Innovative Doctoral Courses for Sustainability (IDOCOS)

Meeting 2, assignment 1

Digital transformation and sustainable development

Wednesday, 22 February 2023 (9:00 – 10:30)

Introduction and questions related to assignment 1

Assignment 1: Digital transformation and sustainable development

a) Select a theme of relevance for the SDGs, e.g., education, energy, health, etc. Some of these are included in the literature for the course.

b) Write a report discussing the theme and a specific problem based on the course material and any other sources you find relevant.

You can discuss the theme and problem from a global perspective or a regional or local perspective.

Be critical and reflect on how did we get there?

What are the causes (always more than one)?

What are the options/scenarios/alternatives for the future?

What needs to be done?

Who are the stakeholders?

What are the risks and opportunities?

Maybe a SWOT table could be a way to end your report with a summary and concluding remarks.

The report should be maximum 3 000 words (500 words/page single-spaced = 6 pages), excluding references.

The problem

“First and foremost, it must be clear to us where we want to go, what we want to achieve (which goals we have), and how we will get there (which strategies we choose and the decisions we make). This may seem simple, but it is not.”

Course book: *Digital Transformation Organisations, Processes, Decisions, page 2*

1. “A clear vision for digital technologies is indispensable to address social and environmental challenges successfully.”

Course book: *Digitalization for Sustainability (D4S), 2022: Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation. Berlin: TU Berlin. Page 95*

2. ”The purpose of digitalisation needs to be subordinated to the goals of a deep and sustainable transformation of society”

Course book: *Digitalization for Sustainability (D4S), 2022: Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation. Berlin: TU Berlin. Page 96*

"Runaway climate change, biodiversity loss, increasing social polarisation and an erosion of democracy require swift and decisive action."

"Digitalisation, in its current and mainstream form, does not deliver solutions and that incremental changes are insufficient to remedy this situation. What is needed, therefore, is a Digital Reset: a fundamental redirection of the purpose of digital technologies towards a deep sustainability transformation"

"Governments around the world, as well as the European Union and United Nations organisations, are currently putting forward new initiatives to govern digital technologies and media infrastructures. However, most of these policy initiatives disregard the broader implications of digitalisation for environmental ***sustainability*** *and* ***social justice****."*

Digitalization for Sustainability (D4S), 2022: Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation. Berlin: TU Berlin. (course book)

Concepts, see coursebook *Digital Transformation…* :

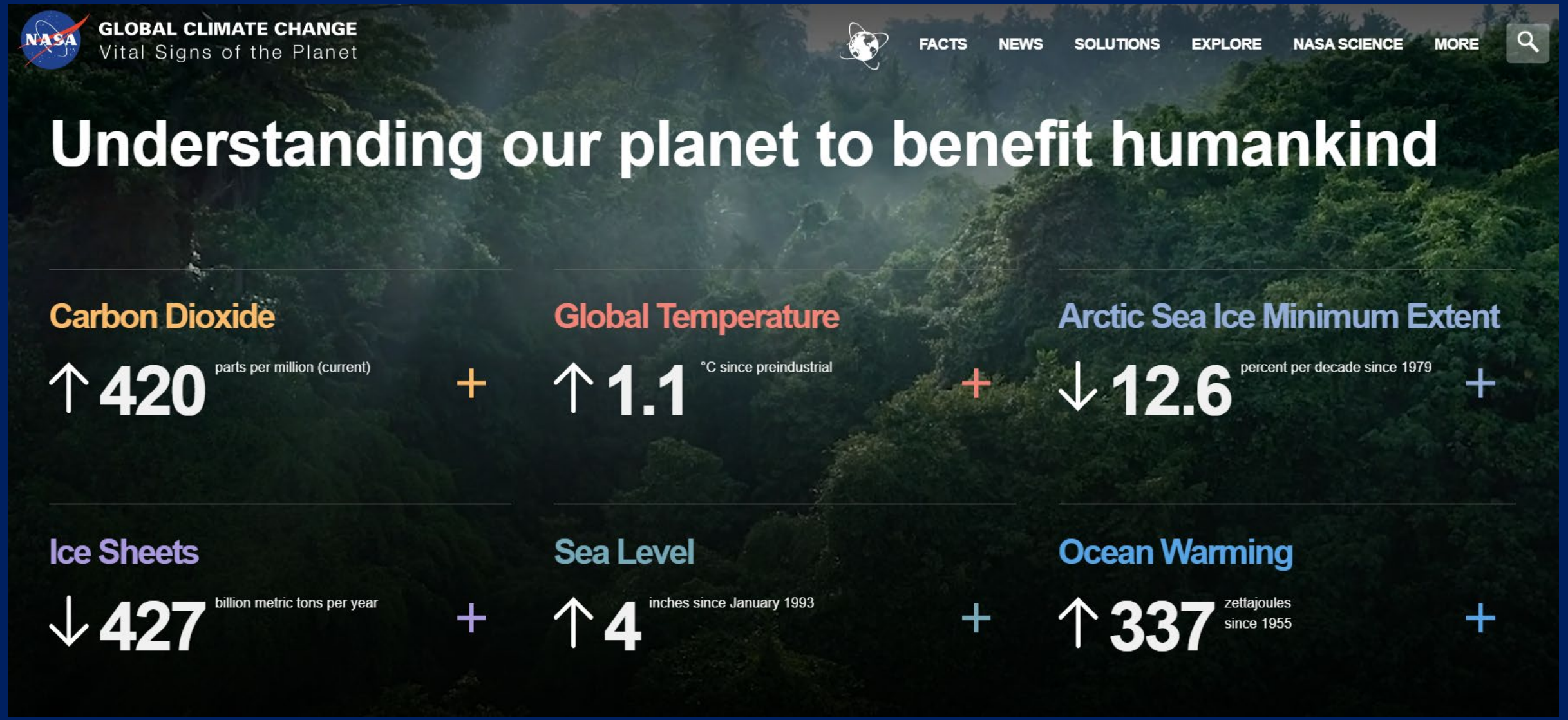
"What we mean by **digitisation** is the use of modern IT to create, deliver and use products (goods, services, and combinations of the two)."

"When we speak of **benefit and value**, we do not simply mean asset growth for shareholders (shareholder value); we also think of value for other stakeholders – co-workers, customers, suppliers and the organisational surrounding. Sometimes a venture can be positive to many, sometimes interests clash"

"…**digital transformation** is the integration of digital technology into all areas of societal activities and processes. Digital transformation is about transforming organisational and societal structures by introducing digital information systems and flows as well as managing such structures and routines utilising these flows."

"What then is **an organisation**? A classical answer is that it is a coop-eration to achieve a goal. People organise to manage to achieve together what they cannot achieve on their own."

The data – Global changes

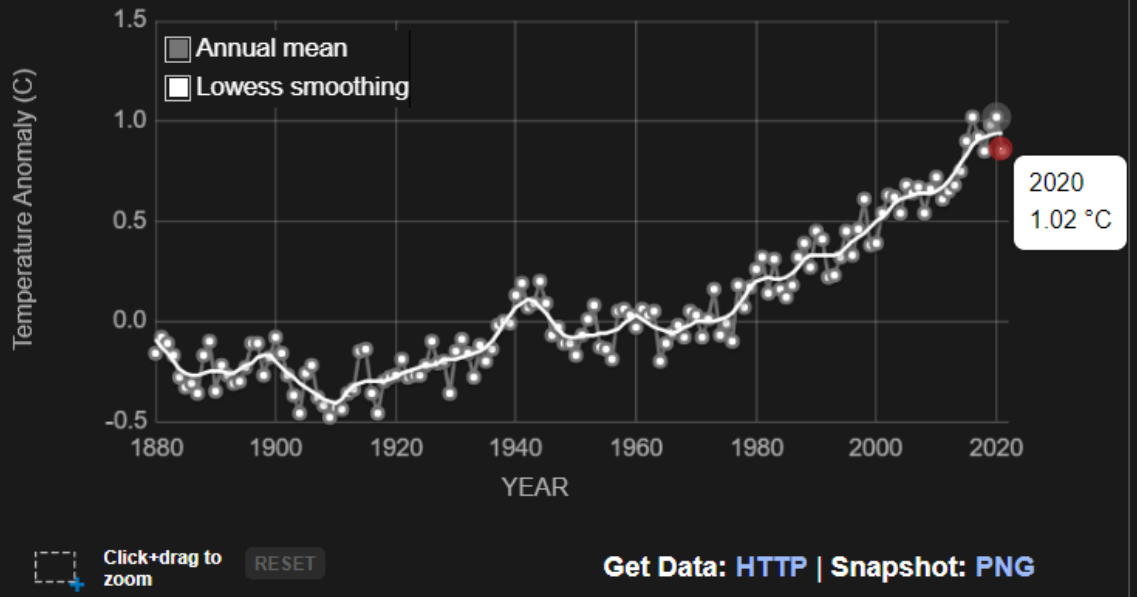


https://climate.nasa.gov/

Global Temperature

GLOBAL LAND-OCEAN TEMPERATURE INDEX

Data source: NASA's Goddard Institute for Space Studies (GISS). Credit: NASA/GISS



Click+drag to zoom RESET

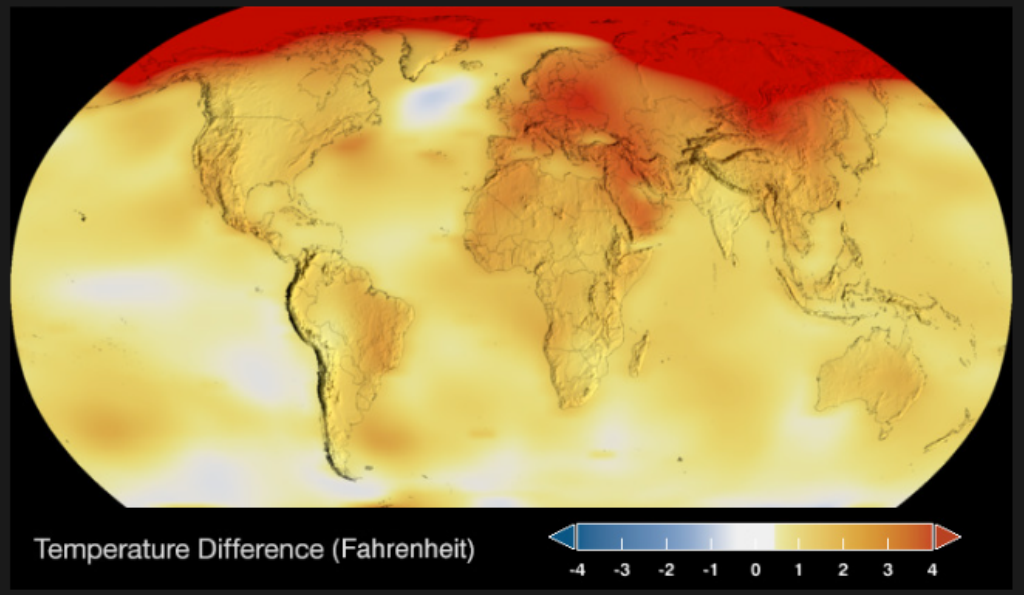
Get Data: HTTP | Snapshot: PNG

This graph shows the change in global surface temperature compared to the long-term average from 1951 to 1980. The year 2020 tied with 2016 for the hottest year on record since recordkeeping began in 1880 (source: NASA/GISS). NASA's analyses generally matches independent analyses prepared by the Climatic Research Unit and the National Oceanic and Atmospheric Administration (NOAA).

TIME SERIES: 1884 TO 2021

Data source: NASA/GISS
Credit: NASA's Scientific Visualization Studio

2021



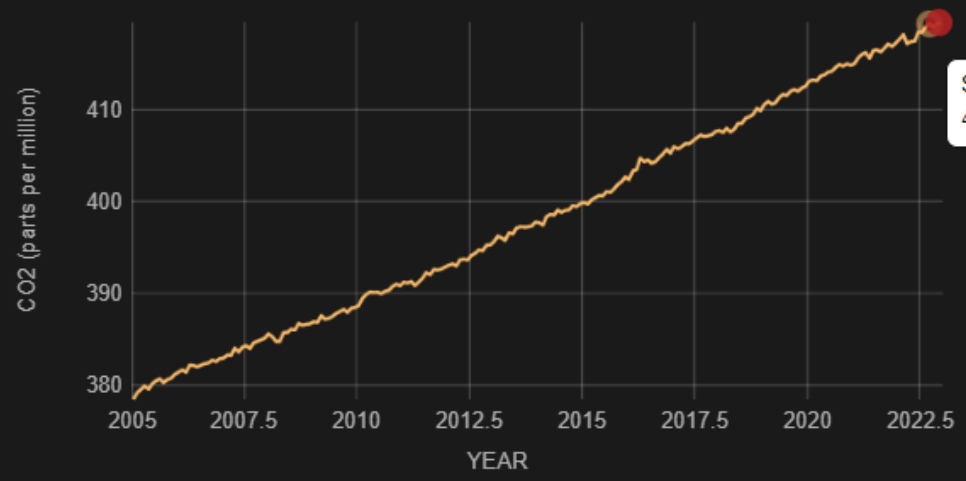
The animation above shows the change in global surface temperatures. Dark blue shows areas cooler than average. Dark red shows areas warmer than average. To smooth out variations due to short-term temperature changes (which are considered "noise" in the data), this map shows a 5-year running average.

https://climate.nasa.gov/

Carbon Dioxide

DIRECT MEASUREMENTS: 2005-PRESENT

Data source: Monthly measurements (average seasonal cycle removed). Credit: NOAA



Get Data: HTTPS | **Snapshot:** PNG

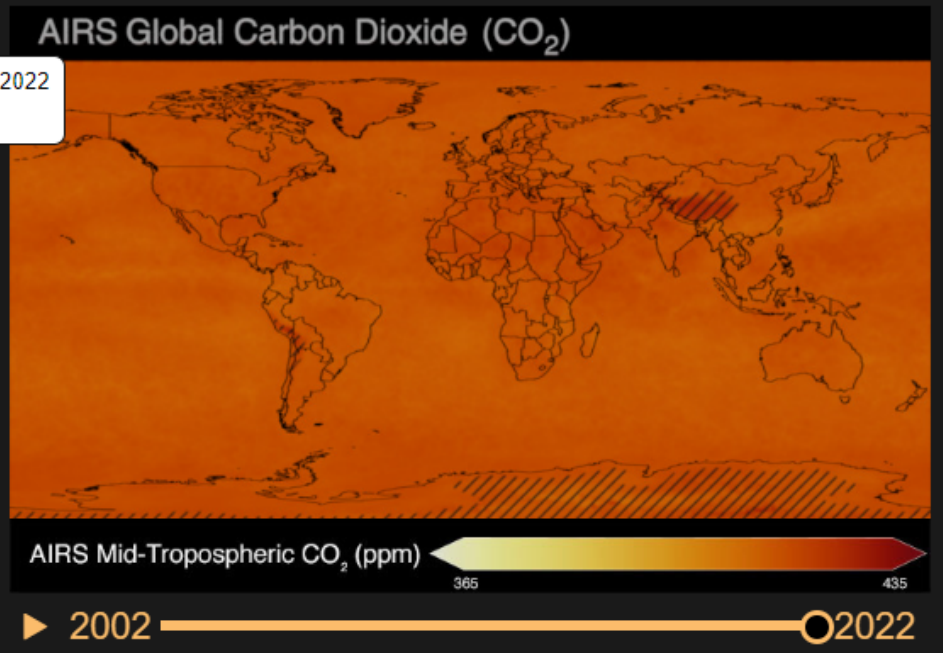
Carbon dioxide (CO_2) is an important heat-trapping gas, or greenhouse gas, that comes from the extraction and burning of fossil fuels (such as coal, oil, and natural gas), from wildfires, and from natural processes like volcanic eruptions. The first graph shows atmospheric carbon dioxide (CO_2) levels measured at Mauna Loa Observatory, Hawaii, in recent years, with natural, seasonal changes removed.

Since the beginning of industrial times (in the 18th century), human activities have raised atmospheric CO_2 by 50% – meaning the amount of CO_2 is now 150% of its value in 1750. This is greater than what naturally happened at the end of the last ice age 20,000 years ago.

TIME SERIES: 2002-2022

Data source: Atmospheric Infrared Sounder (AIRS). Credit: NASA

MAY
2022



The animated map shows how global carbon dioxide has changed over time. Note how the map changes colors as the amount of CO_2 rises from 365 parts per million (ppm) in 2002 to over 400 ppm currently. ("Parts per million" refers to the number of carbon dioxide molecules per million molecules of dry air.) These measurements are from the mid-troposphere, the layer of Earth's atmosphere that is 8 to 12 kilometers (about 5 to 7 miles) above the ground.

Henrik Hansson, IDOCOS (2023-02-22).

https://climate.nasa.gov/

Arctic Sea Ice Extent

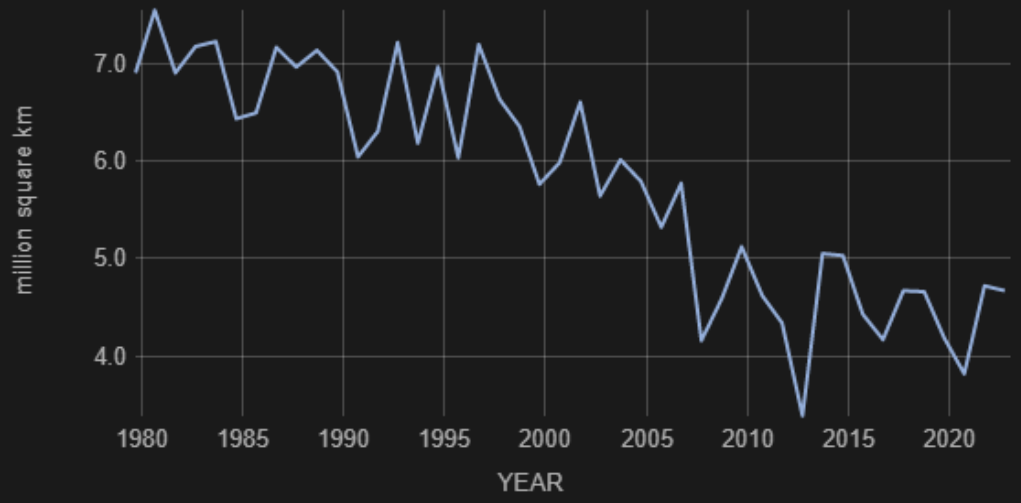
ANNUAL SEPTEMBER MINIMUM EXTENT

Data source: Satellite observations. Credit: NSIDC/NASA

RATE OF CHANGE

↓ 12.6

percent per decade



Click+drag to zoom RESET

Get Data: HTTPS | **Snapshot:** PNG

Arctic sea ice reaches its minimum extent (the area in which satellite sensors show individual pixels to be at least 15% covered in ice) each September. September Arctic sea ice is now shrinking at a rate of 13% per decade, compared to its average extent during the period of 1981 to 2010. This graph shows the size of the Arctic sea ice each September since satellite observations started in 1979. The monthly value shown is the average of daily observations across the month of September during each year and is measured from satellites.

TIME SERIES: 1979-2022

Data source: Satellite observations.
Credit: NASA Scientific Visualization Studio

2012

The animated map above shows the minimum size of the Arctic sea ice measured each year since 1979, based on satellite observations. The 2012 sea ice extent is the lowest in the satellite record.

full vital sign

https://climate.nasa.gov/

Henrik Hansson, IDOCOS (2023-02-22).

Ice Sheets

ANTARCTICA MASS VARIATION SINCE 2002

Data source: Ice mass measurement by NASA's GRACE satellites. **Gap represents time between missions.**
Credit: NASA

RATE OF CHANGE

↓ 151.0

billion metric tons per year since 2002

Click+drag to zoom RESET

Get Data: HTTP | **Snapshot:** PNG

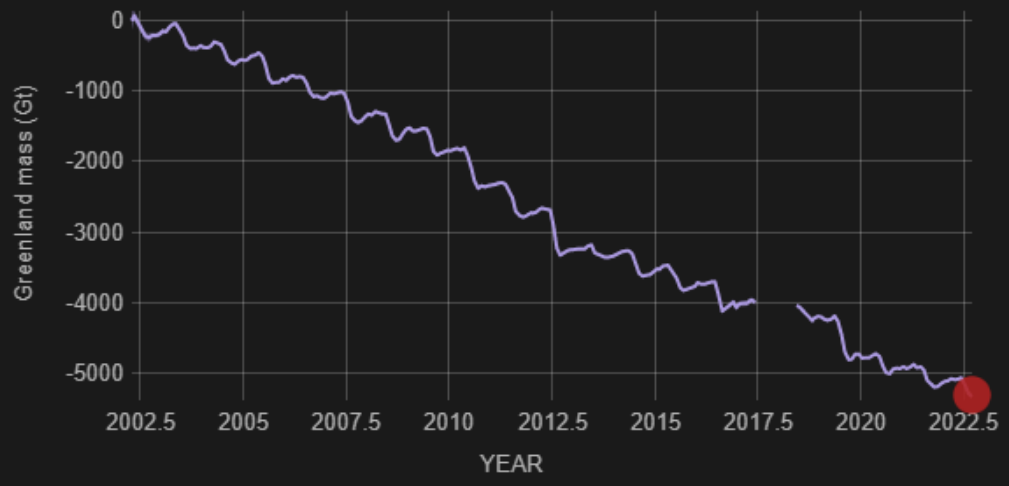
GREENLAND MASS VARIATION SINCE 2002

Data source: Ice mass measurement by NASA's GRACE satellites. **Gap represents time between missions.**
Credit: NASA

RATE OF CHANGE

↓ 273.0

billion metric tons per year since 2002



Click+drag to zoom RESET

Get Data: HTTP | **Snapshot:** PNG

Data from NASA's GRACE and GRACE Follow-On satellites show that the land ice sheets in both Antarctica (left chart) and Greenland (right chart) have been losing mass since 2002.

The GRACE mission ended in June 2017. The GRACE Follow-On mission began collecting data in June 2018 and is continuing to monitor both ice sheets. This record includes new data-processing methods and is continually updated as more numbers come in, with a delay of up to two months.

Note: You now need to create an Earthdata account to access NASA's ice sheet data. Register here for free. Once logged in, click "HTTP" under the charts on this page to access the data.

full vital sign

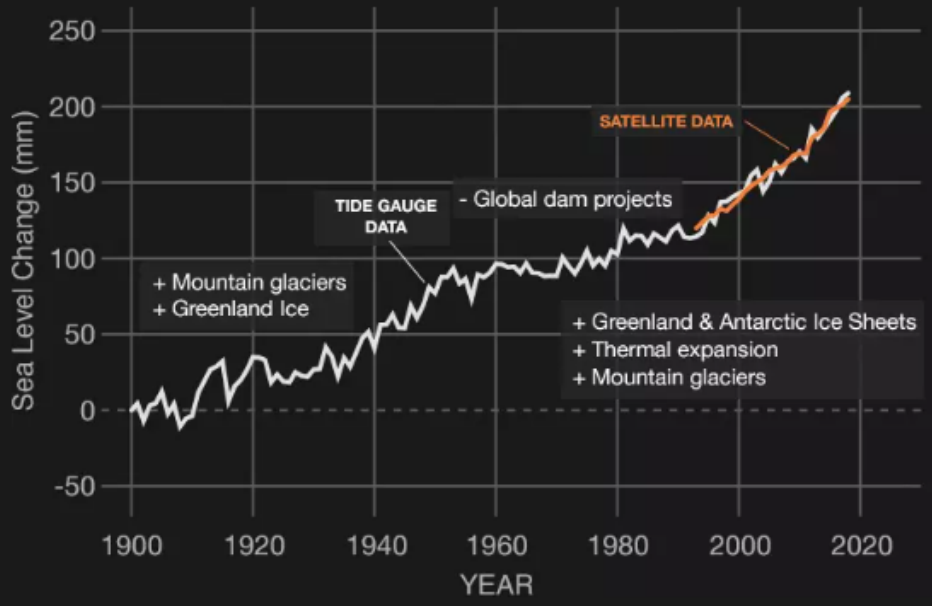
https://climate.nasa.gov/

Henrik Hansson, IDOCOS (2023-02-22).

Sea Level

SOURCE DATA: 1900-2018

Data source: Frederikse et al. (2020)
Credit: NASA's Goddard Space Flight Center/PO.DAAC



Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers, and the expansion of seawater as it warms. The first graph tracks the change in global sea level since 1993, as observed by satellites.

The graph on the left, which is from coastal tide gauge and satellite data, shows how much sea level changed from about 1900 to 2018. Items with pluses (+) are factors that cause global sea level to increase, while minuses (-) are what cause sea level to decrease. These items are displayed at the time they were affecting sea level.

SATELLITE DATA: 1993-PRESENT

Data source: Satellite sea level observations.
Credit: NASA's Goddard Space Flight Center

RISE SINCE 1993

↑ 102.5 millimeters

Click+drag to zoom RESET

Get Data: HTTP | **Snapshot:** PNG

This graph tracks the change in sea level since 1993, as observed by satellites. The data shown are the latest available, with a four- to five-month delay needed for processing. (Source)

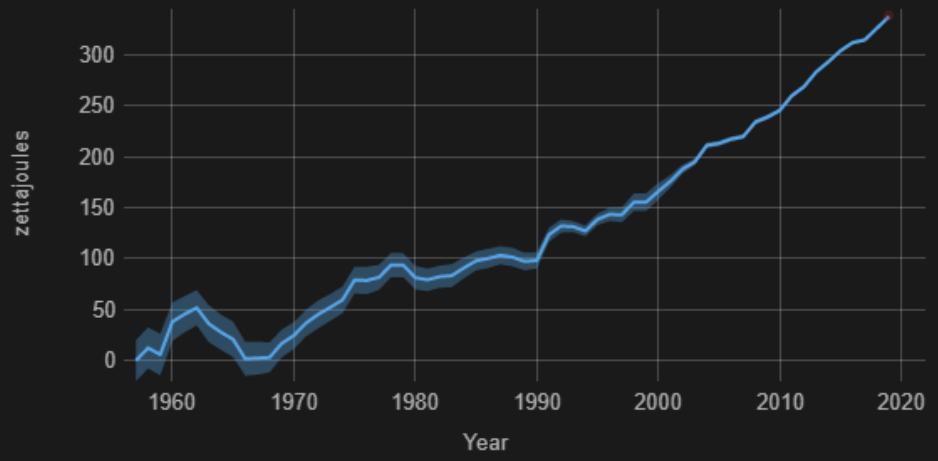
Note: You now need to create an Earthdata account to access NASA's sea level data. Register here for free. Once logged in, click "HTTP" under the "Satellite Data" chart on this page to access the data.

https://climate.nasa.gov/

Ocean Warming

OCEAN HEAT CONTENT CHANGES SINCE 1955 (NOAA)

Data source: Observations from various ocean measurement devices, including conductivity-temperature-depth instruments (CTDs), Argo profiling floats, and eXpendable BathyThermographs (XBTs). Credit: NOAA/NCEI World Ocean Database



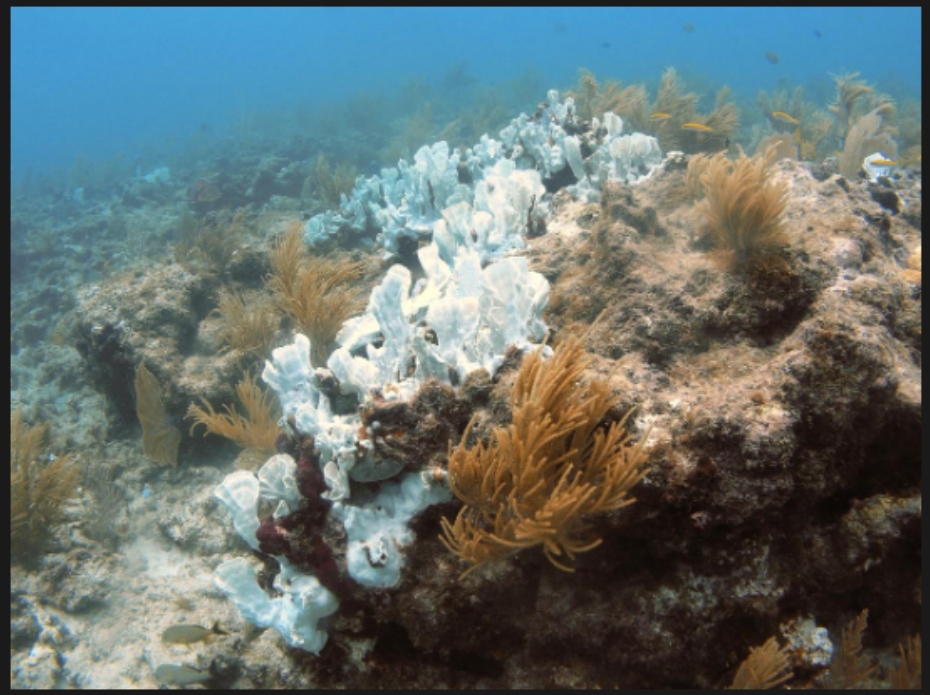
Click+drag to zoom RESET

Get Data: HTTP | **Snapshot:** PNG

Ninety percent of global warming is occurring in the ocean, causing the water's internal heat to increase since modern recordkeeping began in 1955, as shown in the chart. (The shaded blue region indicates the 95% margin of uncertainty.)

Each data point in the chart represents a five-year average, expressed in zettajoules. For example, the 2018 value represents the average change in ocean heat content (since 1955) for the years 2016 to and including 2021.

Why Ocean Heat Matters



Coral bleaching is a consequence of a warming ocean. This image shows bleached coral off Islamorada, Florida. Credit: Kelsey Roberts/USGS

Covering more than 70% of Earth's surface, our global ocean has a very high heat capacity. It has absorbed 90% of the warming that has occurred in recent decades due to increasing greenhouse gases, and the top few meters of the ocean store as much heat as Earth's entire atmosphere.

The effects of ocean warming include sea level rise due to thermal expansion, coral bleaching, accelerated melting of Earth's major ice sheets, intensified hurricanes, and changes in ocean health and biochemistry.

https://climate.nasa.gov/

UN environment programme

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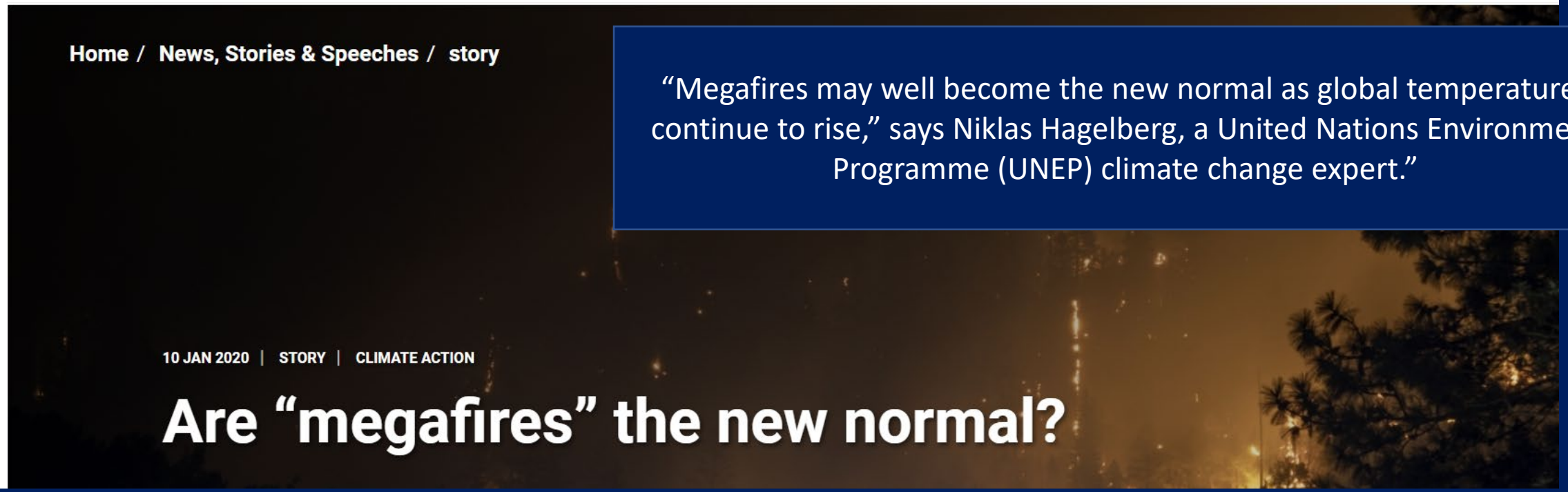

“Megafires may well become the new normal as global temperatures continue to rise,” says Niklas Hagelberg, a United Nations Environment Programme (UNEP) climate change expert.”

“Higher temperatures create, in some parts of the world, drier conditions, increasing the likelihood and intensity of wildfires, and megafires”

Henrik Hansson, IDOCOS (2023-02-22).

Drier and wetter

"Current climate models indicate that rising temperatures will intensify the Earth's water cycle, increasing evaporation. Increased evaporation will result in more frequent and intense storms, but will also contribute to drying over some land areas. As a result, storm-affected areas are likely to experience increases in precipitation and increased risk of flooding, while areas located far away from storm tracks are likely to experience less precipitation and increased risk of drought."

https://gpm.nasa.gov/resources/faq/how-does-climate-change-affect-precipitation

Thwaites 'Doomsday Glacier' is melting faster than expected: Concerns over sea level rise grow

Cracks and fractures beneath Thwaites Glacier could accelerate the breakup of the crucial Florida-sized ice sheet in West Antarctica, research shows.

George Petras and **Janet Loehrke** USA TODAY

Published 9:58 PM CET Feb. 16, 2023 | **Updated 10:27 PM CET Feb. 16, 2023**

CNN World Africa Americas Asia Australia China Europe India Middle East United Kingdom

Nearly 30 dangerous feedback loops could permanently shift the Earth's climate, scientists say

By Laura Paddison, CNN

Published 11:00 AM EST, Fri February 17, 2023

"Climate feedback loops are cyclical chain reactions that happen when one change triggers further changes, in a process that keeps on repeating itself. Some of these feedback loops drive down warming, but others amplify it."

"Take Arctic ice, for example. Warming temperatures cause sea ice to melt, revealing the dark ocean water beneath. As dark surfaces absorb more heat than reflective surfaces like ice, the ocean warms and more ice melts."

Henrik Hansson, IDOCOS (2023-02-22).

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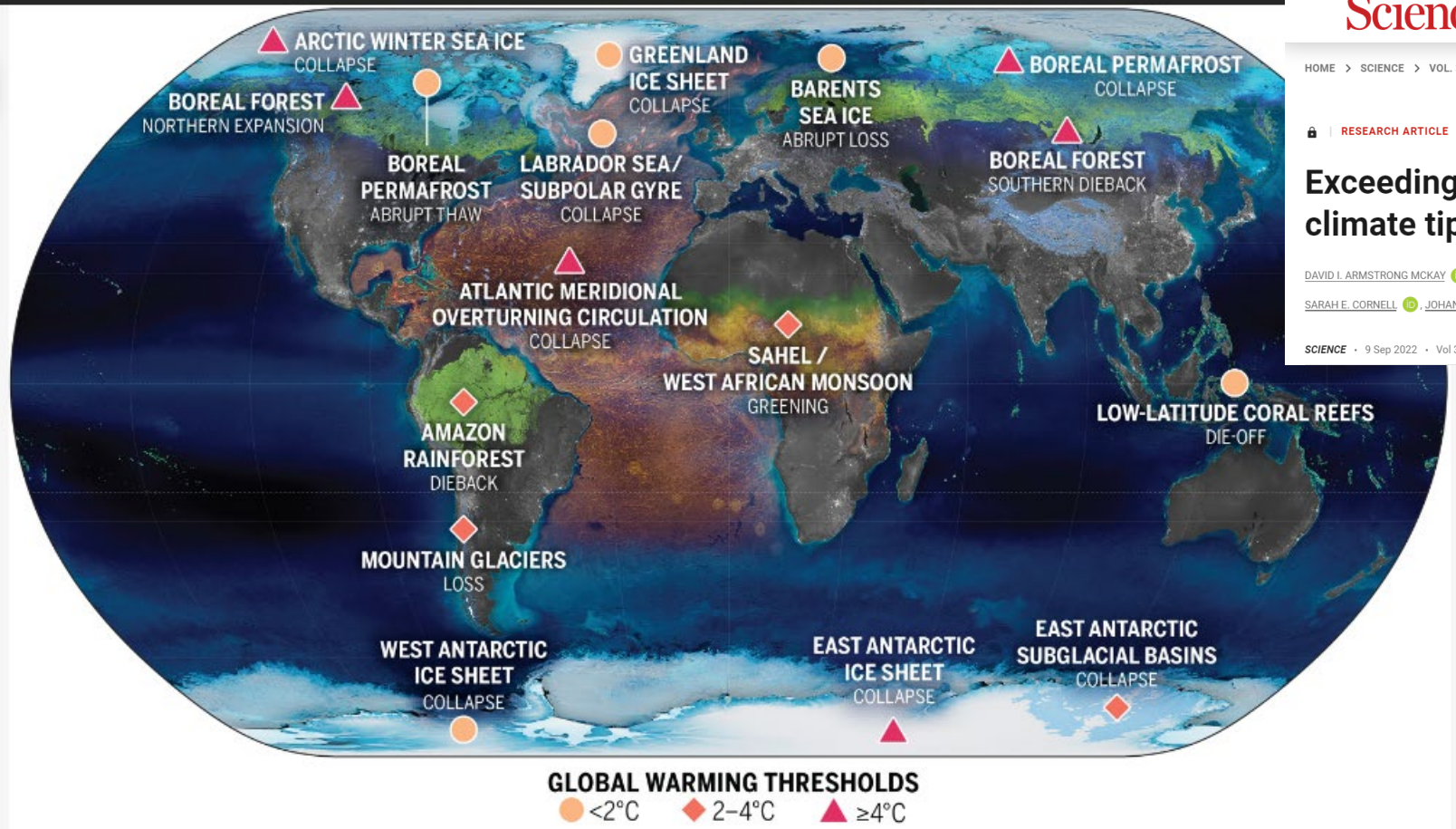

The location of climate tipping elements in the cryosphere (blue), biosphere (green), and ocean/atmosphere (orange), and global warming levels at which their tipping points will likely be triggered.

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RESEARCH ARTICLE | CLIMATE CHANGE

Exceeding 1.5°C global warming could trigger multiple climate tipping points

DAVID I. ARMSTRONG MCKAY, ARIE STAAL, JESSE F. ABRAMS, RICARDA WINKELMANN, BORIS SAKSCHEWSKI, SINA LORIANI, INGO FETZER, SARAH E. CORNELL, JOHAN ROCKSTRÖM, AND TIMOTHY M. LENTON Authors Info & Affiliations

SCIENCE · 9 Sep 2022 · Vol 377, Issue 6611 · DOI: 10.1126/science.abn7950

REVIEW | CLIMATE PROJECTION

Assessing ExxonMobil's global warming projections

G. SUPRAN, S. RAHMSTORF, AND N. ORESKES Authors Info & Affiliations

SCIENCE · 13 Jan 2023 · Vol 379, Issue 6628 · DOI: 10.1126/science.abk0063

Insider knowledge

For decades, some members of the fossil fuel industry tried to convince the public that a causative link between fossil fuel use and climate warming could not be made because the models used to project warming were too uncertain. Supran *et al*. show that one of those fossil fuel companies, ExxonMobil, had their own inter-

War

"Over 90% of the major armed conflicts between 1950 and 2000 occurred within countries containing biodiversity hotspots, and more than 80% took place directly within hotspot areas."

Data: The world's 34 biodiversity hotspots and the location of all armed conflicts with over 1000 casualties between 1950 and 2000

HANSON, T., BROOKS, T.M., DA FONSECA, G.A.B., HOFFMANN, M., LAMOREUX, J.F., MACHLIS, G., MITTERMEIER, C.G., MITTERMEIER, R.A. and PILGRIM, J.D. (2009), Warfare in Biodiversity Hotspots. Conservation Biology, 23: 578-587. https://doi.org/10.1111/j.1523-1739.2009.01166.x

euronews.green NEWS CLIMATE NATURE LIVING ECO-INNOVATION OPINION SERIE

By Rosie Frost & Euronews with Reuters • Updated: 04/10/2022

GREEN NEWS

Ukraine estimates more than €35bn of environmental damage has been done by Russia's invasion

The territory of Ukraine contains habitats that are home to 35% of Europe's biodiversity, including 70,000 plant and animal species, many of them rare, relict, and endemic.
(WWF: ASSESSING THE ENVIRONMENTAL IMPACTS OF THE WAR IN UKRAINE)

Increased greenhouse gases
Toxic elements in air, soil, food
Destruction of habitats
Landmines
Costs

- …millions of hectares of natural reserves under threat
  2,000 cases of environmental damages have already been recorded
  …the bill for air pollution caused by the war in Ukraine is so far about €25 billion.
- €11.4 billion is needed to address damage to the soil.
  …caused 31 million tonnes of CO2 emissions, roughly the amount produced by New Zealand annually.
- …another 79 million tons of greenhouse emissions could be produced for the reconstruction of infrastructure and buildings destroyed during the war.
  Russian gas pipe leaks could have an 'unprecedented' environmental impact
  …satellites detected more than 37,000 fires - a majority affecting forests and other natural ecosystems.
  Large volumes of military scrap containing chemicals that can pollute groundwater have been left behind.
  …. believe that 20 species native to the steppe may have disappeared completely due to the war.

GLOBAL CLIMATE CHANGE
Vital Signs of the Planet

FEATURE | January 9, 2023

NASA Space Missions Pinpoint Sources of CO2 Emissions on Earth

GLOBAL CLIMATE CHANGE
Vital Signs of the Planet

FACTS NEWS SOLUTIONS EXPLORE NA

NEWS | December 14, 2022

NASA Sensors to Help Detect Methane Emitted by Landfills

"Emissions from large facilities such as power plants and refineries account for about half of global carbon dioxide emissions from fossil fuels."

Methane from the waste sector makes up about 20% of human-caused methane emissions. A new project from a nonprofit group, Carbon Mapper, will use NASA instruments and data to measure emissions from landfills around the globe

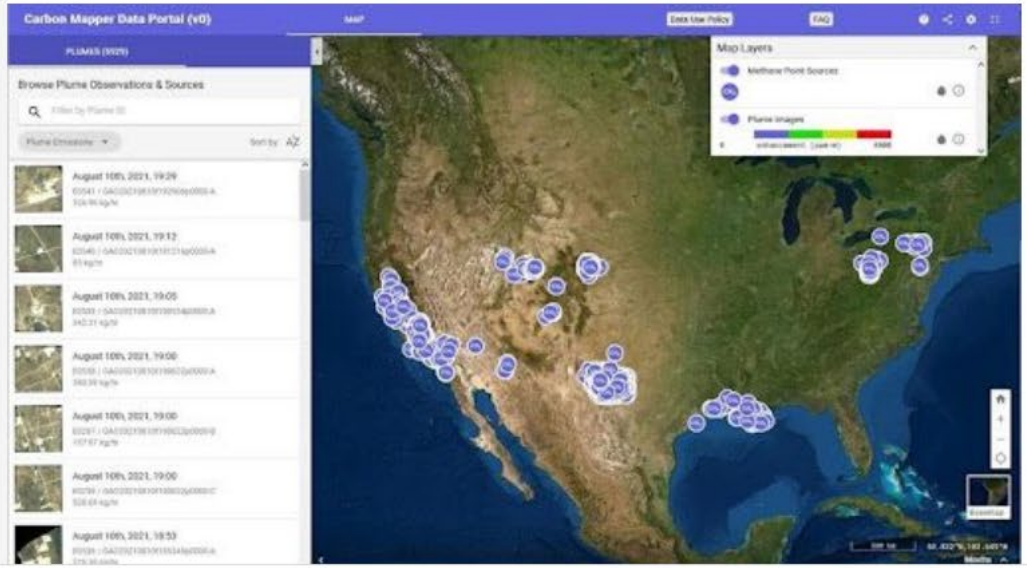
"Methane produced by the waste sector contributes an estimated 20% of human-caused methane emissions. Ton for ton, methane is more than 80 times more potent than carbon dioxide in trapping heat in the atmosphere. But where carbon dioxide remains in the air for centuries, methane has an atmospheric lifetime of only about a decade or two."

Henrik Hansson, IDOCOS (2023-02-22).

ABOUT US OUR MISSION CASE STUDIES DATA RESOURCES NEWS & INSIGHTS

A critical component of Carbon Mapper's mission is to persistently pinpoint, quantify and track strong methane and carbon dioxide (CO_2) emissions at facility scale and to make this data free and open to the public, providing accessibility and transparency to maximize impact.

With its satellite plus airborne monitoring technology, Carbon Mapper shines a spotlight on where, when and how methane and CO_2 emissions are released. Its independent, facility-scale data insights increase global accessibility, transparency and understanding of methane and



https://carbonmapper.org/our-mission/#overview

Oil well leak detection

Overview

There is an urgent need for a wide range of actions to accelerate methane (CH_4) and carbon dioxide (CO_2) mitigation, climate adaptation and conservation. Barriers include high costs for methane leak detection, gaps in self-reported CO_2 data for key emission sectors, incomplete observations of priority regions at scales relevant for decision making, and lack of data accessibility and transparency. Our airborne pilot projects, using advanced remote-sensing technology, are demonstrating the potential for an operational satellite data service that can help accelerate sub-national climate action. We plan to:

- Persistently pinpoint, quantify and track strong methane and CO_2 emissions at facility scale
- Offer a rapid methane leak detection service to facility operators and regulators
- Deliver independent data to help certify methane intensity for oil and gas supply chains
- Increase global accessibility, transparency and understanding of methane and CO_2 data
- Work with key partners to advance new data-driven emission mitigation strategies

Mapping forest biodiversity in Malaysia

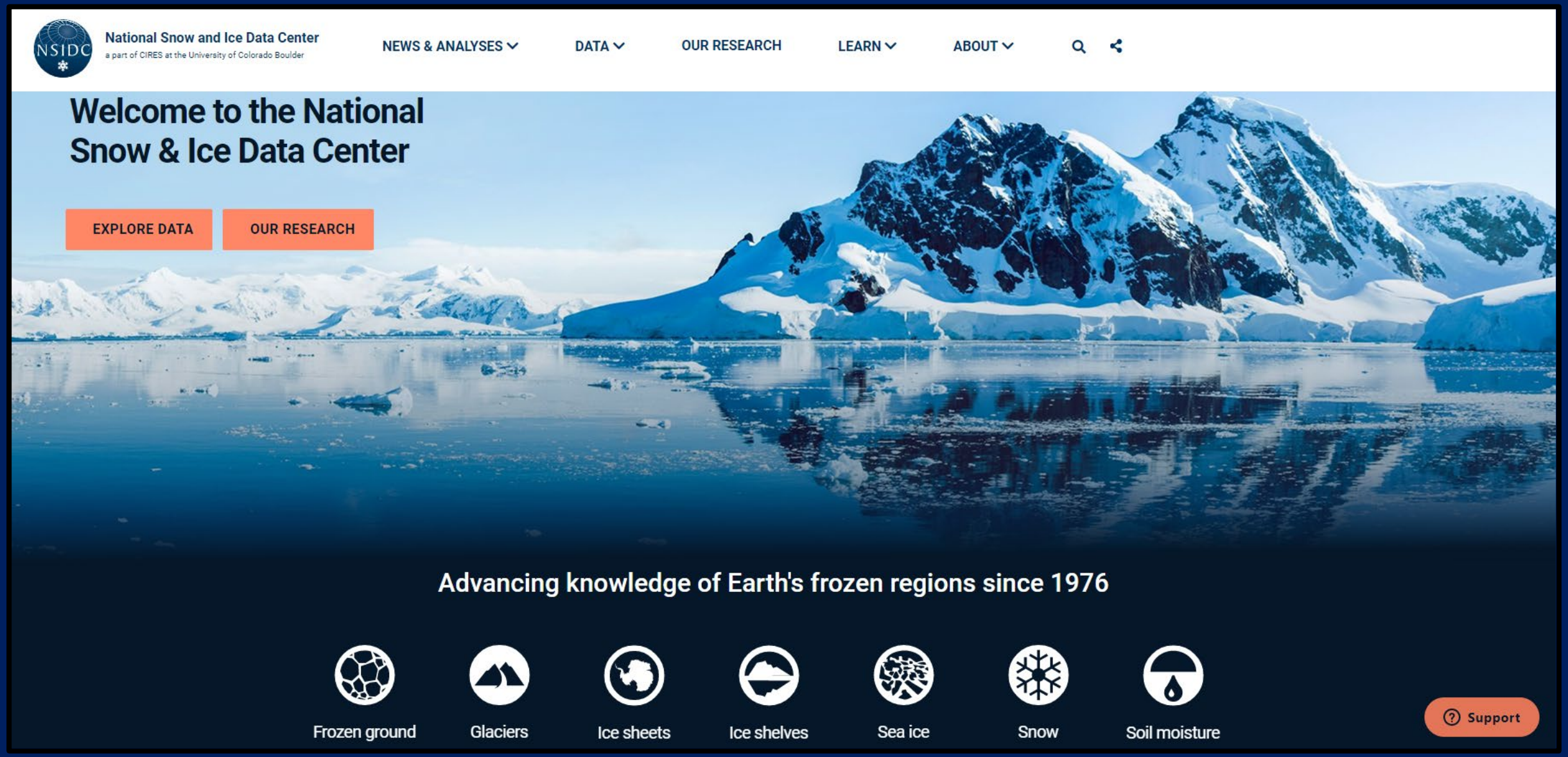
…contrast between high-diversity natural forests and monocultures of oil palm plantation trees

Mapping drought impacts in California

Mapping coral reef health in Hawaii

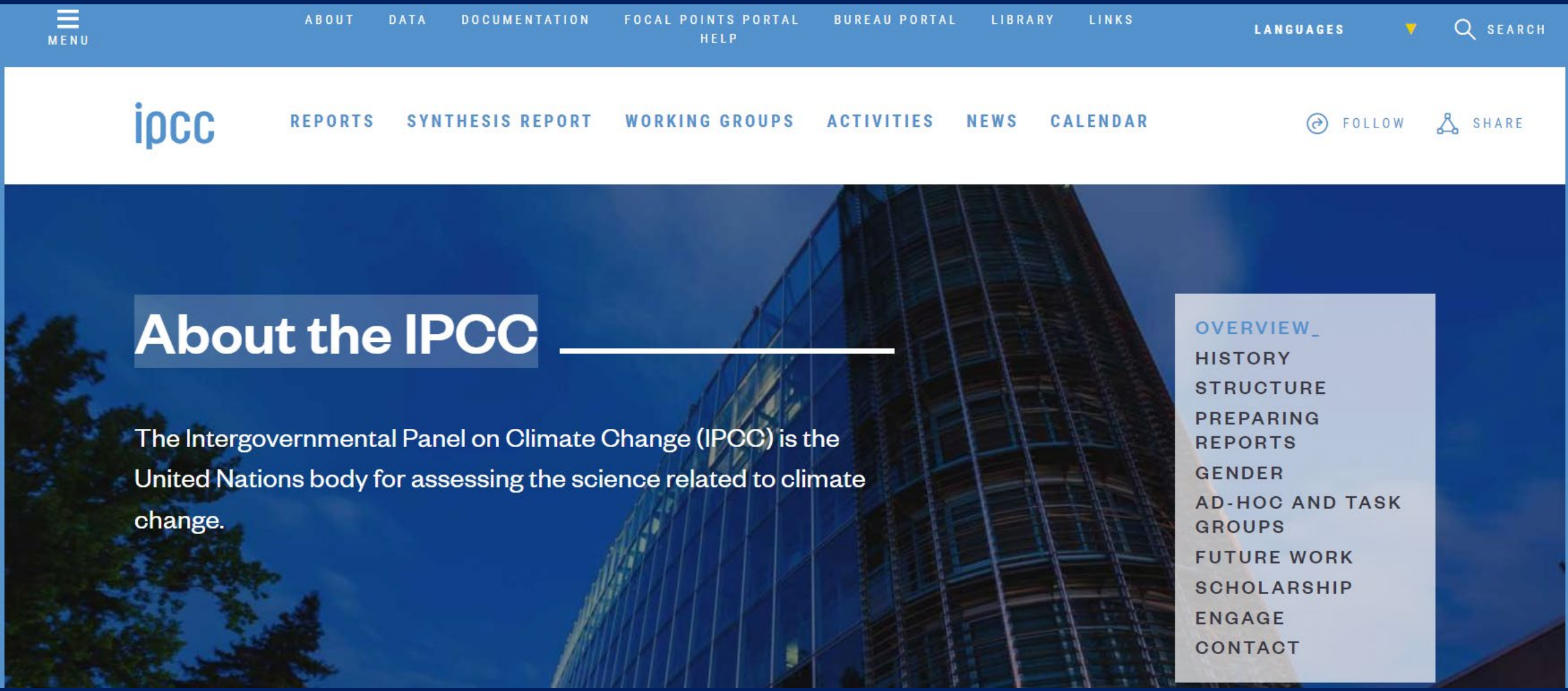
Mapping biodiversity in Peru

….outputs of the richness and abundance of species across this Amazonian landscape



https://nsidc.org/home

Henrik Hansson, IDOCOS (2023-02-22).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About the IPCC
The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.
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Why?

Resistance to change

- Change is not perceived as necessary
- Change is not cost-effective
- Change would cause personal losses
- Change is inconsistent with values
- Leaders of change are not trusted
- Reasons for change are not understood
- The information is not wanted
- Decisions are unpopular
- Trust in faith – “we will see”
- Not a problem – fake news
- Other priorities more urgent
- Against our business model
- Lack of altruism and solidarity
- Fear – “safe” to do business as usual
- Denial
- Lack strategies
- Science does not reach out – a communication problem
- Lack of knowledge, education
- Structural barriers
- Does not affect me personally
- It is not my problem

It is about **change**,
regardless if we want it or not.

Manuela Pardo del Val and Clara Martínez Fuentes
Resistance to change: a literature review and empirical study
Management Decision 41/2 [2003] 148-155

Table II
Results of the sources of resistance, ordered by means

Sources of resistance or inertia to change	Mean
Deep-rooted values	2.70
Capabilities gap	2.42
Departmental politics	2.42
Low motivation due to cannibalization costs and cross subsidy comforts	2.31
Incommensurable beliefs	2.31
Different interests among employees and management	2.27
Communication barriers	2.23
Organizational silence	2.20
Low motivation due to direct costs of change	2.15
Myopia, denial, perpetuation of ideas, implicit assumptions	2.11
Lack of a creative response due to fast and complex environmental changes	2.05
Lack of a creative response due to inadequate strategic vision	2.04
Change values opposite to organizational values	2.04
Forgetfulness of the social dimension of changes due to obsession of promoter	2.01
Lack of a creative response due to resignation	1.96
Leadership inaction, embedded routines, collective action problems	1.94
Cynicism	1.84
Forgetfulness of the social dimension of changes due to forgetting supervisors	1.67
Low motivation due to past failures	1.65

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Who We Are / News

FEATURE STORY

Climate change impacts people who are not born yet

April 21, 2015

CBS NEWS NEWS SHOWS LIVE LOCAL

HEALTH ›

How climate change threatens pregnant women and their fetuses

BY CARA KORTE

UPDATED ON: NOVEMBER 9, 2021 / 8:26 PM / CBS NEWS

Working in extreme heat puts strain on foetus

8 December 2022

By Naomi Grimley
BBC Global Health Correspondent

FUTURE PLANET | CLIMATE

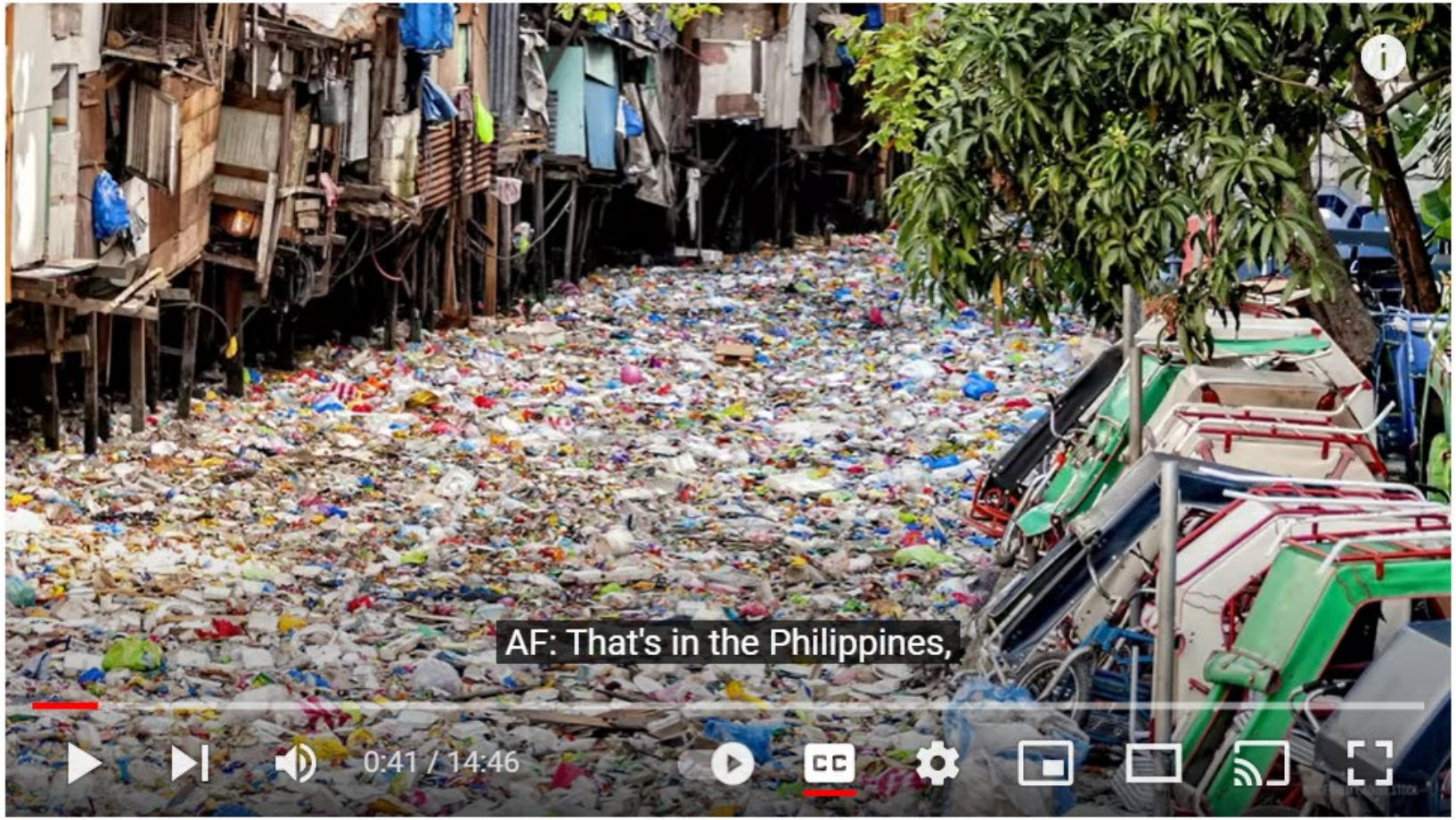
Do people yet to be born have climate change rights?

By Jocelyn Timperley
16th February 2023, BBC

Digitalisation

- Preventive
  - Early warning systems, sensors, IOT, satellite data
  - Education: primary schools, upper secondary schools, higher education, Public
  - Media, social media
  - Research
  - Decision-making systems and data for decision-makers, transparency, inclusion
- Disaster action
  - Monitoring systems; collaboration, resources, timing, skills, maps
  - Media, social media; public information, social
- Recover, restore, rebuild, renew
  - Longterm action and planning
  - Local resources and needs


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
Plastics/Waste



A radical plan to end plastic waste | Andrew Forrest

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CNN US Audio Live TV Lo

life but greener

We consume up to a credit card's worth of plastic *every* week

Analysis by Chris Cillizza, CNN Editor-at-large

Updated 12:37 PM EDT, Wed November 2, 2022

"1) Plastic is man-made and there's nothing in our natural environment that breaks it down.
2) Single-use plastic is hugely popular.
More than a third of all plastic goes into packaging, single use.
only about 9% of plastic gets recycled,"

"What we do know is the leakage of plastic pollution into nature and ultimately into the air we breathe, the food we eat and the water we drink is inescapable. This is alarming, and so far it's been met with an inadequate global response by governments worldwide. This needs to be addressed immediately." (WWF)

Article BBC Future:

How microplastics are infiltrating the food you eat

By Isabelle Gerretsen 4th January 2023

Plastic pollution is one of the defining legacies of our modern way of life, but it is now so widespread it is even finding its way into fruit and vegetables as they grow.

"Microplastics have infiltrated every part of the planet…in Antarctic sea ice, within the guts of marine animals … in drinking water around the world…on beaches of remote, uninhabited islands … in sea water samples across the planet. One study estimated that there are around 24.4 trillion fragments of microplastics in the upper regions of the world's oceans. "

"…sewage sludge…byproduct left behind after municipal wastewater is cleaned. As it is expensive to dispose of and rich in nutrients, sludge is commonly used as organic fertiliser in the US and Europe."

"…microplastics can stunt the growth of earthworms"

"microplastics in fruit and vegetables"

"most of the plastics accumulated in the plant roots…root vegetables such as carrots, radishes and turnips"

Ghost fishing: abandoned, lost, or otherwise discarded fishing gear – continue to kill marine life

"Just how much trash is in the ocean? The amount is shocking. More than 12 million tons of plastic end up in our seas every year. Plastic pollution plagues every corner of the ocean and despite growing awareness, the problem is only getting worse.

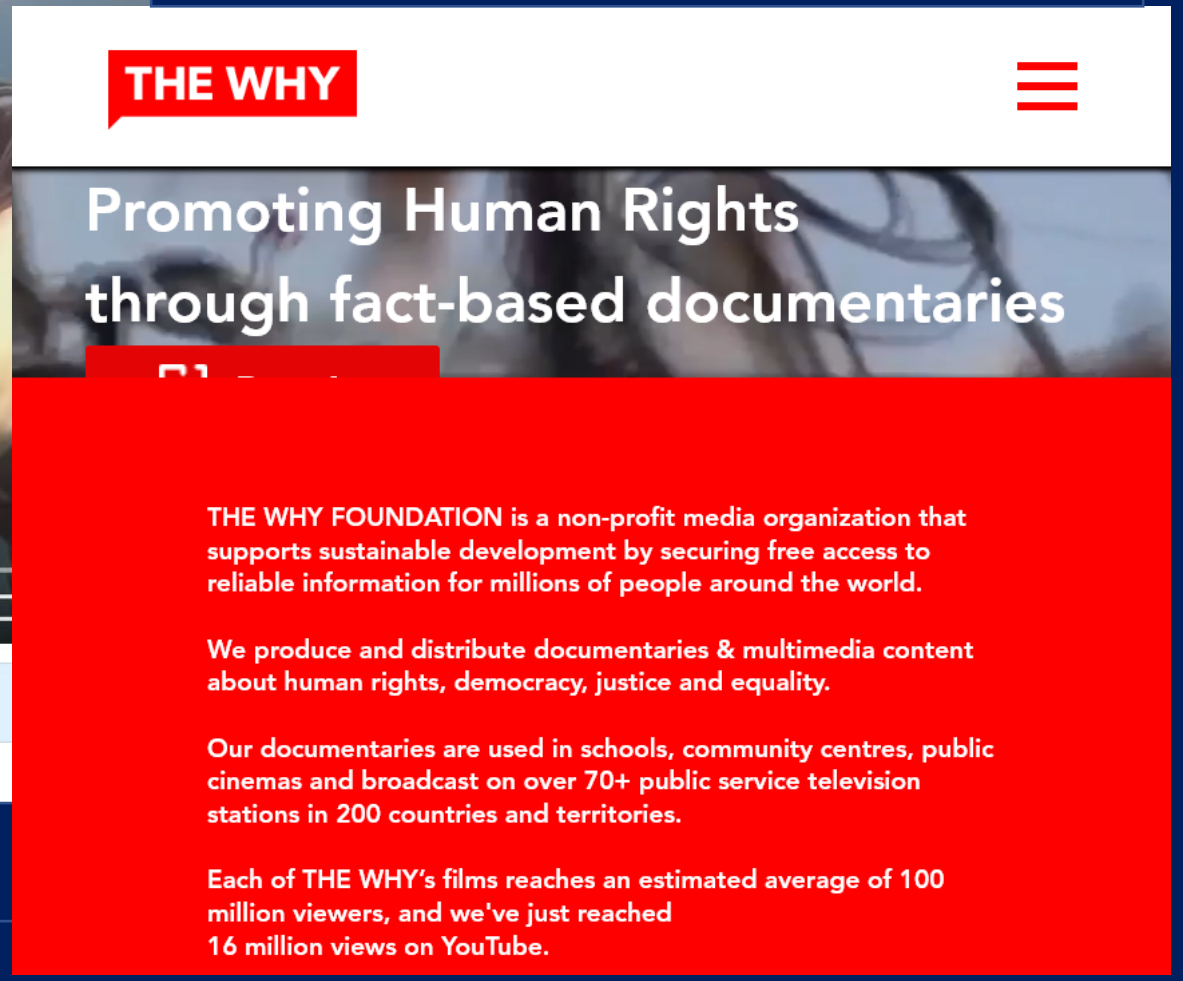
Fishing gear accounts for roughly 10% of that debris: between 500,000 to 1 million tons of fishing gear are discarded or lost in the ocean every year. Discarded nets, lines, and ropes now make up about 46% of the Great Pacific Garbage Patch.

This marine plastic has a name: ghost fishing gear."
WWF - Ghost fishing gear

Plastic fishing gear stay for 500 years...

Film: Why Plastic: Coca-Cola/American Plastic

https://www.youtube.com/watch?v=fBh2Men9rsg



https://www.thewhy.dk/

euronews.green NEWS CLIMATE NATURE LIVING ECO-INNOVATION OPINION SERIES

GREEN NEWS

Coca-Cola revealed as world's worst plastic polluter for fifth year in a row

The result comes from Break Free From Plastic's 2022 annual audit, which also saw Mondelez International, Unilever, Nestle, and PepsiCo in the top five.

What are governments around the world doing about plastic waste?
The five top polluters have been found out through an audit which saw 200,000 citizen scientists in 87 countries analysing trash they gathered on beaches and elsewhere.

Coca-Cola's 'trashiversary' sees them not only land at the top spot for five years in a row, they also doubled their trash footprint in the same time period."

Henrik Hansson, IDOCOS (2023-02-22).

INITIATIVES ABOUT MINDEROO FOUNDATION

Project Home Benchmarks Downloads Methodology About 2021 Edition

PLASTIC WASTE MAKERS INDEX

More plastic. More waste. More pollution.

KEY FINDINGS DOWNLOAD REPORT COMPANY SCORECARDS

More plastic, more waste and more pollution.

"**They're shocking findings, …**We need a fundamentally different approach, that turns the tap off on new plastic production… " DR ANDREW FORREST AO, CHAIRMAN, MINDEROO FOUNDATION

https://www.minderoo.org/plastic-waste-makers-index/#key-findings

INITIATIVES ABOUT

Project Home About FAQs Visit globalplasticwatch.org

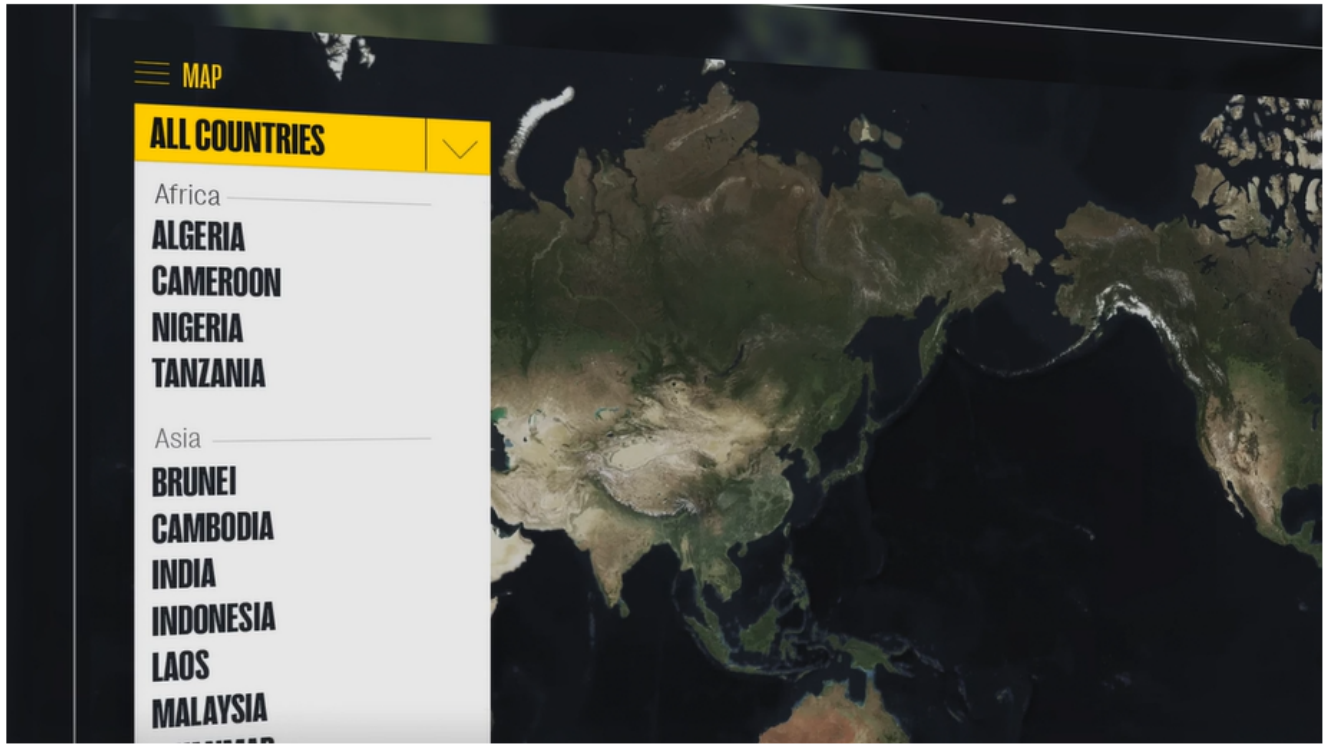
Global Plastic Watch

EXPLORE THE DATA

The data gathered provides a historical first and authoritative insight into one of the world's most intractable environmental challenges – a deluge of plastic pollution which is threatening the oceans, harming communities, marine life, animal and human health.

By using it, governments, industry, researchers and communities can evaluate and monitor the risk of land-based plastic waste sites, as well as prioritise investments in solutions.

Visit globalplasticwatch.org



https://www.minderoo.org/global-plastic-watch/#explore-the-data

HOME

GLOBAL PLASTIC WATCH

WHAT IS GPW?

Global Plastic Watch (GPW) is a digital platform that maps the world's plastic pollution in near real-time using a unique combination of satellite imagery and artificial intelligence.

EXPLORE MAP →

HOW GPW WORKS?

Learn more about **Minderoo Foundation**

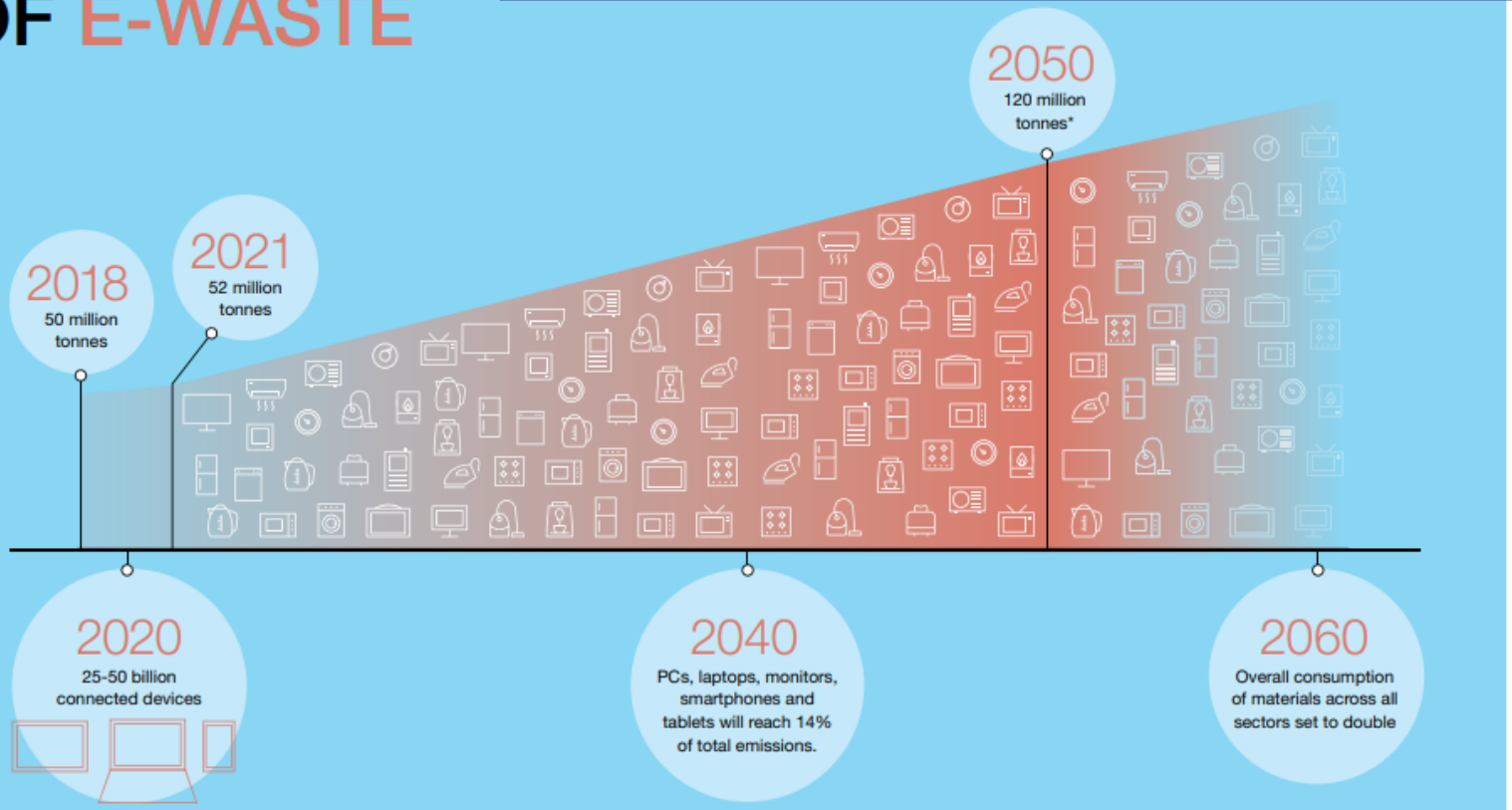
Terms & Conditions **Privacy Policy**

https://globalplasticwatch.org/

Henrik Hansson, IDOCOS (2023-02-22).

Global generation of e-waste is estimated to rise by 100% compared to 2014 and amount to 74 megatons by 2030 (Digital Reset, 2022)

”a tsunami of e-waste”



“ E-waste can be toxic, is not biodegradable and accumulates in the environment, in the soil, air, water and living things. It can also have an adverse impact on health. Children and women are particularly vulnerable to the health risks of e-waste exposure.”

“a product can be made up of more than 1,000 different substances.”

“There is 100 times more gold in a tonne of mobile phones than in a tonne of gold ore.”

Report: The Platform for Accelerating the Circular Economy (PACE). (2019*). A New Circular Vision for Electronics Time for a Global Reboot*. World Economic Forum
Source: Global E-waste Monitor, 2017

Digitalization for Sustainability (D4S), 2022: *Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation*. Berlin: TU Berlin:

"the environmental footprint of digital devices and new digital consumption is substantial"

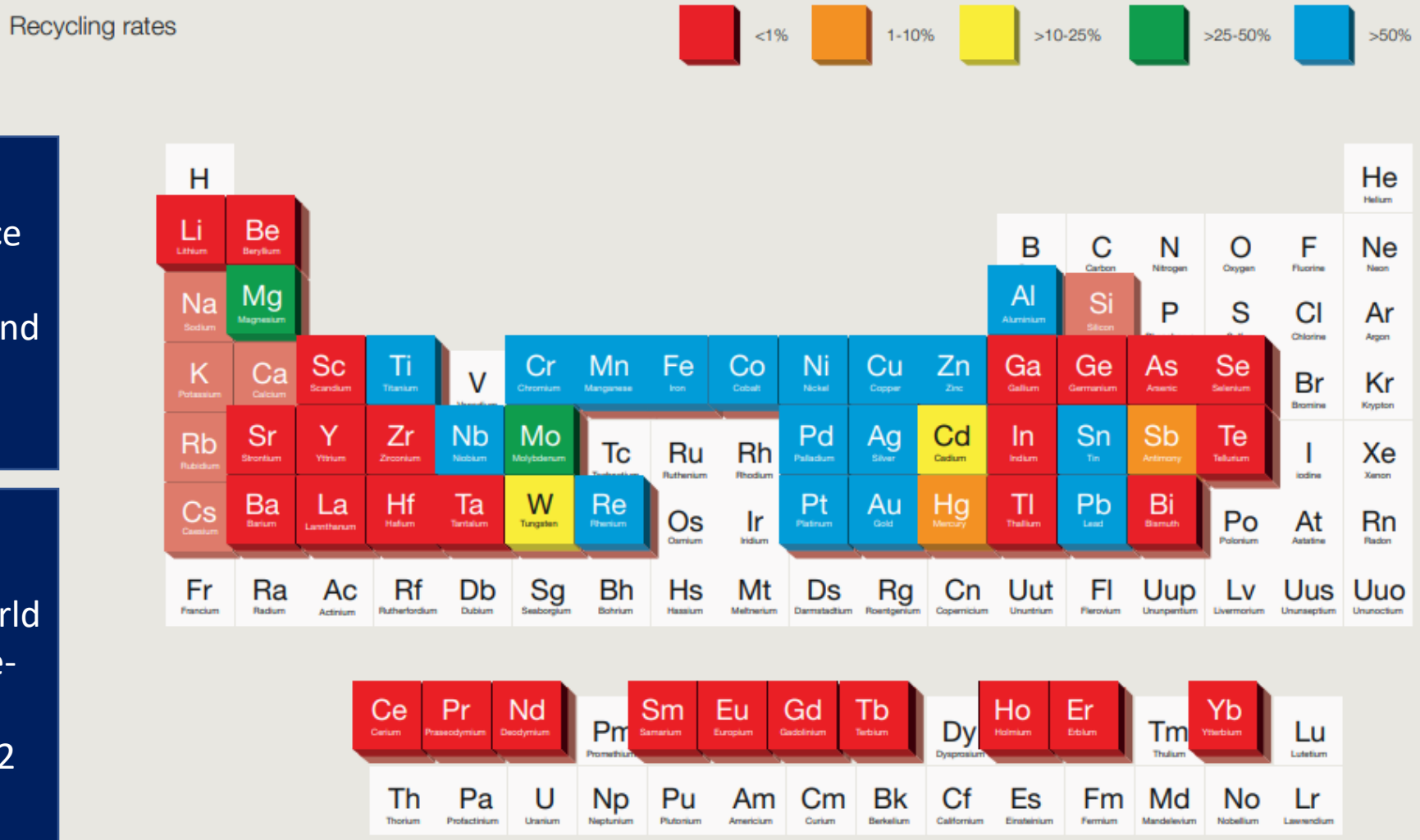
"digitalization is a double-edged sword regarding social and environmental sustainability."

"To make digital technologies work for a deep sustainability transformation requires strong, coherent and cross-sectoral policymaking on all levels of governance."

"digital technologies initiate higher efficiency, and digital services substitute physical goods. But on the other side, the growth in the number of digital devices and services spurs energy and resource consumption, and their application leads via various rebound effects to additional consumption in other sectors."

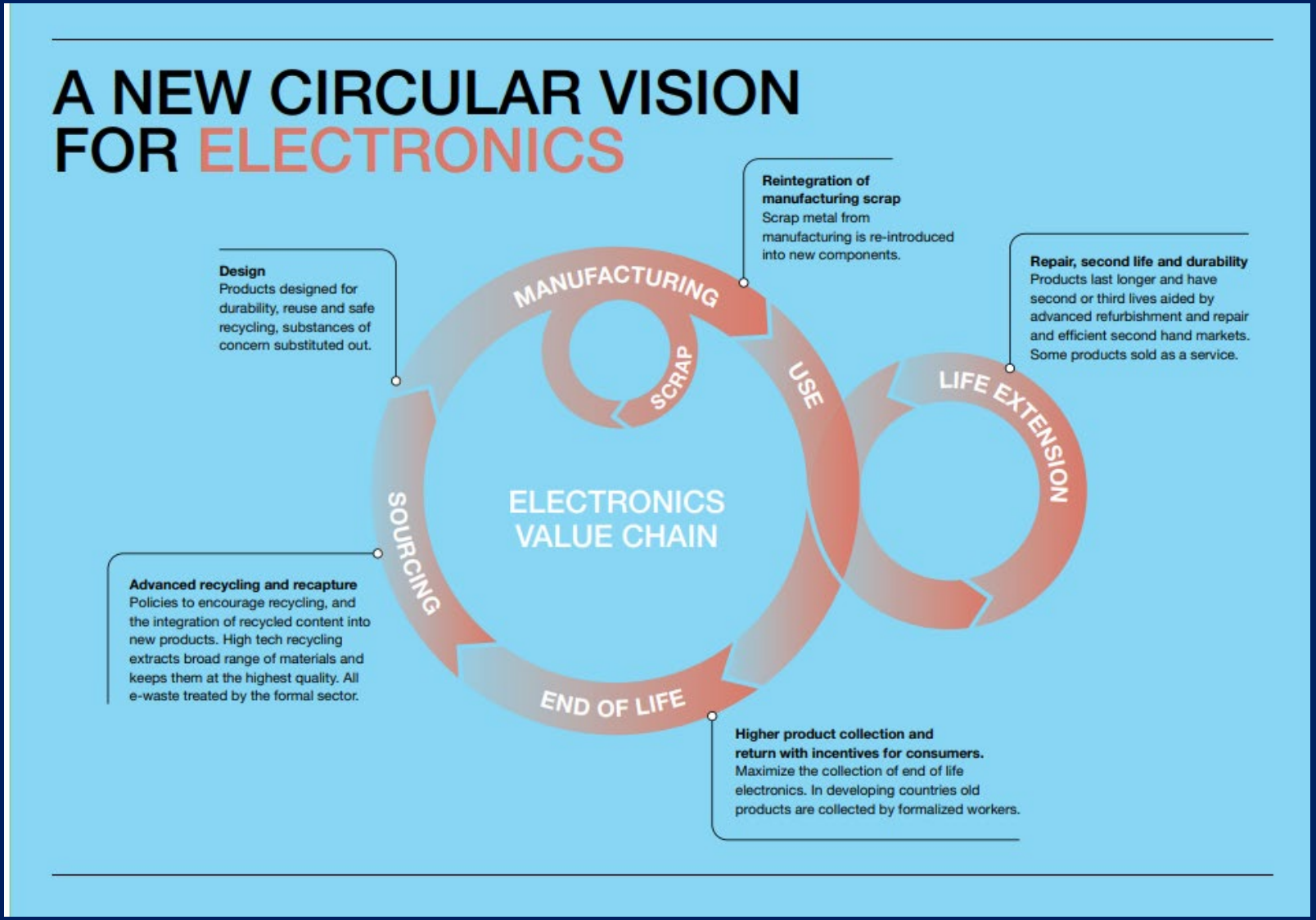
"e-waste
contains many high-value and scarce materials, such as
gold, platinum, cobalt, rare earths, and high quantities of
aluminium and tin"

"Recycling rates globally are low. Even in the EU, which leads the world in e-waste recycling, just 35% of e-waste is officially reported as properly collected and recycled.42 Globally, the average is 20%; the remaining 80% is undocumented, with much ending up buried under the ground for centuries as landfill."



Source: UNU, 2015; UNI, 2014

Report: The Platform for Accelerating the Circular Economy (PACE). (2019*). A New Circular Vision for Electronics Time for a Global Reboot*. World Economic Forum



Report: The Platform for Accelerating the Circular Economy (PACE). (2019*). A New Circular Vision for Electronics Time for a Global Reboot*. World Economic Forum

"The transition to a circular economy must take place in a way that benefits all stakeholders from the consumer to workers, government, businesses, entrepreneurs and society at large. There will be a need for mass collaboration, system changing ideas, new policy frameworks and new ways of doing business"

"The extraction and use of primary (raw) materials is much more polluting than secondary (recycled) materials."
OECD, Global Material Resources Outlook to 2060, (2018)

Digital product passport

"A major political instrument currently being developed is the digital product passport. This legislation will be introduced as part of the European Commission's Circular Economy Action Plan and will require companies to create passports for certain products. The digital product passport summarises information about the components, materials and chemical substances, but also about repairability, spare parts or professional disposal of a product." page 54

Digitalization for Sustainability (D4S), 2022: *Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation*. Berlin: TU Berlin.

At the heart of regenerative design is creative problem-solving rather than profit maximisation.

"A deep sustainability transformation requires fundamental changes in digital governance and the organisation of economic sectors"

Digitalization for Sustainability (D4S), 2022: *Digital Reset. Redirecting Technologies for the Deep Sustainability Transformation*. Berlin: TU Berlin.

“…an important component of the decision making is about collecting and interpreting facts and deciding what is relevant and what is irrelevant”

Digital Transformation Organisations, Processes, Decisions, page 132

"**Digital transformation** has *changed product and service delivery* in a fundamental way by changing the technological and cultural environment. It is, in principle, *affecting everything* since both the surroundings and the internal operations in many activities are increasingly built on digital solutions. As a consequence, digital transformations have *fundamentally changed*, and are **changing our lives**."

Digital Transformation Organisations. Processes. Decisions. page 7

Changing our lives – the sustainability strategies we select

Technical solutions, Political decisions, Lifestyle changes, Social changes