energy from low-and no-carbon technologies, such as wind and solar, and in parallel, decrease and eliminate investment in and production of fossil fuel energy.**
2. **Invest in efficient technologies and infrastructure (insulated buildings, public transportation).**
3. **Ensure sufficient access to affordable energy services (i.e all the things people need to use energy for, like cooking, heating, cooling, transport and communications) for all, while reducing overconsumption of the wealthiest.**
4. **Move to healthier diets with more regional and seasonal vegetables and fruits (to reduce emissions from agriculture).**
5. **Remove carbon from the atmosphere through the conservation and restoration of ecosystems[122].**

One study found that to have a 50% chance of hitting the Paris Agreement goal, 90% of the world's remaining coal reserves must stay in the ground[123], and no new investments in fossil fuel extraction can be made[124].

Footnotes

120 Marta Baltruszewicz et al 2021
121 Providing decent living with minimum energy: A global scenario Decent living gaps and energy needs around the world
122 IPCC Special Report, Chapter 2
123 Most fossil-fuel reserves must remain untapped to hit 1.5 °C warming goal
124 Net Zero by 2050 Report IEA

Lack of global cooperation, as well as the persistence and growth of high-carbon lifestyles are all obstacles to achieving stability of temperature rise limited to 1.5°C. If all the current pledges under the Paris Agreement NDCs were to be met, it would still not be enough to limit warming to 1.5°C , and would instead lead to warming around 3°C – far beyond the goals of the Paris Agreement, or anything considered safe for humanity.

C. Assumptions about negative emissions

The low and very low emissions scenarios above rely on some level of greenhouse gas removal, through **"negative emissions"** technology in the second half of the century.

Many scientists are concerned that the promise of future unproven technologies, such as removal of CO_2 from the atmosphere, will delay the actions that need to be taken today to address climate change. In the past, powerful industries have used the promise of future technologies to justify continued fossil fuel use[125]. Technologies such as 'carbon capture' do not yet exist at a level that is scalable, and so there are important questions about whether the technologies can be relied on.

D. Tipping Points – Can we predict what will happen next?

Even the best science cannot predict the future with absolute certainty. Living with climate change means living with uncertainty[126]. In this section, we look at feedback loops and "tipping points" as examples of uncertainty around the future of our climate.

Imagine a glass of water being tipped over. Depending on how much water is in the glass, there will be a point where the glass is tipped so much that the water will pour out of the glass. Once the water has left the glass, it's impossible to put it back.

Climate tipping points are a "point of no return", when the combined effects of climate change result in irreversible damages that would "cascade" across the world, like dominos. Once a tipping point is reached, a series of events is triggered, leading towards the creation of a planet that is inhospitable for many people and other lifeforms[127].

The IPCC introduced the idea of tipping points two decades ago. A possible tipping point is the melting of land ice in the polar regions (Greenland and Antarctica), leading to many meters of sea-level rise over time. Models suggest that the Greenland ice sheet could eventually disappear at 1.5 °C of warming[128], although only after many years. In July 2021, a heat wave caused Greenland to lose enough ice to cover the US state of Florida in 2 inches (5cm) of water in one day[129 130]. Sea ice is already shrinking

Footnotes

125 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
126 2019 Global Assessment Report on Disaster Risk Reduction
127 Lenton. Climate Tipping Points too Risky to Bet Against
128 Lenton. Climate Tipping Points too Risky to Bet Against
129 Reuters
130 IPCC Special Report on the Ocean and Cryosphere in a Changing Climate.

rapidly in the Arctic, indicating that, at 2°C of warming, the region has a 10–35 percent chance of becoming largely ice-free in the summer[131].

Another possible tipping point is the large-scale destruction and degradation of rainforests like the Amazon, which is home to one in 10known land-based species. Estimates of where an Amazon tipping point could lie range from 40 percent deforestation to just 20 percent forest-cover loss. About 17 percent has been lost since 1970[132], with large areas being lost due to human deforestation every minute.

Moving closer to tipping points such as ice sheets melting, deforestation, melting of permafrost and changes in ocean circulation (or a combination of these) creates a cycle which scientists refer to as a "feedback loop", where climate change causes a cascade of effects that result in even more climate change.

An example of this can be found in the Arctic. The greenhouse gas methane is currently "stored" in Arctic permafrost. As global warming causes the permafrost to melt, the methane stored is released into the atmosphere, adding yet more greenhouse gas emissions that can lead to further global warming. More warming results in more melting permafrost, adding yet more methane to the atmosphere to create even more warming and more melting permafrost, in a vicious cycle that may be impossible to stop.

These feedback loops are "non-linear", meaning they can accelerate in sudden and unexpected ways and could arise in a way that science has not been able to predict[133]. Due to these uncertainties, it is possible that we could already be at risk of triggering tipping points that lead to irreversible changes that culminate in a largely uninhabitable planet[134].

The next 10 years will be critical for adapting to and mitigating climate change. Being well informed about the risks and causes of climate change helps us to make the best decisions in the present, despite the fact that it will never be possible to predict the future with certainty. Climate change is happening much faster than efforts to address it, and the past is not a reliable indicator of the future[135]. Going forward, the future is uncertain. This understanding creates discomfort (a sense of things being out of control), but also opportunity[136]. There is still time to avert the crisis, if action is taken now.

Footnotes

131 IPCC Special Report on Polar Regions
132 Lenton. Climate Tipping Points too Risky to Bet Against
133 2019 Global Assessment Report on Disaster Risk Reduction
134 PNAS Trajectories of the Earth System
135 2019 Global Assessment Report on Disaster Risk Reduction
136 2019 Global Assessment Report on Disaster Risk Reduction

What action is already being taken?

It's been six years since the Paris Agreement. What action has been taken by countries so far to reduce emissions and biodiversity loss, and what more needs to be done?

07

A. Energy transition

One of the most important actions of the next decade will be to switch electricity generation to renewable sources and away from fossil fuels. While the growth in renewable energy is important for enabling the world to move away from fossil fuels, at the same time the increasing availability of renewable energy could simply lead to an overall growth in total energy use[137].

Universal access to clean and affordable energy requires a transformation of both the production and use of energy[138]. To reduce coal use by 70 percent by 2030 means a five-fold increase in wind and solar energy, as well as phasing out and closing 2,400 coal-fired power stations globally within the next decade[139]. Measures taken to replace fossil-fuel energy with renewable energy will cost money, but it will ultimately be cheaper to mitigate climate change than to be forced to adapt to climate change[140].

Additionally, there are many economic and health benefits from transitioning to a low-carbon economy, such as a reduction in urban air pollution that is caused in large part by petrol and diesel powered vehicles[141] [142] [143].

Solar and wind energy are now cheaper than coal or gas-fired plants in most countries, and solar projects offer some of the lowest cost electricity ever seen[144].

The early retirement or repurposing of energy infrastructure is necessary to meet Paris commitments. Many studies show that simply allowing existing fossil fuel facilities to run until their expected end of life would not keep emissions below both 1.5°C and 2°C[145].

Increasing the supply of clean energy is important for achieving sustainable economic growth while limiting global warming. Clean energy has the potential to reduce poverty and indoor and outdoor air pollution and provide critical services such as communications, lighting and water pumping[146].

Improving and increasing energy efficiency could reduce CO_2 emissions by 40 percent by 2040. This would require efficiency gains in transportation (for example, electric cars), in households (more efficient houses and appliances) and in industry. Households worldwide could also save more than $500 billion dollars per year in energy bills by increasing their energy efficiency (electricity, natural gas for heating and cooking and fuel for transportation)[147].

B. Conservation and restoration

The issues of climate change, loss of biodiversity, land degradation, and air and water pollution are interconnected. A key challenge of the next decades will be to recognize the interconnected nature of these issues, and make sure that actions to address one do not have unintended consequences on the other. For example, the replacing of native vegetation with monoculture crops for supplying bioenergy[148], or the destruction of ecosystems to build renewable energy infrastructure[149].

Footnotes

137 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
138 UNEP 2021, Making Peace with Nature
139 The Truth Behind the Climate Pledges
140 Burke et al, Large potential reduction in economic damages under UN mitigation targets
141 UNEP 2021, Making Peace with Nature, Section 4.1
142 IPCC 2018 Global Warming of 1.5oC, Chapter 3, section 5.2
143 Global Environmental Outlook 6 2019, Key Message 19, Chapter 24.4, and Box 24.1
144 International Energy Agency 2020 World
145 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
146 UNEP 2021, Making Peace with Nature
147 The Truth Behind the Climate Pledges
148 UNEP 2021, Making Peace with Nature, pg.107
149 Renewable energy can save the natural world – but if we're not careful, it will also hurt it.

Large-scale reforestation with native vegetation simultaneously addresses the issues of biodiversity loss, land degradation, and air and water pollution.

Restoring ecosystems increases the capacity of forests, the ocean and soil to absorb carbon dioxide. Today, nature is only able to absorb around half of CO_2 emissions, more or less equally split between land-based ecosystems and the ocean, with the remainder staying in the atmosphere and causing the Earth to warm[150].

Forests currently absorb less than a quarter of the carbon emissions from fossil fuels and industry[151], with the potential to store much more.

Agriculture is a big driver of biodiversity loss and greenhouse gas emissions. Changing food production systems so that they use agricultural methods that work with nature is critical for restoring natural ecosystems and building the capacities of soil to sequester carbon. Sustainable agricultural methods have the potential to help to eliminate hunger and malnutrition, and contribute to human health. Sustainable agriculture conserves and restores soils and ecosystems, improving local biodiversity, rather than degrading it[152].

Small-scale farmers, particularly women farmers, are central to the challenge of achieving sustainable food security and need to be empowered through access to financing, education and training, and information and technology[153].

C. Global awareness

Since the Special Report on Global Warming of 1.5ºC from the IPCC in 2018 and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment in 2019, global awareness of the climate and ecological crisis has risen considerably.

In 2021, the UN published the results of the Peoples' Climate Vote[154]. With 1.2 million people from across the world providing their views, this is the largest survey of public opinion on climate change ever conducted, giving an insight into public opinions on climate solutions like renewable energy and nature conservation. In many of the participating countries, this was the first time that there had ever been such a large-scale attempt to obtain public opinion on the topic of climate change.

The Peoples' Climate Vote found that nearly two-thirds (64 percent) of people in 50 countries believe that climate change is a global emergency. This is important information for governments in the run up to the Glasgow COP26, as it shows that the majority of people believe that it is vital to act on climate change now.

The survey also found a high level of support across the world for the conservation of forests and land, the implementation of renewable energy, climate friendly farming techniques and investment in green business.

Footnotes

150 UNEP 2021, Making Peace with Nature, Executive Summary section B, Sections 2.3.2 in main report, and figure 2.8
151 Brack, Duncan, Forests and Climate Change
152 UNEP 2021, Making Peace with Nature, Executive Summary
153 UNEP 2021, Making Peace with Nature, Executive Summary
154 UNDP Peoples' Climate Vote

In countries with a high level of deforestation – Brazil, Indonesia and Argentina – there was a majority support for conserving forests and land. In India, conserving forest and land was the third most popular climate policy in that country after increasing use of renewable energy and using climate-friendly farming techniques.

In countries where there are high carbon emissions from heating and electricity use – the US, Australia, Germany, South Africa, Japan, Poland and Russia – there was a majority support for renewable energy.

The results of the survey are significant as they show broad support for climate action across the world and amongst different age groups, education levels, nationalities and genders[155].

As well as putting pressure on governments to act on climate change and exercising their voting and civic rights, individuals can facilitate a global shift towards a low carbon future through personal and civic action. When it comes to the role of citizens in reducing carbon emissions, people in some countries can have a higher impact than others, based on their CO2 emissions per person and their wider influence in society. Individuals in high-emitting countries can facilitate a global shift towards a low carbon future through changing their diets (for example eating less, or no, meat) and travel habits (for example flying or driving less), avoiding waste of food and resources, and reducing their consumption of water and energy. These actions can also help protect and conserve biodiversity. People can also promote change by raising awareness in their communities and by engaging in community and political action, using the most appropriate means available to the society in which they live[156].

Footnotes

155 People's' Climate Vote Results
156 Global Carbon Atlas, CO2 emissions per person (2017)

Distribution and fairness

08

Some countries and regions of the world started emitting a significant amount of CO_2 centuries ago; others only started relatively recently. One of the reasons global annual emissions are now rising is because of the rapid growth of emerging economies, especially in Asia, the Middle East and in Central and South America. Almost all growth in emissions this century will come from developing countries[157].

While most of the recent increase in carbon emissions can be traced to developing countries, it is important to recognise that rich countries such as the US and the EU member states have outsourced many of the more carbon-intensive and environmentally toxic parts of their production chain to countries such as China and India - while the rich world continues to consume high-carbon goods, it has come to rely on other parts of the world to manufacture them. For example, a large percentage of electronic goods that are used all over the world are made in China. This has the effect of displacing emissions to these countries, rather than reducing them[158].

The difference in impact between those most responsible for causing climate change and those most vulnerable to its impacts are very striking. For example, the wealthiest 1 percent of the world's population (approx. 75 million people) are responsible for twice the emissions of the poorest half of the world's population (approx. 3,750 million people)[159].

The industrialized nations and regions of the world that became rich from burning fossil fuels and colonial exploitation have the best resources to lead now. In the light of different national circumstances, the Paris Agreement calls for "rapid reductions" of emissions to be achieved "on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty"[160].

Today there is an increasing recognition for the need to adapt and adjust to the realities of climate change. Adaptation is specifically discussed in the Paris Agreement. What adaptation to climate change looks like will be different for different communities in different parts of the world. The challenges of adapting to climate change will be greatest for most developing countries given that many of the impacts are greatest in these countries and many lack the financing, infrastructure and technical capability needed to adapt.

This will ultimately have implications on the equality of opportunity for development as envisioned in the UN Sustainable Development Goals[161] and the UN Declaration on the Right to Development[162].

The warmer the world becomes the greater each sector is affected. The greater the degradation of ecosystems, the more difficult it will be to adapt. Poor and marginalized communities – including those in wealthy countries – lack the basic capacities needed to adapt to current levels of warming[163].

In many cases, adaptation will not be possible at all, for example in some places agriculture will no longer

Footnotes

157 UN Emissions Gap Report 2020
158 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
159 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?
160 United Nations Foundation, Climate Analytics and E3G. The Value of Climate Cooperation: Networked and Inclusive Multilateralism to Meet 1.5°C. (Washington DC, 2021)
161 UN Sustainable Development Goals
162 UN Declaration on the Right to Development
163 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?

be possible due to higher temperatures and lack of water resources. Developing countries are, in general, most vulnerable due to the impacts being greater, coupled with a lack of financial, and technological infrastructure[164]. Moreover, the marginalization of these communities has typically been tied to the very processes that cause climate change, including colonialism, exploitation of resources (often while degrading the ecological resources that support local livelihoods) and fossil fuel–driven capital accumulation[165].

Richer countries will have more resources than poor countries to adapt to the demands of a changing climate, meaning that there is a need for financial aid and technological assistance to poorer countries. The greater the degree of warming the greater the impacts on societies, economies, human health and ecosystems, hence the greater the challenge of adaptation.

Of the 192 countries that have submitted pledges to the Paris Agreement, 127 are partially or totally conditional. This means that without international finance or technical support, these pledges may not be implemented. These conditional pledges were mostly put forward by countries that lack the financial capability to reduce emissions as well as the technological and institutional capacity[166].

Many of these commitments may not be implemented because, so far, little international support has materialized[167].

The issue of climate change also brings up questions of generational responsibility. Older generations benefitted the most from economic development as a result of burning fossil fuels, whereas younger generations will – and are – suffering the consequences.

Footnotes

164 Loss and Damage and limits to adaptation: recent IPCC insights and implications for climate science and policy

165 Three Decades of Climate Mitigation: Why Haven't We Bent the Global Emissions Curve?

166 The Truth Behind the Climate Pledges

167 The Truth Behind the Climate Pledges

COP26 and beyond

09

The climate and ecological crisis is already with us and getting worse as greenhouse gas emissions continue to grow and humans continue to destroy biodiversity. The damages from climate change are worse than expected a decade ago, and are already being felt across the globe. To keep the goal of limiting warming to a maximum 1.5°C within reach, significant reductions in emissions are needed in the 2020s, as well as in the following decades.

The past five years have had some successes. Solar and wind power have turned out to be much cheaper and easier to implement than predicted, electric vehicles are becoming more common and available, and low carbon technologies are competitive in a growing number of markets. However, there is increasing recognition that emissions need to be reduced in the sectors that are the toughest to decarbonize, such as aviation. A 2018 report on the aviation industry, for example, found that current plans to update technologies and improve operations will not mitigate the expected fuel demand and emissions[168]. Roadmaps are emerging for taking on emissions from heavy industry.

Changes in consumption patterns and dominant lifestyles are also a critical and integral part of the solutions to addressing climate change[169]. Lifestyles of individuals consist of various elements of daily living including consumption relating to nutrition, housing, mobility, consumer goods, leisure, and services.

Now that the goals of the Paris Agreement have been set, the Glasgow COP26 is expected to be about creating a more detailed roadmap of how to achieve them. Some important questions for the conference will include how to transition away from fossil fuels and how to convert net-zero pledges into action. To develop the next stages will require leadership on all levels, from individuals to businesses and investors, to government[170], to the Global Assembly.

Footnotes

168 Roadmap to decarbonising European aviation
169 1.5 Degree Lifestyles
170 The Truth Behind the Climate Pledges

Glossary

Adaptation: To change, adjust or improve something so as to make it suitable for a different situation.

Biodiversity: The variety of plant and animal life in the world or in a particular habitat

Carbon budget: An amount of carbon dioxide that a country, company, or organization has agreed is the largest it will produce in a particular period of time.

Carbon dioxide (CO_2): Carbon dioxide is a gas consisting of one part carbon and two parts oxygen.

Conference of the Parties (COP): The decision-making body responsible for monitoring and reviewing the implementation of the United Nations Framework Convention on Climate Change.

Decarbonizing: The reduction of carbon dioxide emissions through the use of low carbon power sources, meaning less greenhouse gasses are emitted into the atmosphere.

Economic growth: Economic growth is an increase in the goods and services produced in a market (for example, a country's economy). Economic growth is measured in terms of gross domestic product, or **GDP**.

Equity: "Common but differentiated responsibilities" (CBDR) is a principle of international environmental law establishing that all states are responsible for addressing global environmental destruction, yet not equally responsible [171].

Exploit/exploitation: To use someone or something unfairly to your own advantage, with a lack of care for the thing that's being exploited.

Extinction: The moment when a kind of organism, usually a species, becomes extinct. Extinction happens when the last remaining individual of the species dies.

GDP: Gross domestic product is the standard measure of the value added created through the production of goods and services in a country during a certain period.

Greenland ice sheet: The Greenland ice sheet is a vast body of ice covering 1,710,000 square kilometres, roughly 79% of the surface of Greenland. It is the second largest ice body in the world, after the Antarctic ice sheet.

Greenhouse gases: The six greenhouse gases covered by the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol are: carbon dioxide, methane, nitrous oxide, hydroflurocarbons, perflurocarbons and sulphar hexafluoride.

Indigenous people: An official definition of "indigenous" has not been adopted by any UN-system body. According to common definition, however, indigenous people are the descendants of those who inhabited a country or a geographical region at the time when people of different cultures or ethnic origins arrived. The new arrivals later became dominant through conquest, occupation, settlement or other means. It is estimated that there are more than 370 million indigenous people spread across 70 countries worldwide[172].

Footnotes

171 CBDR - Britannica
172 https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf

Industrial Revolution: In modern history, the Industrial Revolution was the process of change from a farming and handcraft based economy, to one dominated by industry and machine manufacturing, during the 18th and 19th centuries.

Intergovernmental Panel on Climate Change (IPCC): An intergovernmental body of the United Nations that provides objective scientific information on human-induced climate change, its natural, political, and economic impacts and risks, and possible response options.

Low carbon: Causing or resulting in only a relatively small net release of carbon dioxide into the atmosphere.

Mitigation: The action of reducing the severity, seriousness, or painfulness of something.

Nationally determined contributions (NDC): Nationally determined contributions (INDC) are intended reductions in greenhouse gas emissions under the United Nations Framework Convention on Climate Change (UNFCCC).

Negative emissions: Negative emissions is one of the terms used for activities that remove carbon dioxide from the atmosphere.

Net zero: net zero refers to the balance between the amount of greenhouse gas produced and the amount removed from the atmosphere. We reach net zero when the amount we add is no more than the amount taken away.

Paris Agreement: The Paris Agreement is a legally binding international treaty on climate change, adopted in 2015.

Pollution: The presence in or introduction into the environment of a substance which has harmful or poisonous effects. Pollution can be created by human activity, for example rubbish in the oceans or chemical run-off from agriculture.

Scientific Revolution: A change in thought that took place during the 16th and 17th centuries. During this time, science became its own discipline, distinct from philosophy and technology. By the end of this period, science had replaced Christianity as the focal point of European civilization.

Temperature translations: Degrees Celsius (°C) to Fahrenheit (°F):

1.0°C = 1.8°F
1.2°C = 2.6°F
1.5°C = 2.7°F
2°C = 3.6°F
2.5°C = 4.4°F
3°C = 5.4°F
3.5°C = 6.2°F
4°C = 7.2°F
4.5°C = 8.1°F
5°C = 8.8°F
6°C = 10.8°F

Credits

This information booklet was made to inform the learning phase of the Global Assembly.

The Global Assembly's Knowledge and Wisdom Committee led the writing process of this booklet. The purpose of the committee is to ensure that the Global Assembly's learning phase is grounded in evidence. This committee chose the framing question that the Assembly will be deliberating on, as well the content of this information booklet.

The members of the committee have expertise in: Earth Systems Science, Systems Change, Engineering & geology, Indigenous knowledge, Ecology, Climate Science, Environmental Economics, Climate Adaptation & Vulnerable countries, Behavioral and Cognitive Psychology.

The committee is chaired by Professor Bob Watson, former chair of the Intergovernmental Panel on Climate Change (IPCC) and former Chair of the Intergovernmental Panel on Biodiversity Ecosystem Services (IPBES).

The members of the committee are:

- Dr. Nafeez Ahmed, System Shift Lab, UK
- Dr. Stuart Capstick, Centre for Climate Change and Social Transformation, Cardiff University, Wales
- Professor Purnamita Dasgupta, Institute of Economic Growth, Delhi
- Professor Saleemul Huq, International Centre for Climate Change and Development (ICCCAD), Bangladesh
- Jyoti Ma (USA) & Mindahi Bastida Munoz (Mexico), The Fountain, Sacred Economics, Indigenous Wisdom Keepers
- Professor Michael N. Oti, Petroleum Geology, University of Port Harcourt, Nigeria
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