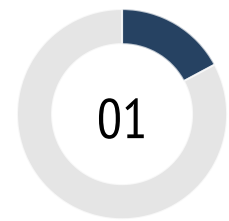




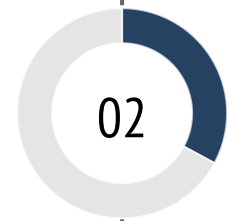
Strategic Carbon Accounting & Decarbonization Approaches for Serbia

Module 1

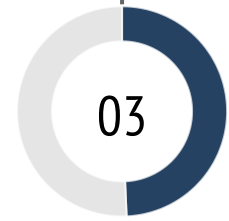
Content outline



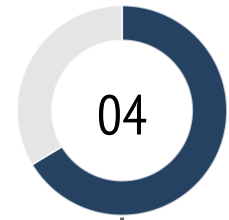
Module 1 - Importance of carbon accounting to achieve climate change mitigation



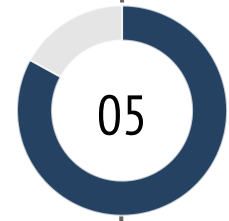
Module 2 - Emission sectors according to the International Panel on Climate Change



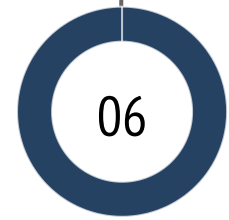
Module 3 - Key steps in carbon emissions accounting and reporting



Module 4 - Carbon accounting and reporting in practice

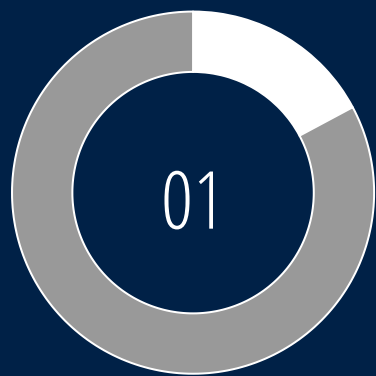


Module 5 - Tools for carbon accounting



Module 6 - Application of carbon accounting in business environment





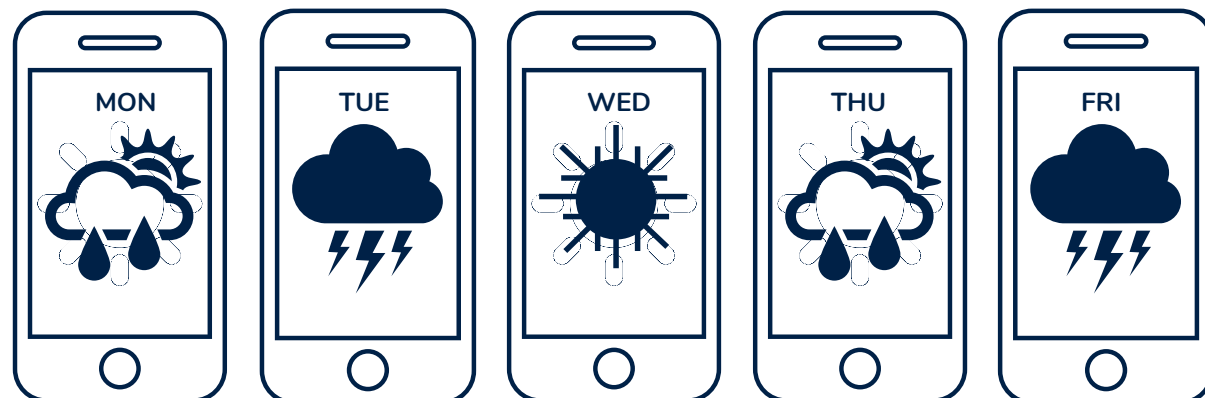
Importance of carbon accounting to achieve climate change mitigation

Weather versus Climate

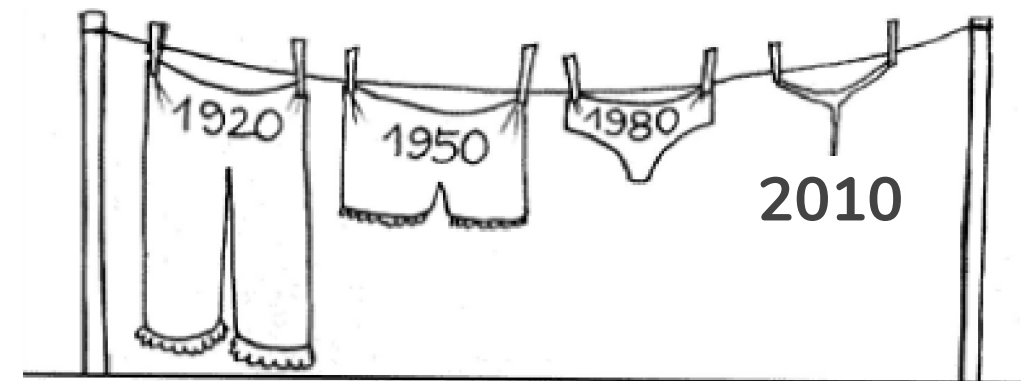
The difference is a matter of time



Refers to **short-term changes in the atmosphere**. It can change minute-to-minute, hour-to-hour and day-by-day



Describes the **average weather conditions** in a specific area over a **long period of time** (30 years or more)



1 Solar radiation

Solar radiation powers the solar system

The greenhouse effect is the **natural warming of the earth** that results when gases in the atmosphere trap heat from the sun that would otherwise escape into space.

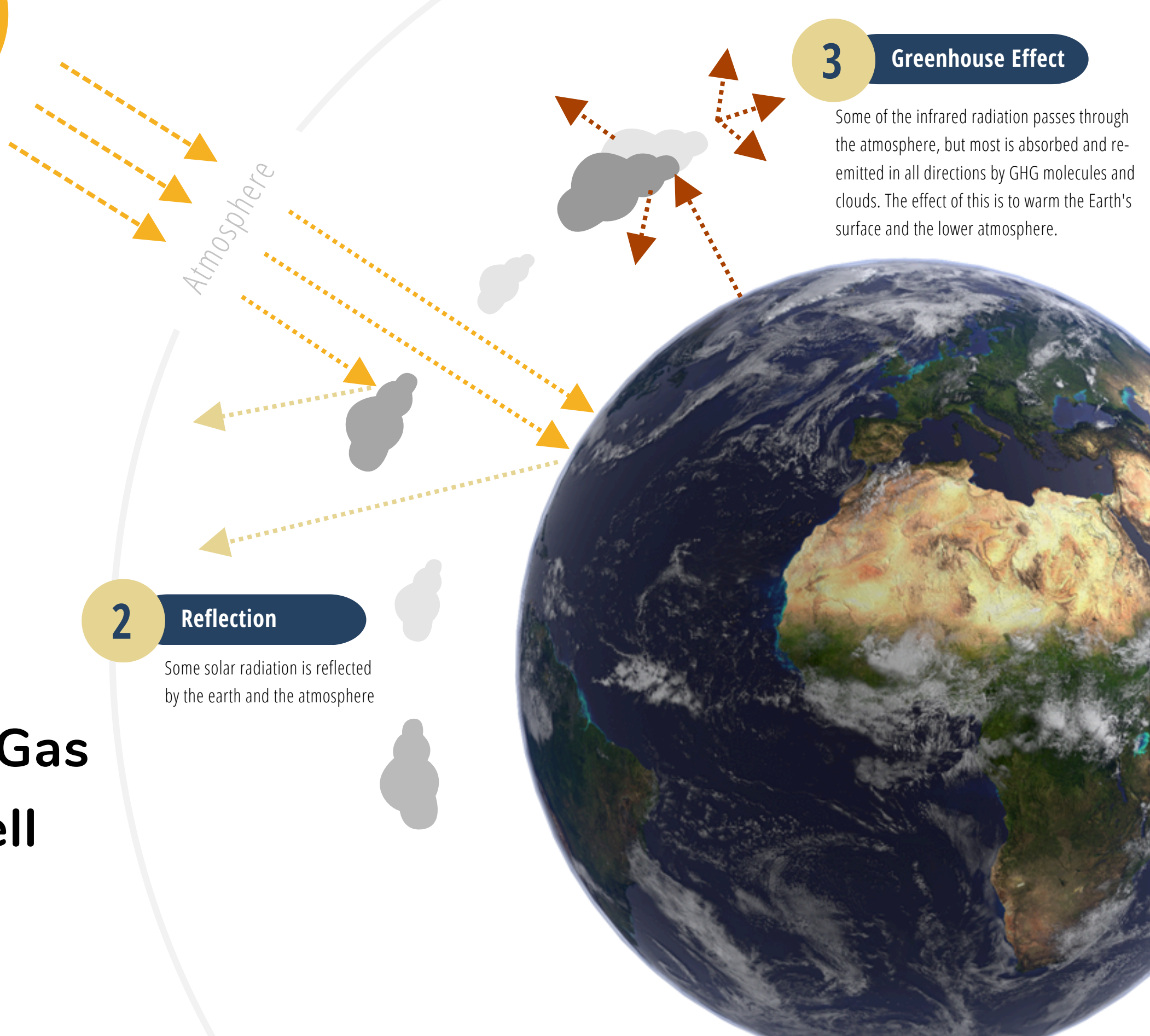
The Greenhouse Gas Effect in a nutshell

2 Reflection

Some solar radiation is reflected by the earth and the atmosphere

3 Greenhouse Effect

Some of the infrared radiation passes through the atmosphere, but most is absorbed and re-emitted in all directions by GHG molecules and clouds. The effect of this is to warm the Earth's surface and the lower atmosphere.



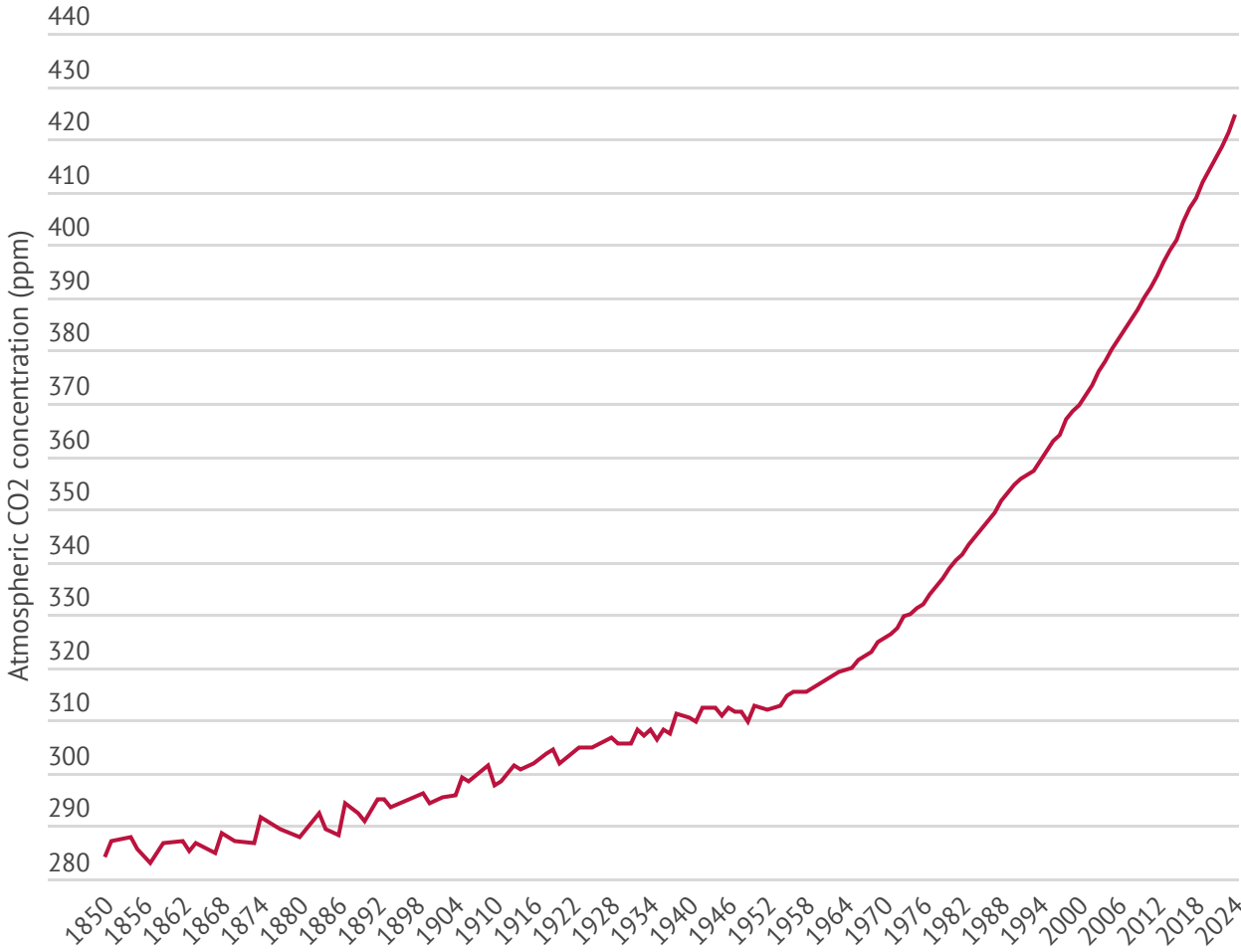
CO₂ Data from Ice Cores



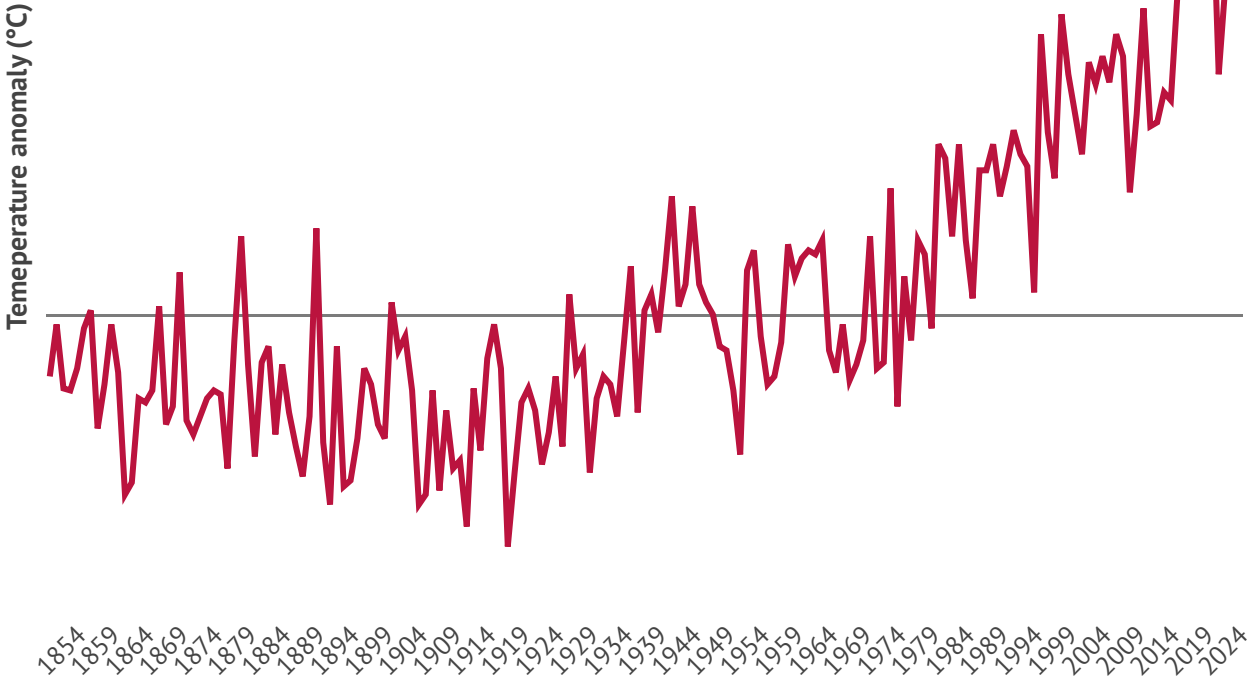
Source: National Oceanic and Atmospheric Administration
OurWorldInData/CO₂-and-other-greenhouse-gas-emissions

<https://gmL.noaa.gov/ccgg/trends/global.html>

2024 = +/- 424 ppm



2024 = + ? °C



Temperature anomalies are based on the HadCRUT4 land-sea dataset as published by the Met Office Hadley Centre. Temperature anomalies are given in degrees celcius relative to the average temperature over the period 1961-1990. These are available at the global level, for the Northern Hemisphere, South Hemisphere, and Tropics (defined as 30 degree north and south of the equator).

Source: gml.noaa.gov/ccgg/trends/
Contact: Xin Lan

Source:
Global Time Series, published March 2025, retrieved on April 7, 2025
<https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series>

WMO confirms 2024 as warmest year on record at about 1.55°C above pre-industrial level

● PRESS RELEASE

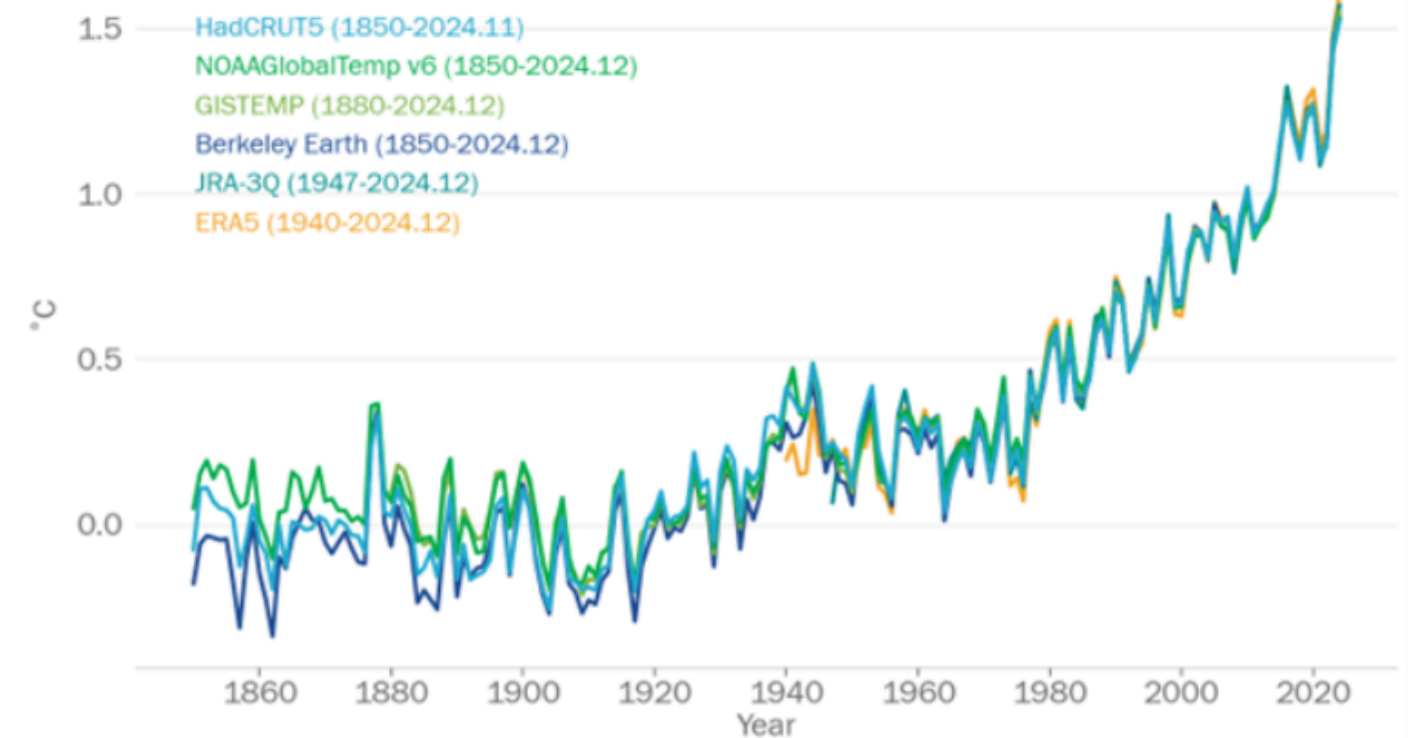
10 January 2025

The World Meteorological Organization (WMO) has confirmed that 2024 is the warmest year on record, based on six international datasets. The past ten years have all been in the Top Ten, in an extraordinary streak of record-breaking temperatures.

Key messages

- The past ten years 2015-2024 are the ten warmest years on record
- We have likely seen the first calendar year with a global mean temperature of more than 1.5°C above the 1850-1900 average
- Six international datasets are used to reach the consolidated WMO global figure
- 2024 saw exceptional land and sea surface temperatures and ocean heat
- Long-term temperature goal of the Paris Agreement not yet dead but in grave danger

Global mean temperature 1850-2024
Difference from 1850-1900 average



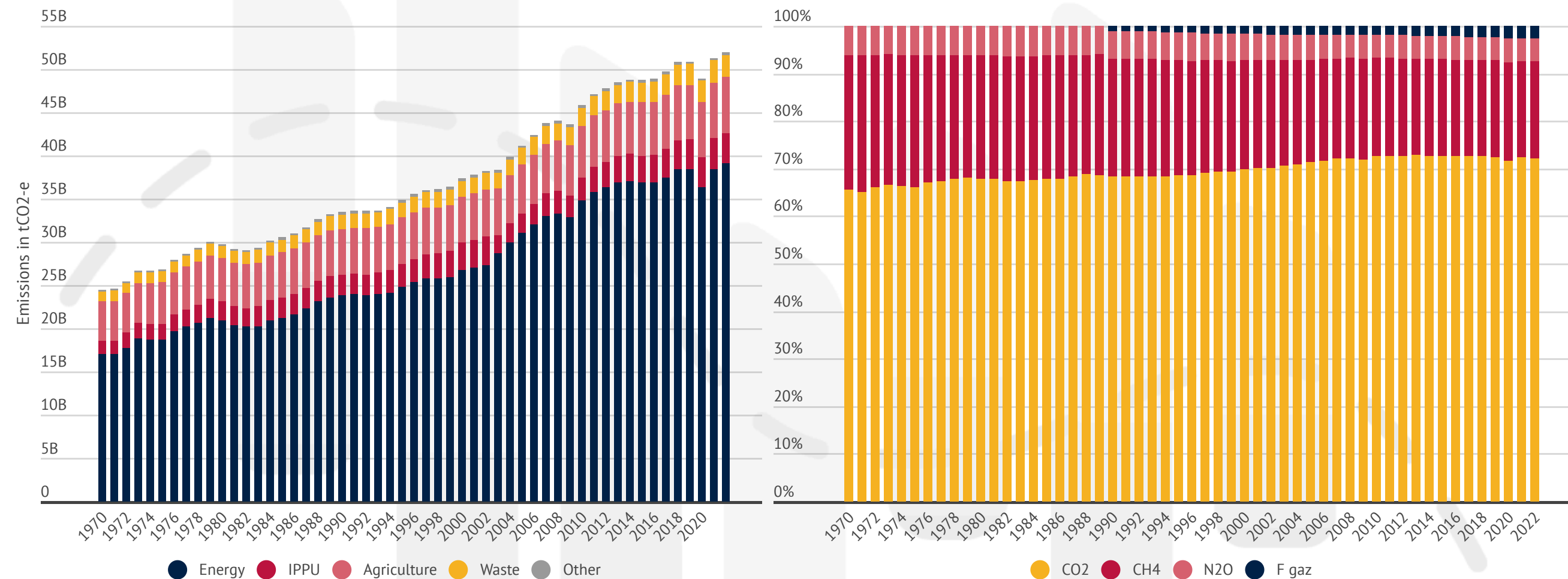
“While a single year above 1.5 °C of warming does not indicate that the long-term temperature goals of the Paris Agreement are out of reach, it is a wake-up call that we are increasing the risks to our lives, economies and to the planet,” WMO Secretary-General Celeste Saulo



The World Meteorological Organization (WMO) is a specialized agency of the United Nations responsible for promoting international cooperation in atmospheric science and meteorology. WMO monitors weather, climate, and water resources and provides support to its Members in forecasting and disaster mitigation. The organization is committed to advancing scientific knowledge and improving public safety and well-being through its work.

Source:
<https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>

Global anthropogenic GHG emissions



Source: EDGAR (Emissions Database for Global Atmospheric Research) Community GHG Database (a collaboration between the European Commission, Joint Research Centre (JRC), the International Energy Agency (IEA), and comprising IEA-EDGAR CO₂, EDGAR CH₄, EDGAR N₂O, EDGAR F-GASES version 8.0, (2023) European Commission.

Note: Fossil emissions only. Emissions from land use and land use change are not included.

Other key indicators

Ocean heat content

- Stored about 90% of the energy trapped by GHG
- 2024 = highest level in the 65-year observational record. Each of the past eight years = a new record.
- Ocean warming = degradation of marine ecosystems, biodiversity loss, and reduction of the ocean carbon sink.

Ocean acidifcation

- Steady decrease of the pH
- Ocean acidification = impact on biodiversity and ecosystems, and food production from shellfish aquaculture and fisheries

Global mean sea level

- 2024 = highest sea level
- +4.7 mm / year
- SLR = cascading damaging impacts on coastal ecosystems and infrastructure, with further impacts from flooding and saltwater contamination of groundwater

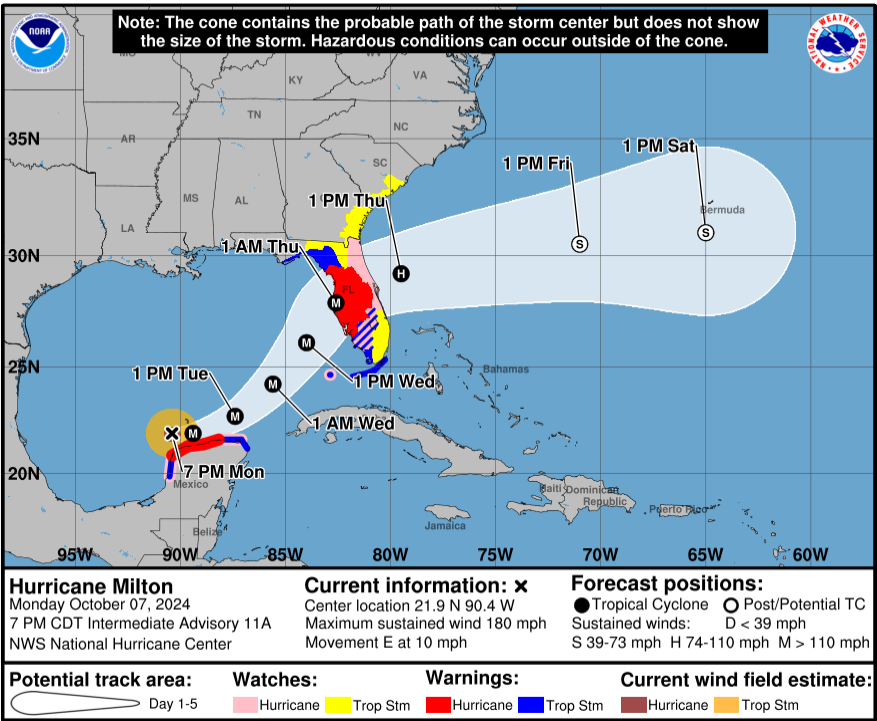
Glacier mass balance

- 2022-2024 represents the most negative three-year
- Retreat = short-term hazards, harms economies and ecosystems and long-term water security

Sea ice extent

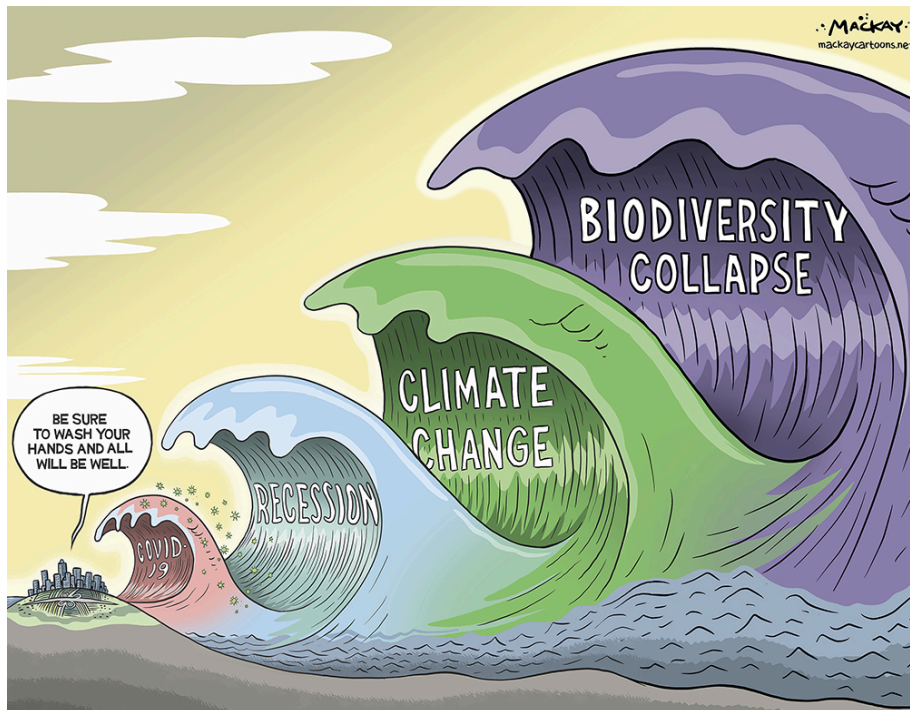
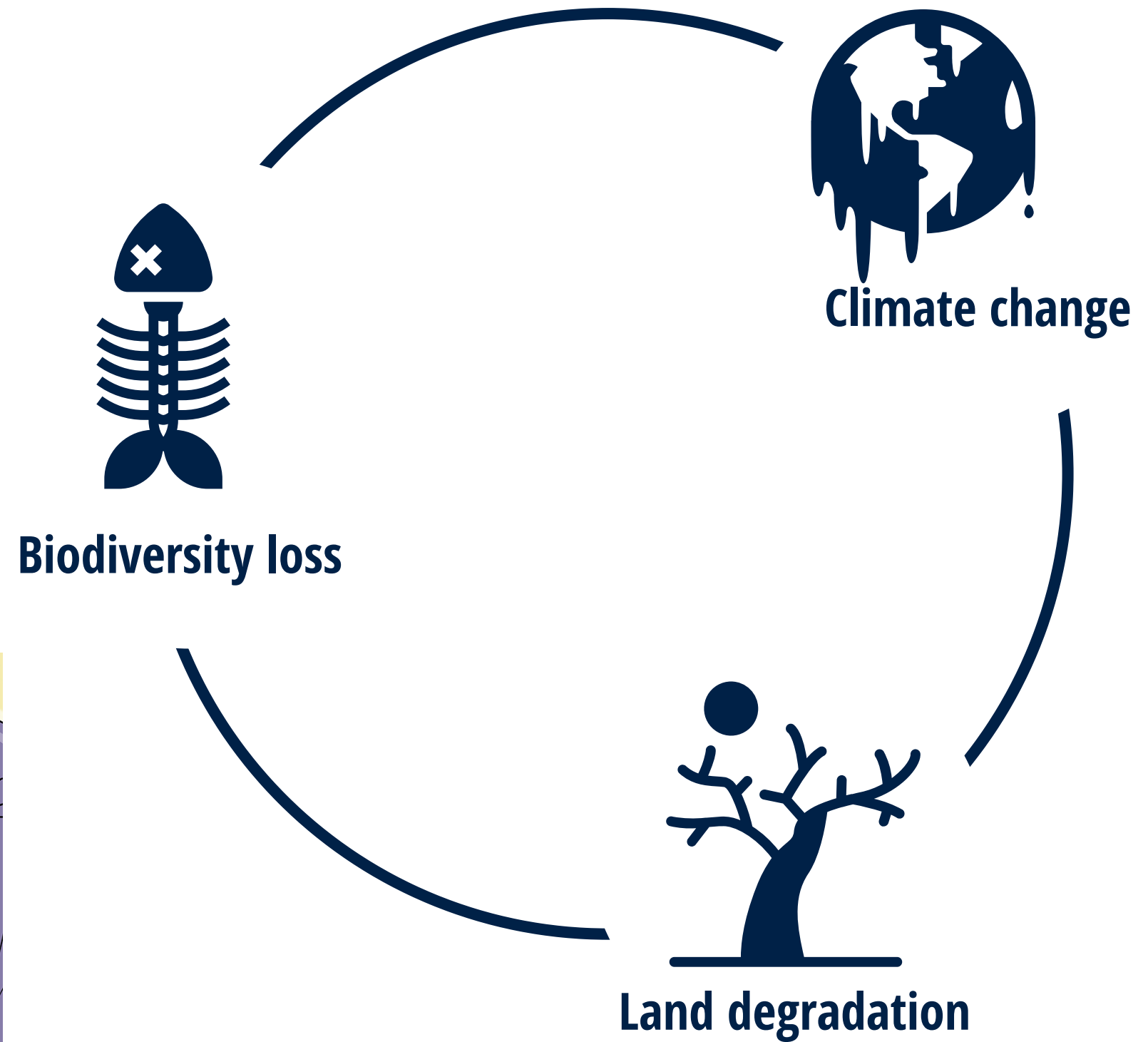
- 18 past years = 18 lowest sea ice extent

& extreme events & impacts....

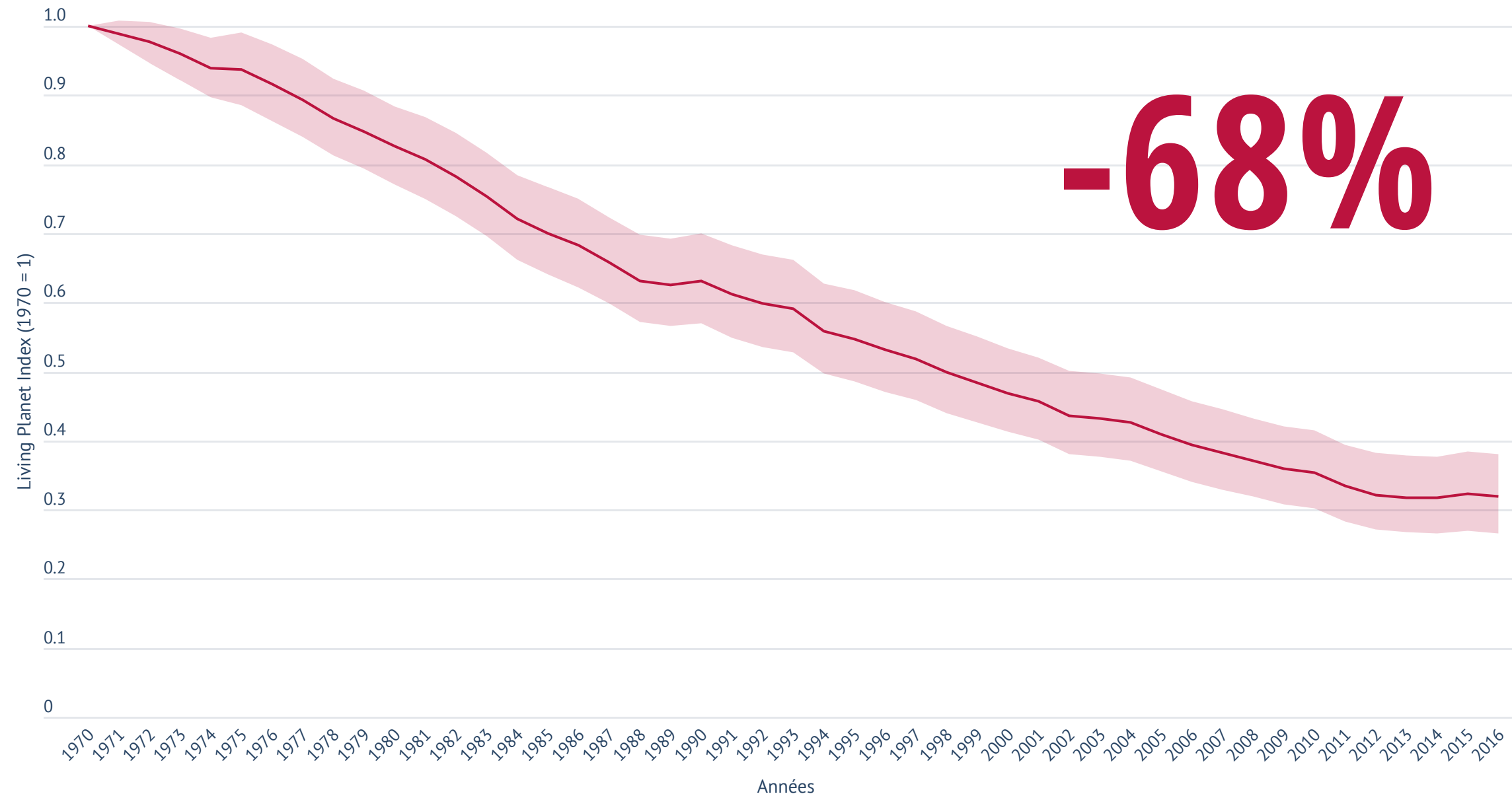


Source: <https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>

Three contemporary and interconnected crises



Loss of biodiversity since 1970



The LPI tracks the abundance of nearly 21,000 populations of mammals, birds, fish, reptiles and amphibians around the world.

WWF. 2020. Living Planet Report 2020. Bending the curve of biodiversity loss: a deep dive into the Living Planet Index. Marconi, V., McRae, L., Deinet, S., Ledger, S. and Freeman, F. in Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.

Land degradation

25%

Total area of degraded land

24,000,000,000

tonnes of fertile soil lost per year*.

2050

95% of land could be degraded if current trends continue

*largely due to unsustainable agricultural practices

GEF, 2019. https://www.thegef.org/sites/default/files/publications/gef_land_degradation_bifold_2019.pdf

Climate updates from AR6

Findings from 278 scientists on climate change mitigation

More than **50% chance that global temperature > 1.5 °C between 2021 and 2040** across studied scenarios, and **under a high-emissions pathway**, specifically, the world may hit this threshold even sooner — between 2018 and 2037.

Changing course to **limit global warming to 1.5 °C, GHG emissions peak immediately and before 2025** at the latest.

Burning fossil fuels = the number one cause of the climate crisis.

Need urgent, **systemwide transformations to secure a net-zero**, climate-resilient future

Annual public and private climate finance has risen by upwards of 60% since AR5 but **are far way below finance to fossil fuel**

Annual growth rate of GHG emissions = 2.1% per year between 2000 and 2009 BUT **1.3% per year between 2010 and 2019**. ↓

Source:

<https://www.wri.org/insights/2023-ipcc-ar6-synthesis-report-climate-change-findings>

A faint, dark blue world map is centered in the background of the slide, showing the outlines of continents and major landmasses.

United Nations Framework Convention on Climate Change

Rio conventions

**Convention to combat
desertification**



**United Nations Framework
Convention on Climate Change**



**United Nations Convention on
Biological Diversity**

United Nations Framework Convention on Climate Change

Article 2 of the Convention 1992

The **ultimate objective** of this Convention [...] is to **achieve, [...], stabilization of greenhouse gas concentrations** in the atmosphere at a level that would **prevent dangerous anthropogenic interference with the climate system**. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.



United Nations
Climate Change



United Nations
Climate Change

[Art. 4] The Convention also requires all Parties to develop, **periodically update, publish and make available** to the Conference of the Parties (COP) their **national inventories of anthropogenic emissions of all greenhouse gases** not controlled by the Montreal Protocol.

The Montreal Protocol on Substances that Deplete the Ozone Layer is the landmark multilateral environmental agreement that regulates the production and consumption of nearly 100 man-made chemicals referred to as ozone depleting substances, such as CFCs, HCFCs, Halons, etc. (ODS)

CONFERENCE OF THE PARTIES

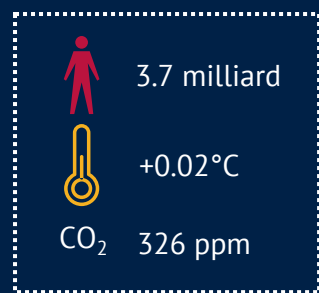
The Conference of the Parties is the **supreme decision-making body of the Convention**. All States (Parties) to the Convention are represented at the Conference of the Parties, where they **review the implementation of the Convention** and any other legal instruments it adopts and **take the necessary decisions to promote the effective implementation of the Convention**, including institutional and administrative arrangements.

The CMP oversees the implementation of the Kyoto Protocol and takes decisions to promote its effective implementation.



The CMA oversees the implementation of the Paris Agreement and takes decisions to promote its effective implementation.

History of conferences on climate change



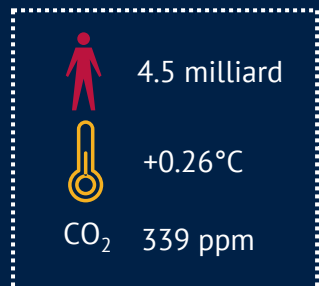
22 April, first Earth Day



Creation of UNEP at the 1st United Nations Conference on the Human Environment in Stockholm



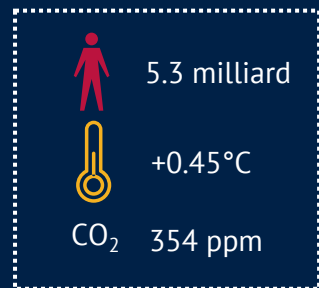
First World Climate Conference



Montreal Protocol accepted



Creation of the Intergovernmental Panel on Climate Change (IPCC)



The IPCC and the Second World Climate Conference call for a global treaty on climate change



Créé par L'Organisation météorologique mondiale L'OMM et le Programme des Nations Unies pour l'environnement (PNUE) . À ce jour, les évaluations du GIEC fournissent aux décideurs politiques des évaluations scientifiques régulières sur l'état actuel des connaissances sur le changement climatique, comme les rapports d'évaluations et les lignes directrices pour les inventaires de gaz à effet de serre.

Source:

<https://www.lifegate.com/history-climate-change-conferences>

<https://unfccc.int/timeline/>

<https://www.nytimes.com/2020/04/21/climate/NYT-first-earth-day.html>

<https://www.nytimes.com/interactive/projects/cp/climate/2015-paris-climate-talks/from-the-archives-1979-an-eye-on-climate-change>

1992

The Rio Summit leads to the United Nations Framework Convention on Climate Change (UNFCCC)



1994

The UNFCCC enters into force



1995

First Conference of the Parties (COP 1, Berlin)



1996: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories



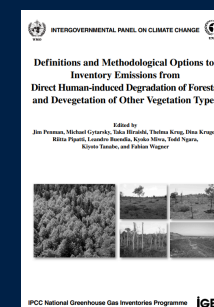
1997

The Third Conference of the Parties reached an historic milestone with the adoption of the Kyoto Protocol, the first global treaty to reduce greenhouse gas emissions.

On this occasion, COP 3 reaffirmed that the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories should be used as the 'methodologies for estimating anthropogenic emissions by sources and removals by sinks of greenhouse gases' in the calculation of legally binding targets in the first commitment.

2000

Report on forest degradation



2001

The Marrakech Accords are adopted at COP 13
Publication of the IPCC Third Assessment Report

The Marrakech Accords pave the way for ratification of the Kyoto Protocol, i.e. an agreement on operational rules for international emissions trading, the Clean Development Mechanism and Joint Implementation, as well as a compliance regime and accounting procedures.



6.1 milliard
+0.39°C
CO₂ 370 ppm



2003: IPCC best practice recommendations for the LULUCF sector

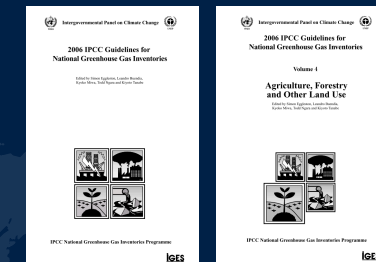


2005

The first meeting of the Parties to the Kyoto Protocol (CMP1) takes place in Montreal



2006 IPCC guidelines for National greenhouse gas inventories



2007

The Bali roadmap is established
Publication of the IPCC Fourth Assessment Report

The Bali Roadmap, including the Bali Action Plan, charts the course for a new negotiating process to combat climate change. The Plan has five main categories: shared vision, mitigation, adaptation, technology and financing.



IPCC wins Nobel Peace Prize

7 milliard
+0.72°C
CO₂ 390 ppm

2010

Cancun Agreements

COP 16: The Cancún Agreements are a comprehensive set of measures taken by governments to help developing countries tackle climate change. The Green Climate Fund, the Technology Mechanism and the Cancún Adaptation Framework are established



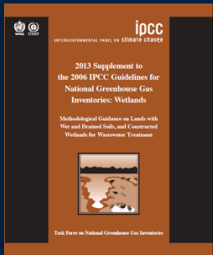
2011

Durban Platform for Enhanced Action

2013 Progress on the agreement on the Durban platform, the GCF, the Warsaw framework for REDD-plus and the Warsaw international mechanism for loss and damage



2013 supplement - wetlands



2015 COP 21: Paris Agreement



Limit global warming to below 2°C, and preferably to 1.5°C

2016 Kigali Amendment

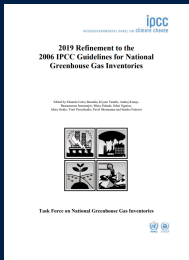
COP 23 Bonn: Koronivia's joint action for agriculture


COP 23: a landmark decision recognising the unique potential of agriculture in the face of climate change, focusing on six interrelated topics: soil, nutrient use, water, livestock, adaptation assessment methods, and the socio-economic and food security dimensions of climate change in the agricultural sectors.

2018 Katowice Climate Package - Transparency




2019 Improvement to 2006 IPCC guidelines for Greenhouse gas inventories






7.8 milliard



+1°C



CO₂ 414 ppm



2020



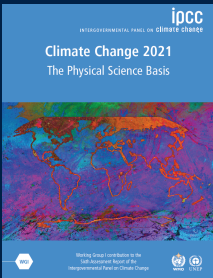
b) D'inviter toutes les Parties à engager ou amplifier les préparatifs internes de leurs contributions prévues déterminées au niveau national, sans préjudice de la nature juridique desdites contributions, dans la perspective de l'adoption d'un protocole, d'un autre instrument juridique ou d'un texte convenu d'un commun accord ayant valeur juridique, élaboré au titre de la Convention et applicable à toutes les Parties, en vue d'atteindre l'objectif de la Convention tel qu'énoncé en son article 2, et d'en faire part bien avant la vingt et unième session de la Conférence des Parties (d'ici au premier trimestre 2015 pour les Parties qui sont prêtes à le faire) d'une manière propre à améliorer la clarté, la transparence et la compréhension des contributions prévues, sans préjudice de la nature juridique desdites contributions;

The only programme dealing with agriculture and food security under the UNFCCC

2021

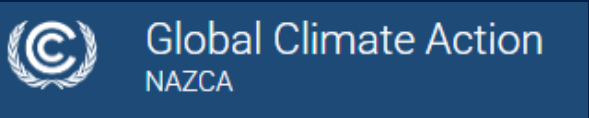
Glasgow Pact

Several initiatives around the AFOLU sector: FACT (Forest, Agriculture and Commodity Trade) roadmap, Just Rural Transition, declaration on forests and land use, Global methane pledge, Raising climate ambition and actions for agriculture and food systems: Boosting Koronivia, etc.



2022

Establishment of a loss and damage fund to help vulnerable countries cope with the impact of climate change
Agreement on targets for the Global Goal on Adaptation
Net zero commitments of non state entities



2023

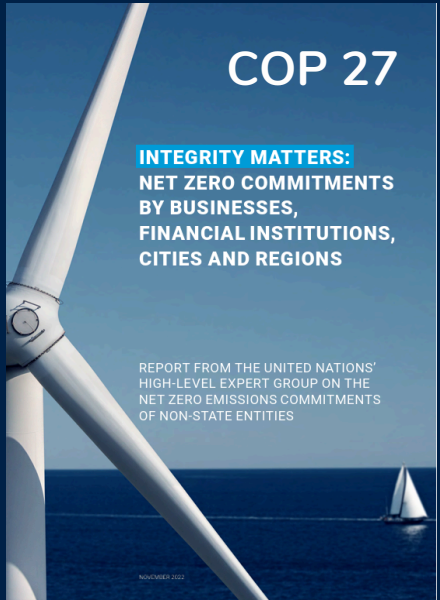
Year of the first global stocktake

2024

New Collective Quantified Goal on Climate Finance

2025

NDC 3



Paris, France

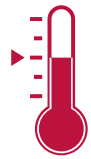


SECTAIRE EXECUTIVE CCNUCC

PRESIDENT

SECRET

Article 2, Implementation of the Paris Agreement



+2°C

To limit the rise in global average temperature to below 2°C compared with pre-industrial levels and by continuing the action taken to limit the rise in temperature to 1.5°C compared with pre-industrial levels [...].



Strengthening our ability to adapt

to the adverse effects of climate change and promoting resilience to these changes and low greenhouse gas emission development, in a way that does not threaten food production;



Financial flows

Make financial flows compatible with a development profile that is low in greenhouse gas emissions and resilient to climate change.

Key elements of the Paris Agreement



Article 3 - NDCs

Efforts to combat climate change must become progressively more ambitious over time



Article 4 - Mitigation

Achieving a global cap on greenhouse gas emissions as soon as possible
Communication of NDCs every 5 years



Article 5 - GHG sinks and reservoirs and REDD+

Take measures to conserve and enhance biomass, forests and greenhouse gas sinks and reservoirs



Article 7 - Adaptation

Adaptation is recognised as a key element of the long-term global response to climate change and an urgent need for developing country Parties. Parties must submit an adaptation communication on adaptation priorities, needs, plans and actions (Article 7.10). This communication must be submitted and updated periodically, as a component of, or in conjunction with, other communications such as NAPs, NDCs or national communications (Article 7.11).

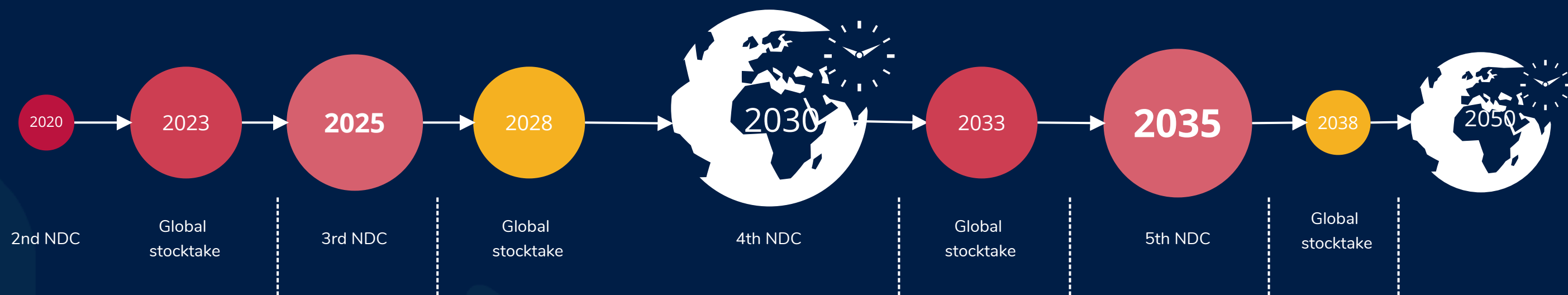


Article 13 - Transparency of measures

As part of the transparency of measures, each Party must regularly provide: a national GHG inventory, prepared using methodologies approved by the IPCC and the CMA; and the information needed to monitor progress in implementing and achieving its mitigation NDC (Paragraph 13.7).



PA architecture



----- Every two years, a biennial transparency report (BTR), a national GHG inventory report, and an adaptation communication
----- Every four years, a national communication

Article 4 - In order to achieve the long-term temperature goal set out in Article 2, Parties aim to **reach global peaking of greenhouse gas emissions as soon as possible**, recognizing that peaking will take longer for developing country Parties, and to **undertake rapid reductions** thereafter in accordance with best available science, so as to **achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century**, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.



PRESIDENT

SECRETARY TO THE
GOVERNING BODIES



COP24 • KATOWICE
UNITED NATIONS CLIMATE CHANGE CONFERENCE
POLAND 2018



"Katowice Climate Package"

Defines the essential procedures and mechanisms that make the Paris Agreement operational

Establish an **effective international system for promoting and monitoring progress**, while giving countries the means to set up national systems for implementing the Agreement. Enable countries to **transparently deliver their share of action to meet the global challenge of climate change**.

FCCC/PA/CMA/2018/3/Add.2

Decision 18/CMA.1

Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement

C. Methods

1. Methodologies, parameters and data

20. Each Party shall use the 2006 IPCC Guidelines, and shall use any subsequent version or refinement of the IPCC guidelines agreed upon by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA). Each Party is encouraged to use the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

D. Metrics

37. Each Party shall use the 100-year time-horizon global warming potential (GWP) values from the IPCC Fifth Assessment Report, or 100-year time-horizon GWP values from a subsequent IPCC assessment report as agreed upon by the CMA, to report aggregate emissions and removals of GHGs, expressed in CO₂ eq. Each Party may in addition also use other metrics (e.g. global temperature potential) to report supplemental information on aggregate emissions and removals of GHGs, expressed in CO₂ eq. In such cases, the Party shall provide in the national inventory document information on the values of the metrics used and the IPCC assessment report they were sourced from.

III. Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement

C. Information necessary to track progress made in implementing and achieving its nationally determined contribution under Article 4 of the Paris Agreement

65. Each Party shall identify the indicator(s) that it has selected to track progress towards the implementation and achievement of its NDC under Article 4. Indicators shall be relevant to a Party’s NDC under Article 4, and may be either qualitative or quantitative.

66. These indicators could include, as appropriate, for example: net GHG emissions and removals, percentage reduction of GHG intensity, relevant qualitative indicators for a specific policy or measure, mitigation co-benefits of adaptation actions and/or economic diversification plans or other (e.g. hectares of reforestation, percentage of renewable energy use or production, carbon neutrality, share of non-fossil fuel in primary energy consumption and non-GHG related indicators).

Table 8.7 | GWP and GTP with and without inclusion of climate–carbon feedbacks (cc fb) in response to emissions of the indicated non-CO₂ gases (climate-carbon feedbacks in response to the reference gas CO₂ are always included).

	Lifetime (years)		GWP ₂₀	GWP ₁₀₀	GTP ₂₀	GTP ₁₀₀
CH ₄ ^b	12.4 ^a	No cc fb	84	28	67	4
		With cc fb	86	34	70	11
HFC-134a	13.4	No cc fb	3710	1300	3050	201
		With cc fb	3790	1550	3170	530
CFC-11	45.0	No cc fb	6900	4660	6890	2340
		With cc fb	7020	5350	7080	3490
N ₂ O	121.0 ^a	No cc fb	264	265	277	234
		With cc fb	268	298	284	297
CF ₄	50,000.0	No cc fb	4880	6630	5270	8040
		With cc fb	4950	7350	5400	9560

Notes:
Uncertainties related to the climate–carbon feedback are large, comparable in magnitude to the strength of the feedback for a single gas.
^a Perturbation lifetime is used in the calculation of metrics.
^b These values do not include CO₂ from methane oxidation. Values for fossil methane are higher by 1 and 2 for the 20 and 100 year metrics, respectively (Table 8.A.1).

Source:

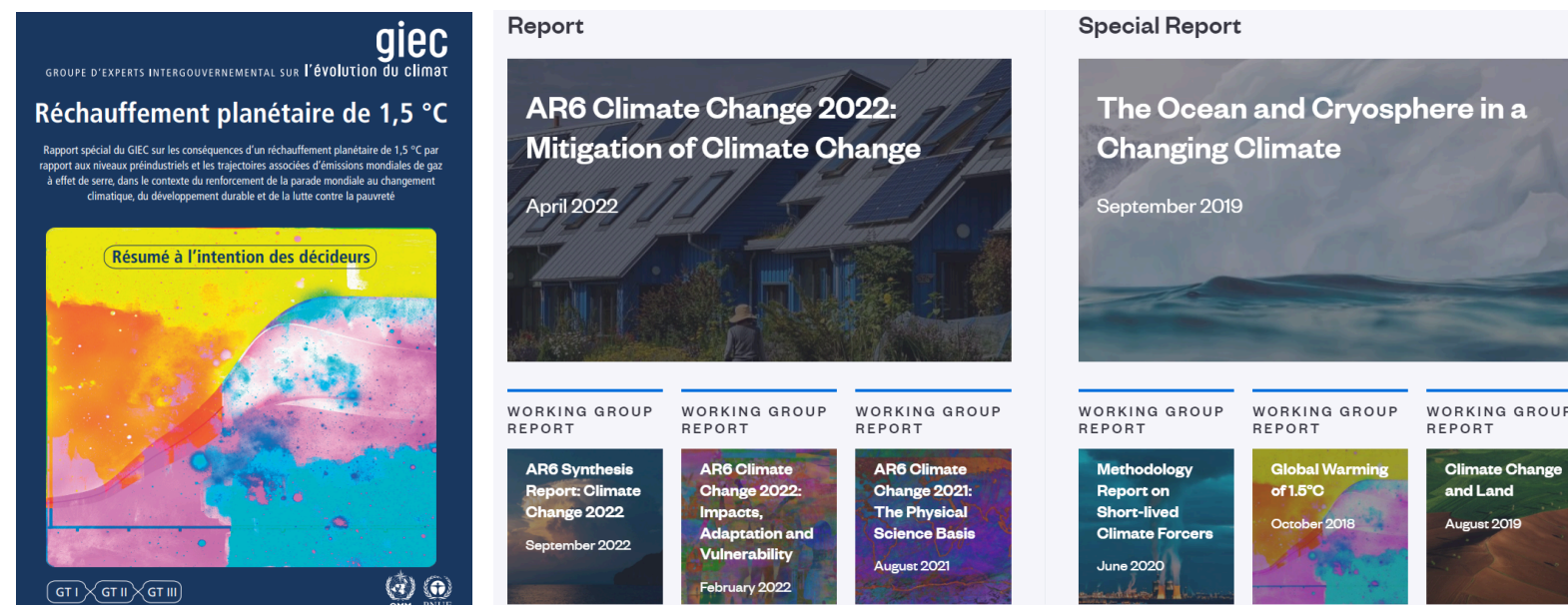
FCCC/PA/CMA/2018/3/Add.2



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Established in 1988 by WMO and UNEP to:

- Conduct periodic assessments of the science, impacts and socio-economic aspects of climate change, as well as adaptation and mitigation options to address it (working groups);
- Evaluate and develop, where necessary, methodologies such as the IPCC Guidelines for National Greenhouse Gas Inventories;
- Provide scientific/technical/socio-economic advice, as requested, to the UNFCCC and its bodies.



Source:
<https://www.ipcc.ch/>

Three working groups

- The physical Science Basis

Provides the **most up-to-date physical understanding of the climate system and climate change**, bringing together the latest advances in climate science and combining multiple sources of data from paleoclimate, observations, process understanding and global and regional climate simulations

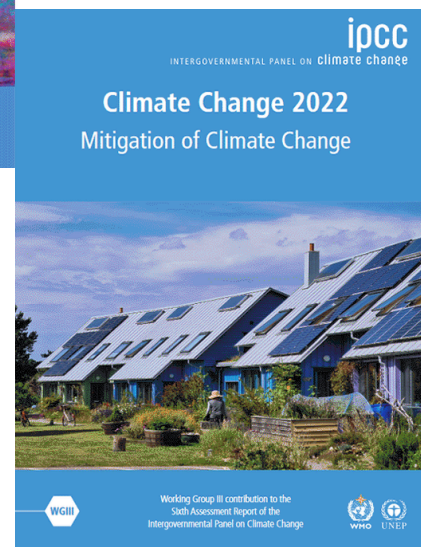
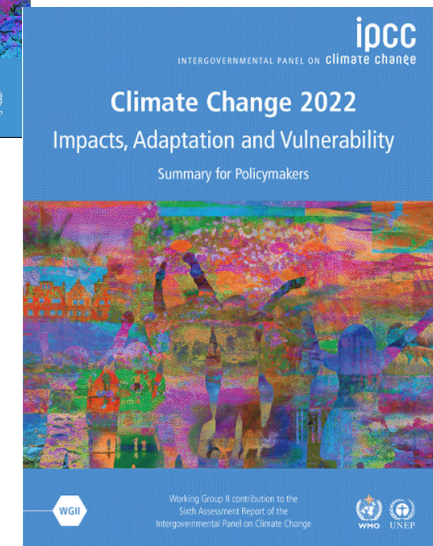
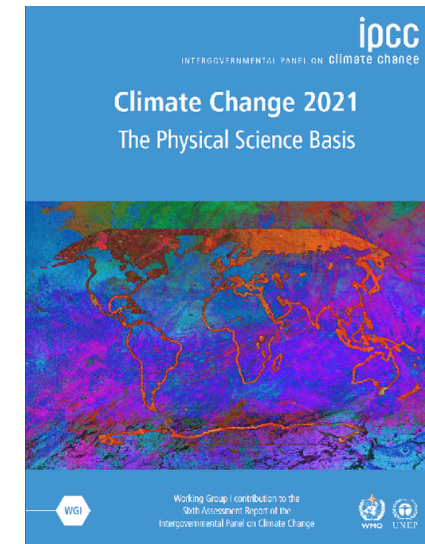
- Impacts, Adaptation and Vulnerability

Assesses the **impacts of climate change, examining ecosystems, biodiversity and human communities at global and regional levels**. It also reviews the vulnerabilities, capacities and limitations of the natural world and human societies to adapt to climate change.

- Mitigation of Climate Change

Provides an **updated global assessment of climate change mitigation progress and commitments, and examines the sources of global emissions**. It explains the evolution of emission reduction and mitigation efforts, assessing the impact of national climate commitments against long-term emission targets.

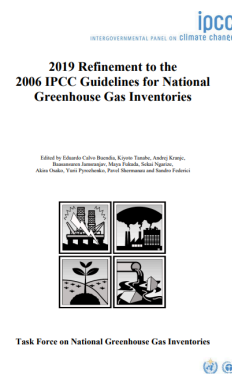
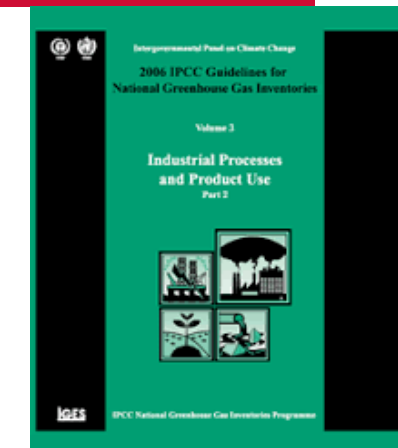
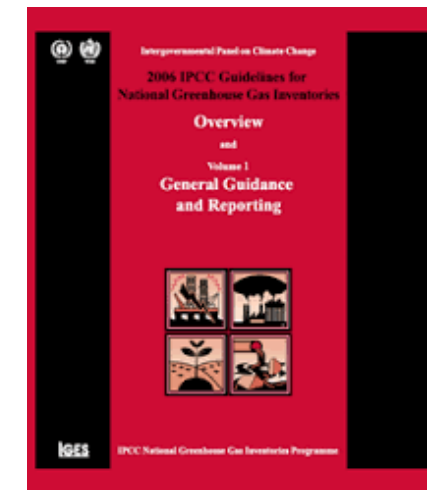
- The "Task Force on National Greenhouse Gas Inventories" (IPCC TFI)



The **IPCC TFI** was set up by the IPCC at its 14th session (October 1998) to oversee the IPCC National Greenhouse Gas Inventory Programme (IPCC-NGGIP).

The TFI is responsible for the internationally-agreed methodologies used **for the calculation of national anthropogenic GHG emissions and removals by signatories to the UNFCCC and its Paris Agreement**

- To develop and improve/refine international methodologies for estimating and reporting national GHG emissions and carbon sequestration,
- To encourage member countries to adopt the methodologies developed,
- To set up and maintain a database of emission factors.



Coming soon...

For the AR7 cycle, the TFI has been tasked with the production of **two new Methodology Reports**:

- emissions of **short-lived climate forcings**, which relate to the emission of indirect GHGs and precursor substances that have only been partly covered by IPCC methodologies until now; and
- net emissions from **carbon dioxide removal technologies and carbon capture utilisation and storage activities**.

SLCF include aerosols (sulphate, nitrate, ammonium, carbonaceous aerosols, mineral dust and sea spray), which are also called particulate matter (PM), and chemically reactive gases (methane, ozone, some halogenated compounds, nitrogen oxides, carbon monoxide, non-methane volatile organic compounds, sulphur dioxide and ammonia).

Temperature change in Serbia since 1850

**Climate change mitigation &
Sustainable businesses:
a collective effort**

1860

1880

1900

1920

1940

1960

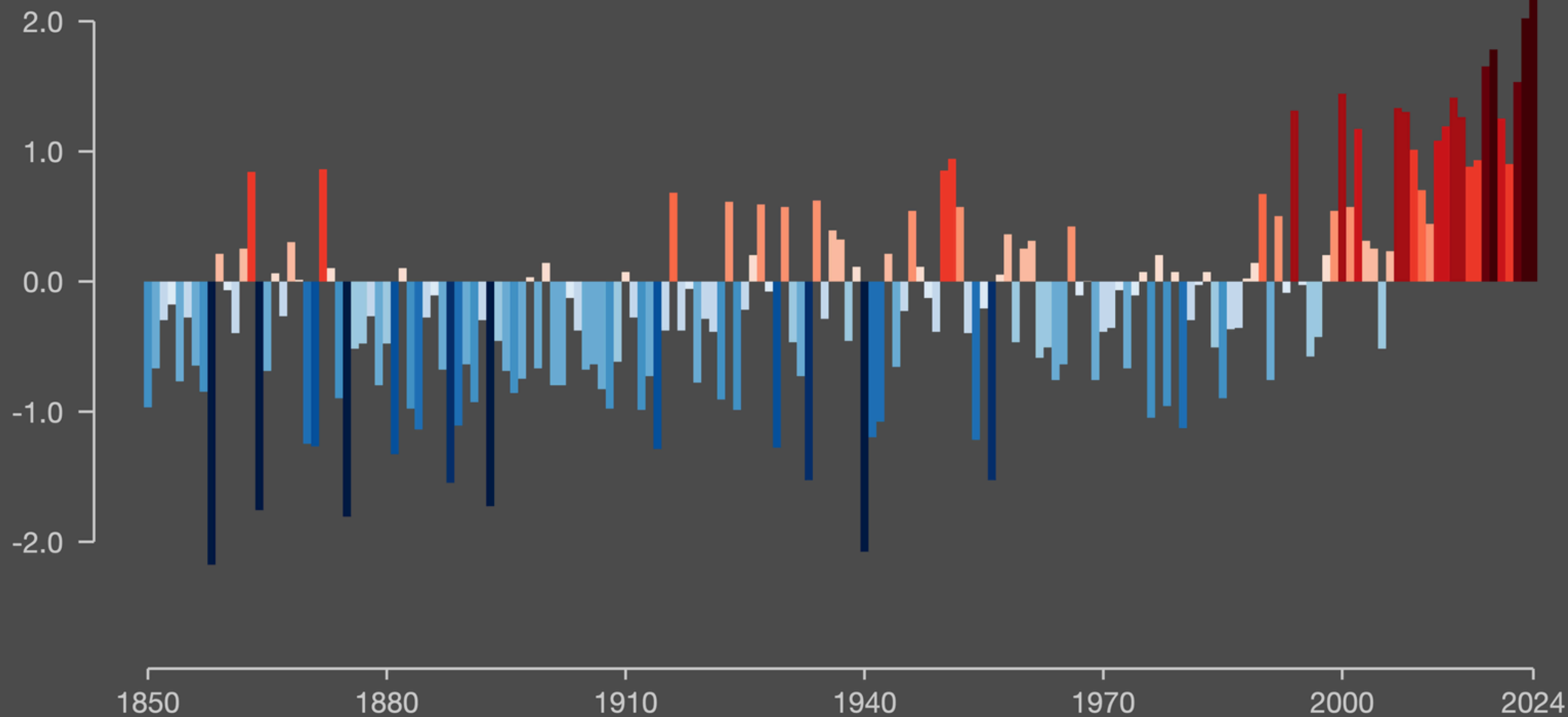
1980

2000

2020

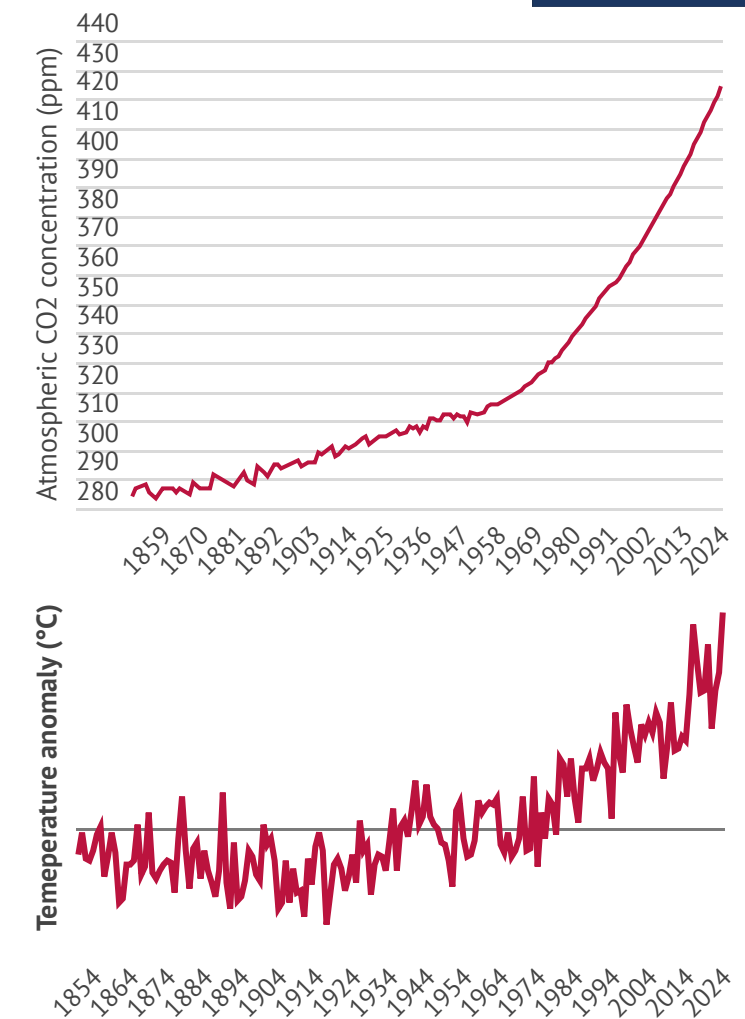
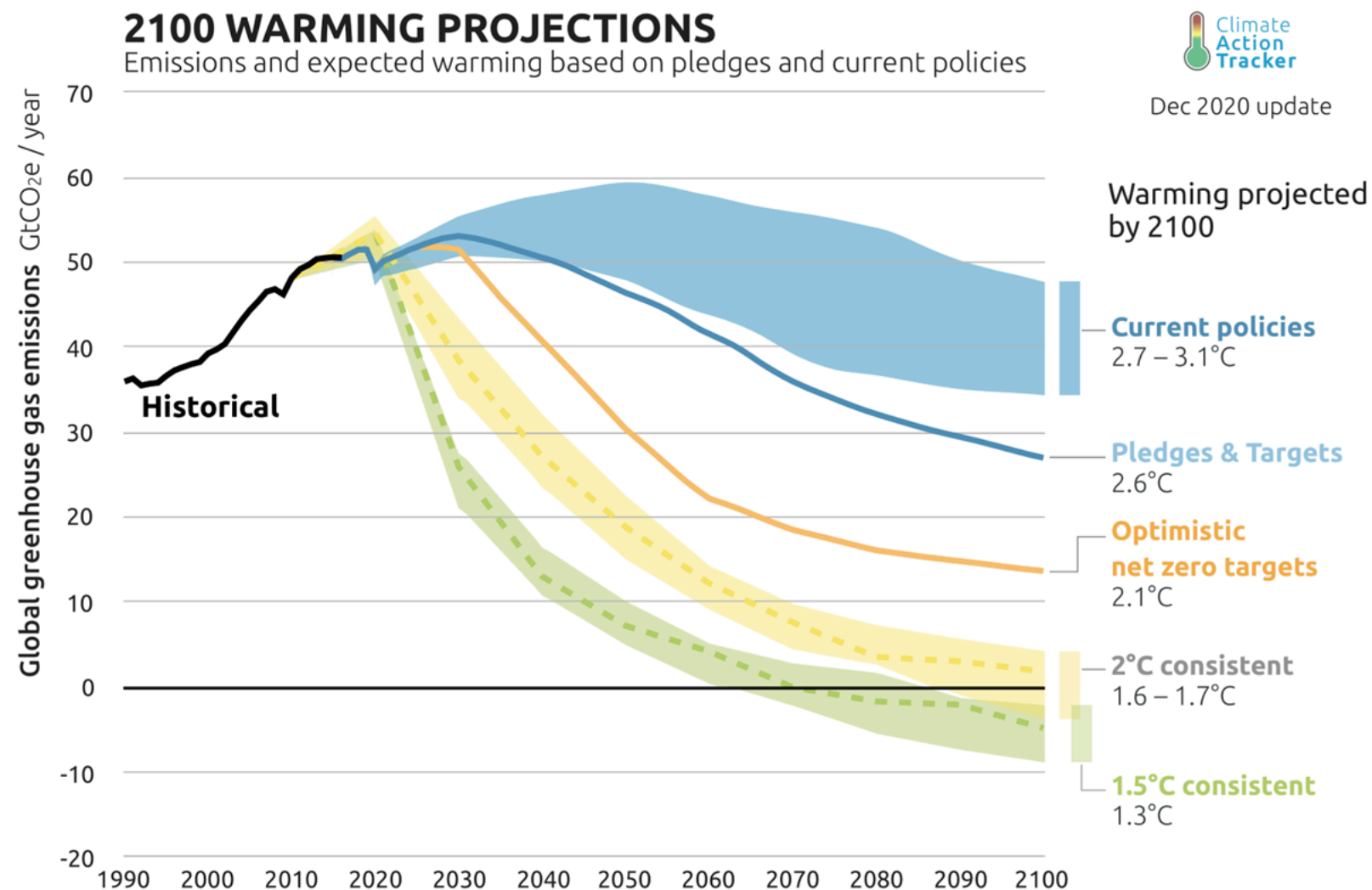
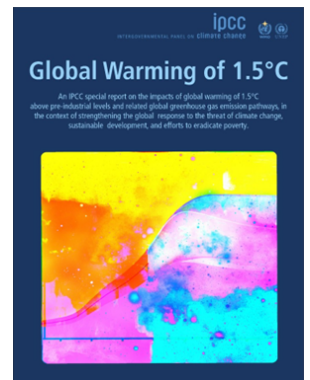
Temperature change in Serbia

Relative to average of 1961-2010 [°C]



Why it matters?

Without transformation in society and rapid implementation of ambitious emissions cuts, limiting warming to 1.5°C while achieving sustainable development will be exceedingly difficult, if not impossible.



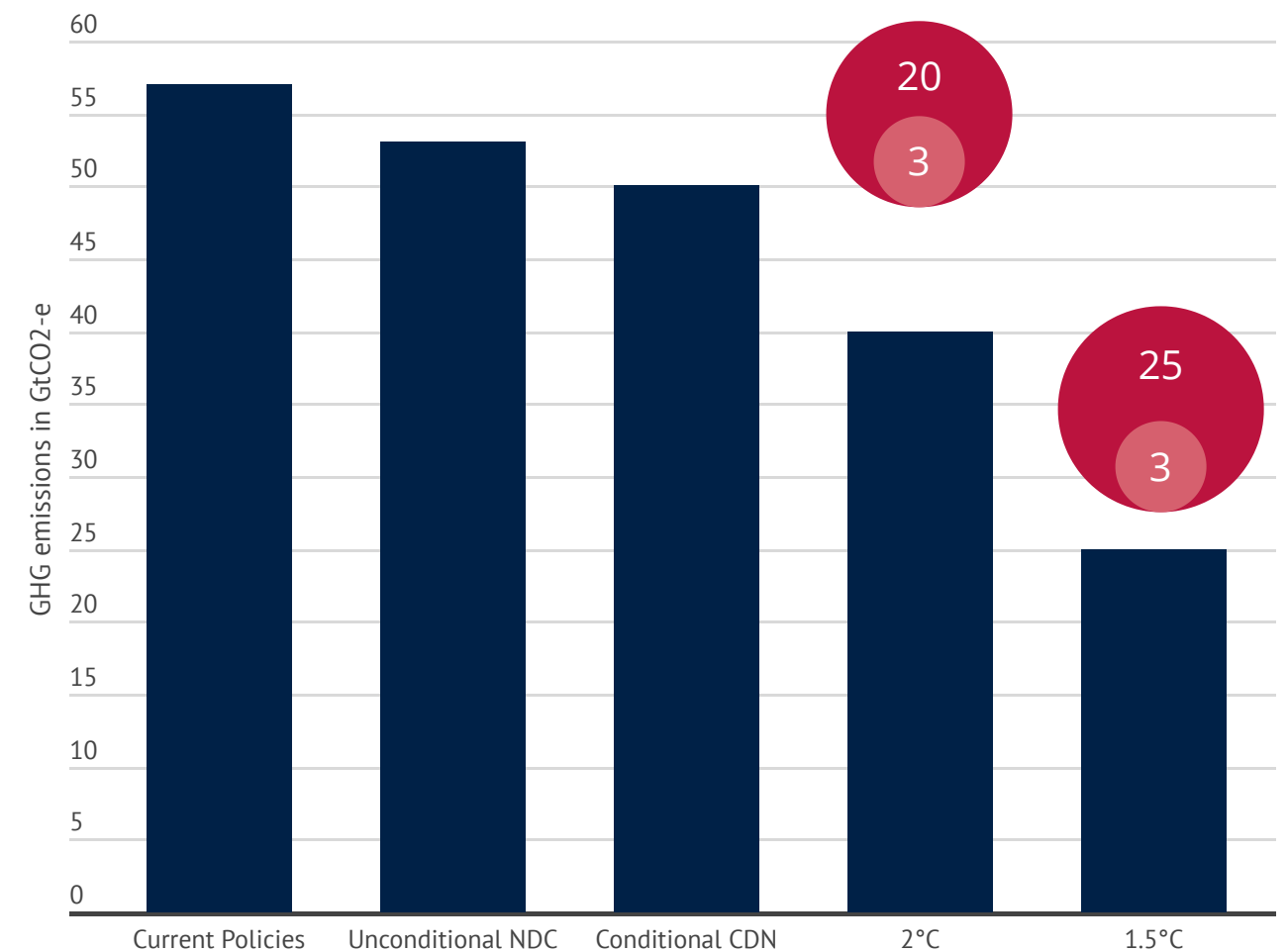
State of play of last NDCs (2020)

Without stronger policies beyond those implemented by the end of 2020, **GHG emissions** are expected to **increase beyond 2025**, resulting in global warming of about **3.2°C by 2100**.

Global GHG emissions have continued to increase and **would need to decrease by 43% from 2019 to limit warming to 1.5°C**.

Source:
AR6, WG III, 2022, Chapitre 4
CPI & FAO. 2025. The Triple Gap in Finance for Agrifood Systems. Revised. Rome. <https://doi.org/10.4060/cd3611en>

Overall GHG Emissions and Emission Differences between Scenarios



Gap between unconditional NDCs and GHG temperature targets in 2030

Gap between conditional NDCs and GHG temperature targets in 2030

Source:
AR6, WG III, 2022, Chapitre 4

Climate & business

Integrating climate actions into the business model will help companies to meet their climate goals and make their business more resilient by acknowledging and mitigating climate-related financial risks



Financial accounting
performance of the
business on profit,
cash flow, assets....



Sustainability
Environmental and
social impacts to your
stakeholders,
customers, society...



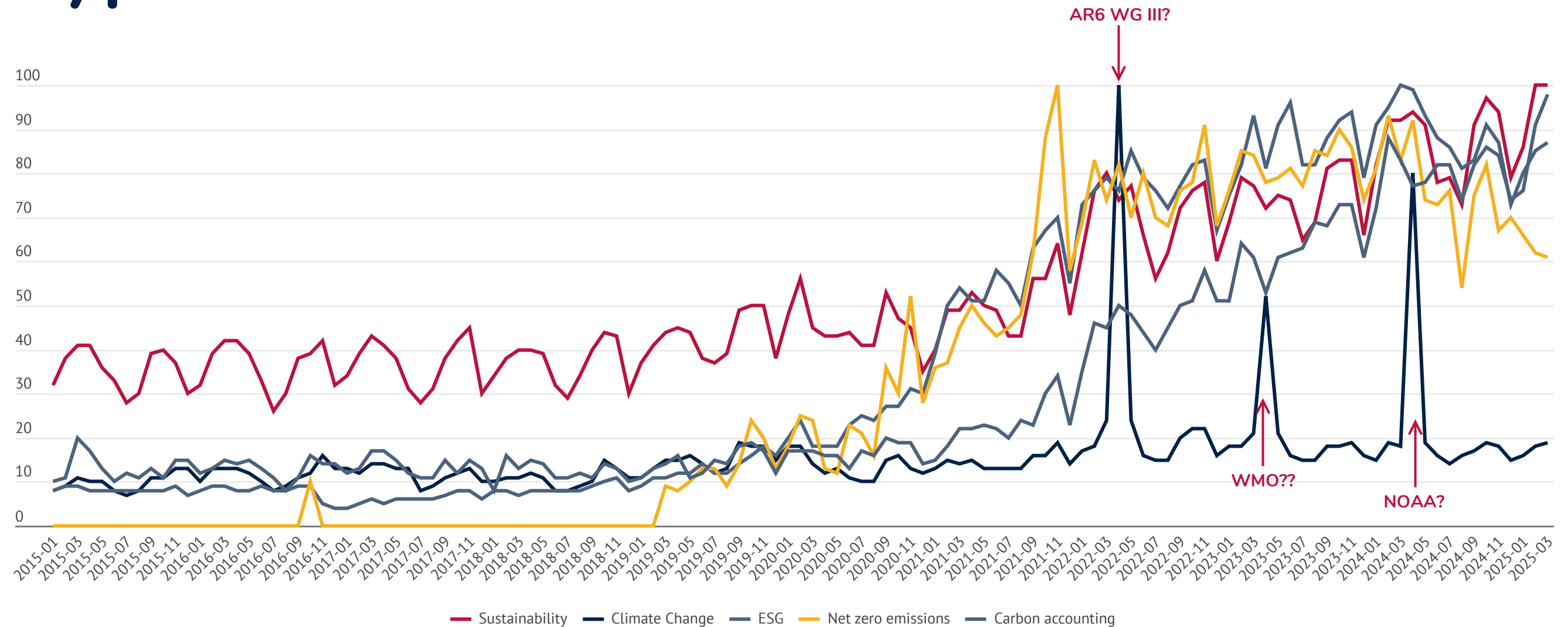
Source: Berenberg, 2018. Understanding the SDGs in sustainable investing

Environment, Social and Governance

- Set of standards to measure the sustainability and societal impact of an investment in a company
- Used as criteria for investors to evaluate companies in which they might want to invest
- Key environmental issues include **natural resources** (e.g. biodiversity, land use, water stress), **pollution and waste** (e.g. packaging), **environmental opportunities** (e.g. in renewable energy) and **climate change** (e.g. GHG emissions, CFP)

Hype?

In part, but increased interest over time of ESG and net zero emissions



Interest over time in sustainability, climate change, ESG, net zero emissions and carbon accounting from January 2015 to March 2025

Data source: Google trend

World Meteorological Organization (WMO) State of the Global Climate Report: This report offers an in-depth analysis of key climate indicators, including greenhouse gas concentrations, global temperatures, sea-level rise, and ocean heat content. For instance, the 2022 report was released on April 21, 2023, highlighting ongoing climate changes and their global impacts.

World Meteorological Organization

National Oceanic and Atmospheric Administration (NOAA) Global Climate Report: NOAA publishes monthly and annual climate reports. The April 2024 Global Climate Report, released later that year, detailed significant climate anomalies and events for that month

Early adopters



The 1.5°C Supply chain leaders have already committed:

- We have all committed to **reducing our GHG emissions across our value chain in line with the 1.5°C ambition**. We **integrate climate in our business strategy** and drive climate action as part of our wider role in society (as members of the Exponential Roadmap Initiative and/or Business Ambition for 1.5°C)
- We will **work together with our suppliers and business partners** to join us on this journey by taking action **aiming to halve GHG emissions before 2030, and every decades, reaching net-zero before 2050** and communicate progress annually, e.g. as outlined in the SME Climate Commitment. To promote, reward and inspire action, we plan to **make climate related targets and performance a key supplier purchasing criteria within one year**.
- We **recognize the challenge this poses for our suppliers and we will support them**, working together to reach our shared goals. In addition, we will support SMEs globally through the SME Climate Hub with tools, knowledge and best practice for implementing a robust climate strategy, to support broad action.

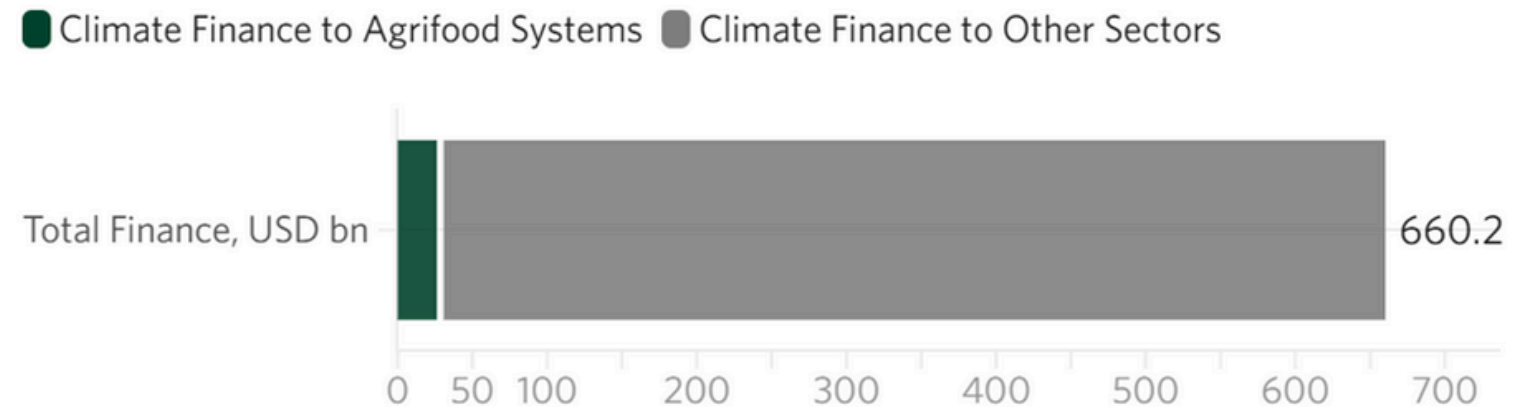
Why it is important for businesses?

- GHG emissions reductions, net zero emissions, carbon neutrality...are key themes around the world
- More climate actions are taken, e.g. waves of green new deals, climate legislation, more legal complaints filed against companies, increase in the population's education/school towards CC
- With the decarbonization of the energy sector, agriculture could become the first GHG emitter
- **Compliance with existing and upcoming regulations:** Integrated the sooner in businesses the easier it will be to stay in line with international commitments
- Decrease the risks from carbon regulation, e.g. carbon tax
- **Competitive edge** by aligning with sustainability trends and green market demands.
- Boost companies' reputation, investors confidence, innovation and competitiveness & market image
- **Enhanced reputation, youth** is also your next customer

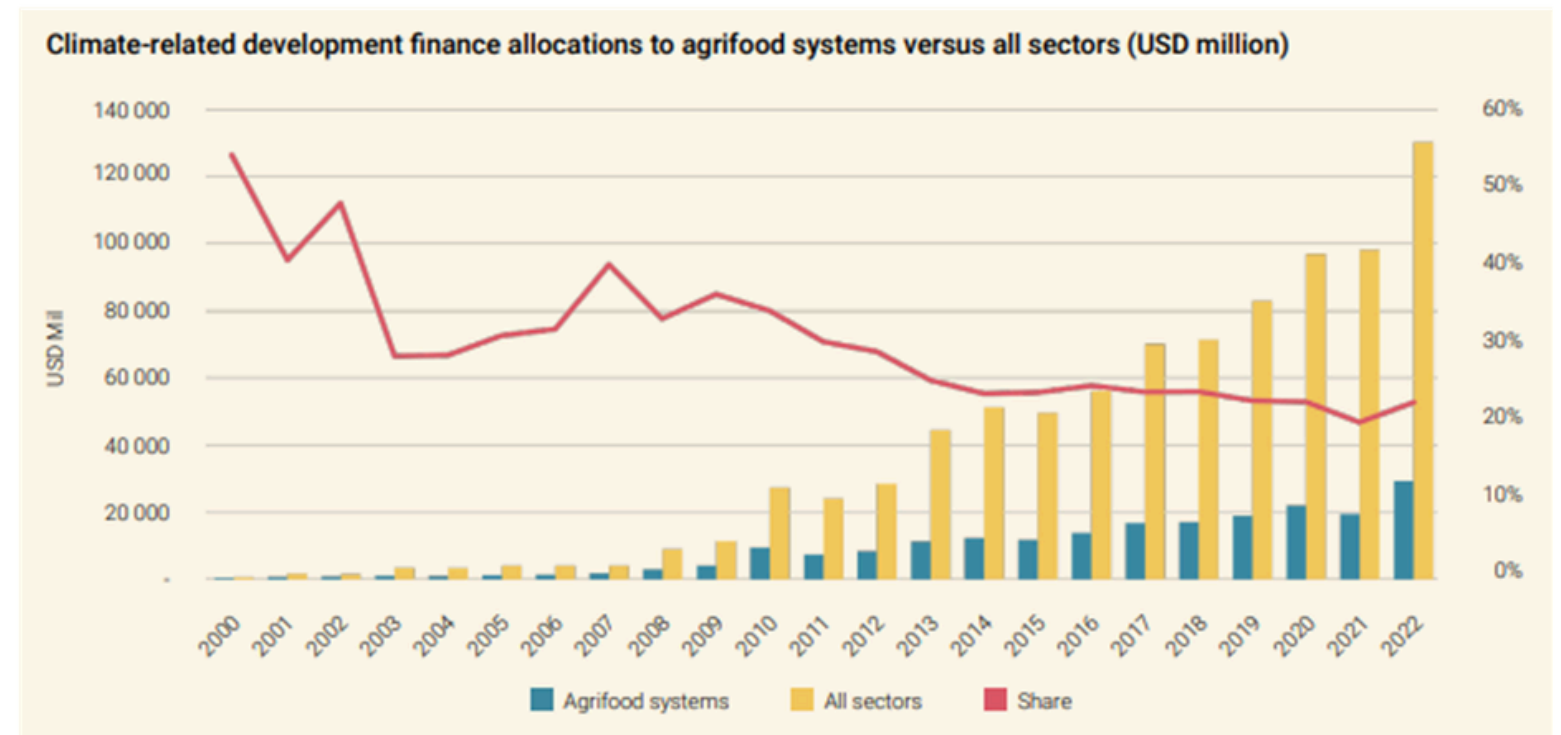


Climate finance

In 2019/20, agrifood systems received a tiny fraction (4.3%) of total global climate finance tracked at the project level.

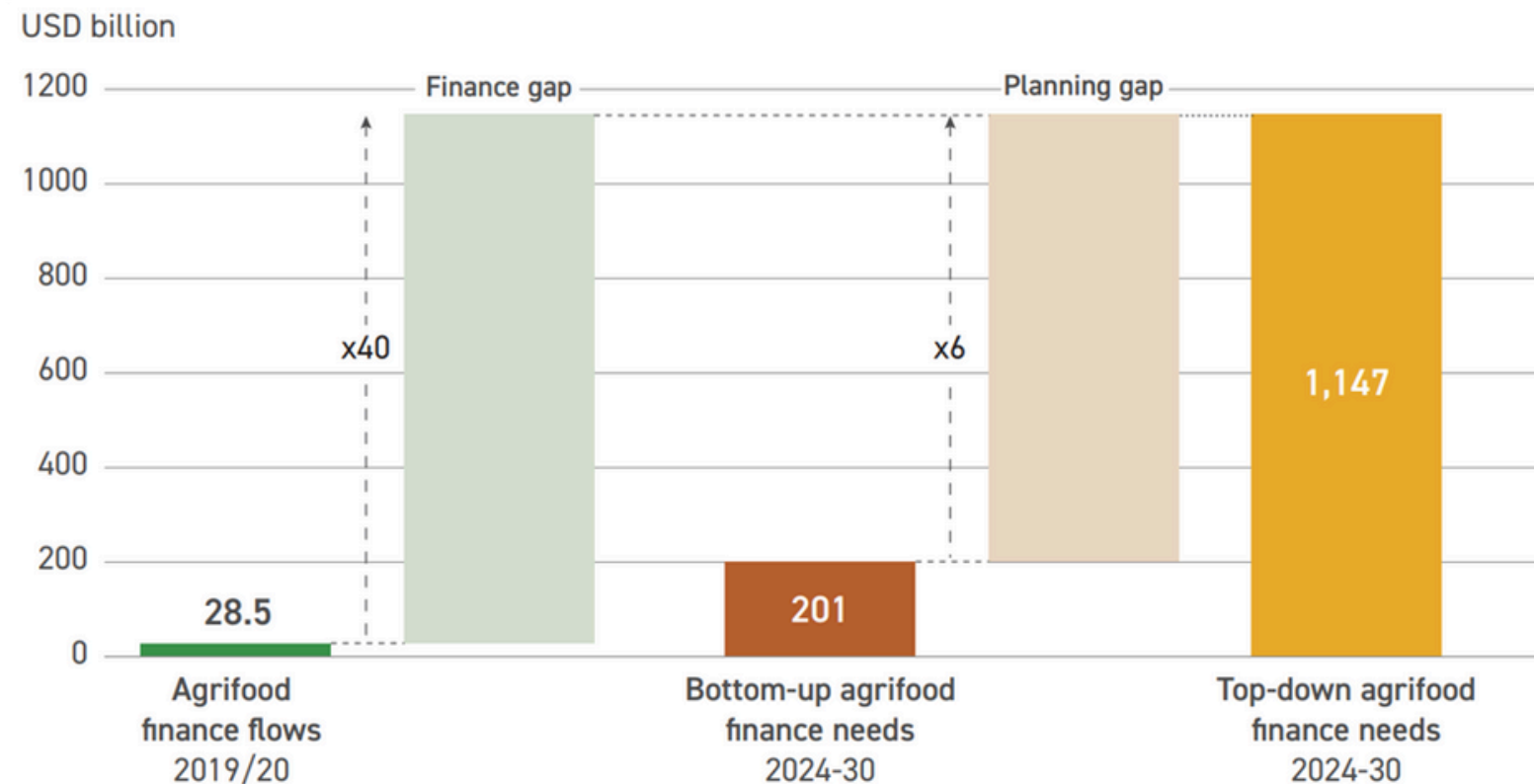


Climate-related development finance to agrifood systems saw a significant decline in 2020–2021.



Climate finance

The cost of transitioning global agrifood systems to a 1.5°C-aligned pathway is estimated to run to over a trillion dollars a year



65% of climate finance needs for agrifood systems reported in NDCs are conditional, or dependent on international public and private finance sources

Both analyses are impeded by significant gaps in the availability and quality of data, making it difficult to accurately assess the disparities in investment needs between the two methods.



Module 1 | Key takeaway notes

Business goals served by GHG inventories

- **Managing GHG risks and identifying reduction opportunities**

As policies tighten and carbon pricing becomes more common, knowing your emissions is crucial.

Businesses can proactively address future carbon constraints and find cost-effective emissions reductions, which can result in both cost savings and competitive advantage.

- **Public reporting and participation in voluntary GHG programs**

Investors, customers, and regulators are increasingly demanding transparency.

Voluntary reporting builds trust and brand reputation, and positions companies as leaders in sustainability, which is useful for ESG ratings, investor relations, and customer loyalty.

- **Participating in mandatory reporting programs**

In many jurisdictions, reporting GHGs is no longer optional.

Being prepared ensures regulatory compliance, avoids fines or sanctions, and facilitates smooth participation in existing or upcoming governmental carbon regulations.

- **Participating in GHG markets**

Cap-and-trade systems and carbon pricing mechanisms are expanding globally.

Accurate inventories are essential for participating in carbon trading, determining allowance needs, and estimating carbon tax liabilities. This also enables internal carbon pricing within firms.

- **Recognition for early voluntary action**

Companies that act early often gain preferential treatment or credits under new schemes.

Good inventory data supports claims of “baseline protection”, which can lead to carbon credits, reputational benefits, and policy influence.

Source:

WRI & WBCSB, 2004. GHG protocol revised