ENVIRONMENTAL PLANT BIOTECHNOLOGY

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no specific receiving time, write an e-mail if you need to talk to me

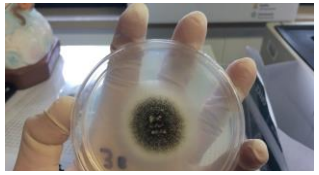
Where do you find me?

Vallisneri Building, 4th floor

Password: Pyrenoid_24

Ms Plant Biotechnology
Università di Milano
+ Freising Weinstephan (D)

Lupinus



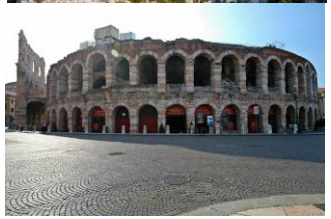
Aflatoxins

PhD Molecular and Cell Genetics
INRA Versailles (F)
Nitrate signaling in Arabidopsis

Standard nitrate

Low nitrate

Post-doc
Université de Marseille (F)



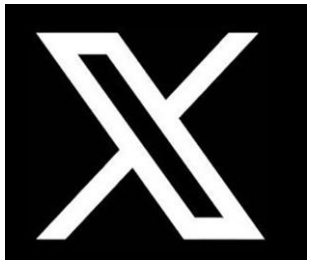
Post-doc
Università di Verona

Control light

Excess light

now
Università di Padova
Regulation of photosynthesis in Arabidopsis, crops, Physcomitrium and microalgae

https://www.biologia.unipd.it/



@PUnipd

plant.lab.unipd

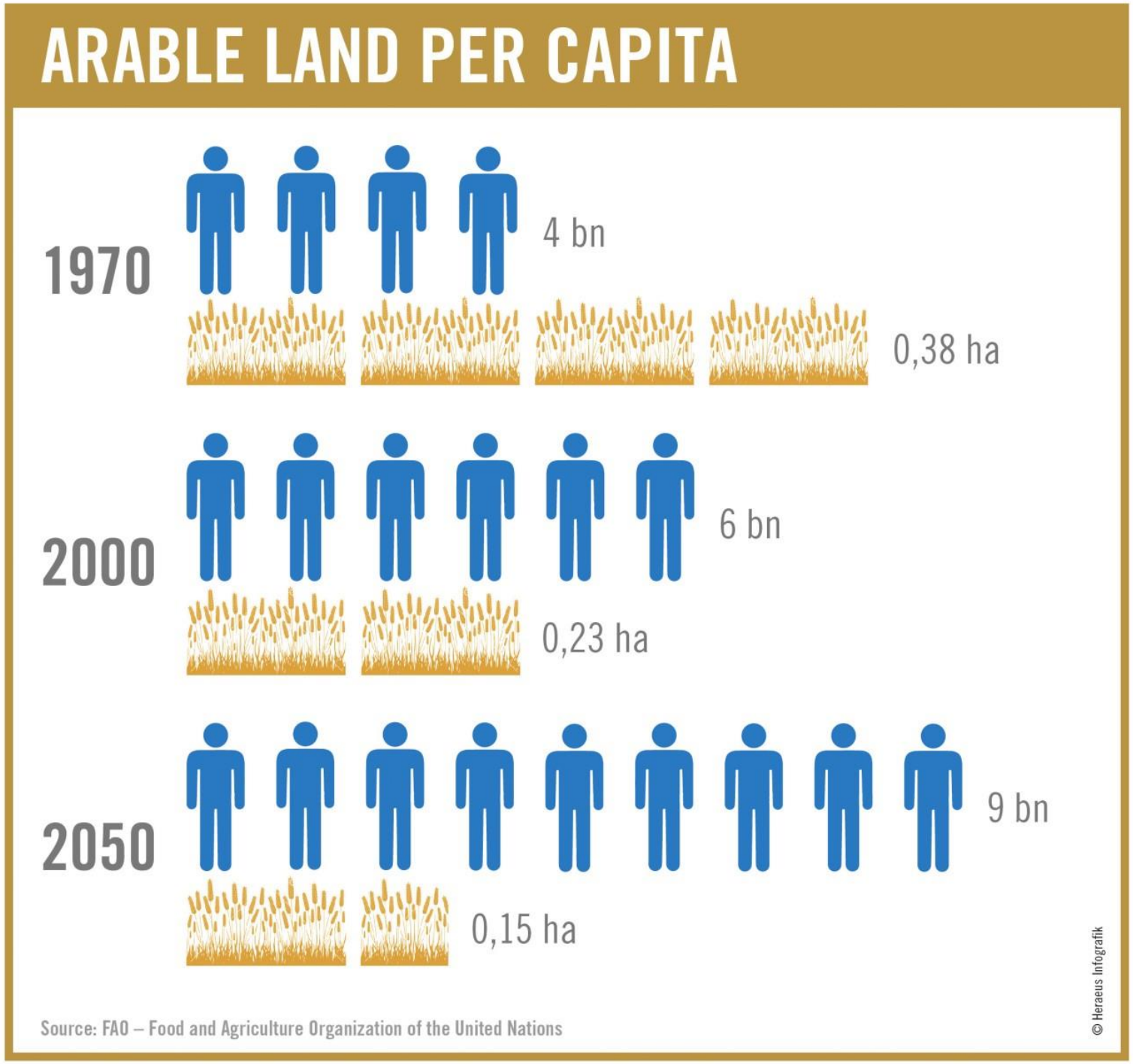
15 November 2022
Day of Eight Billion

Current (yesterday)
World Population

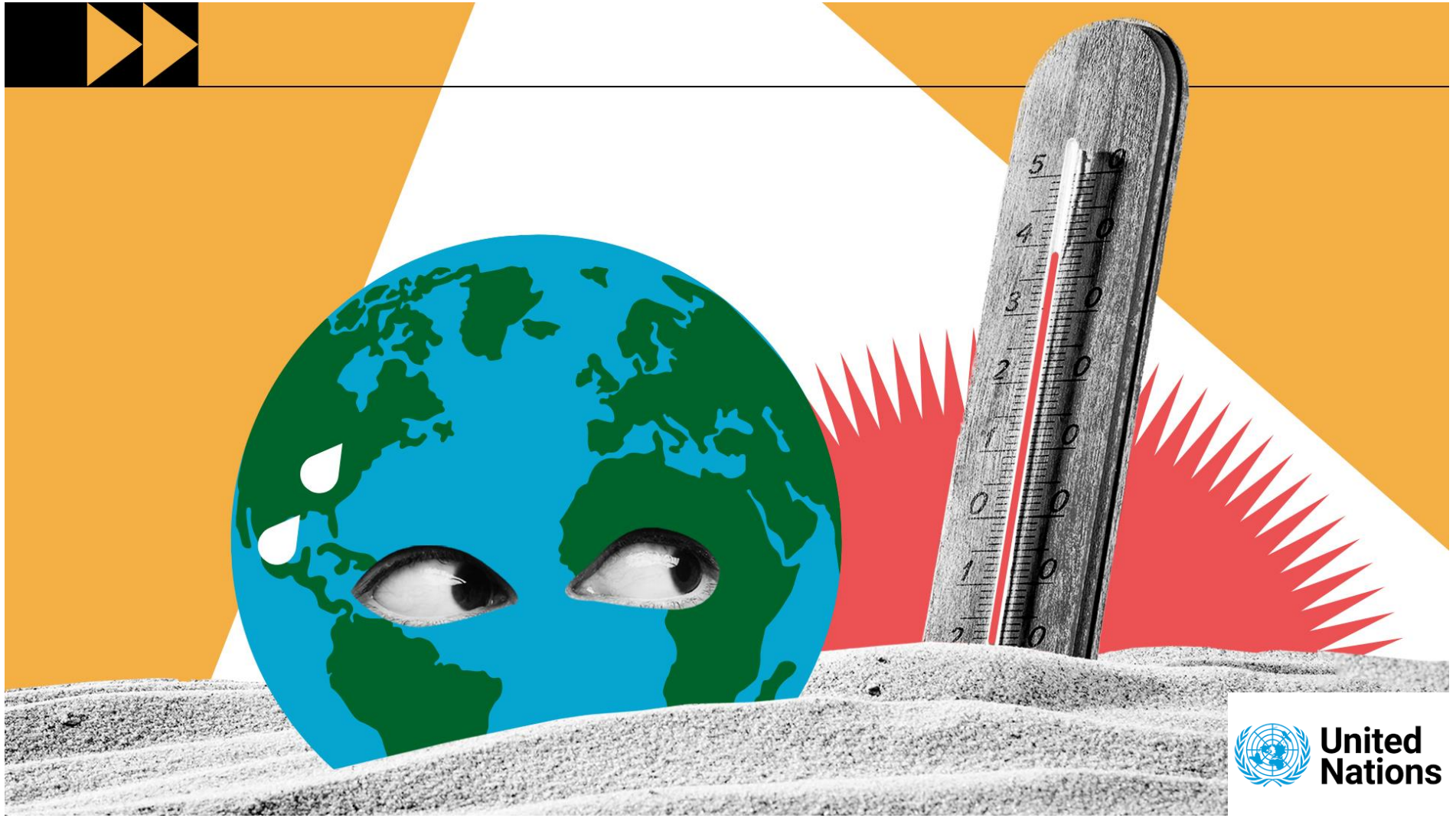
8,093,576,175

Source: worldometer

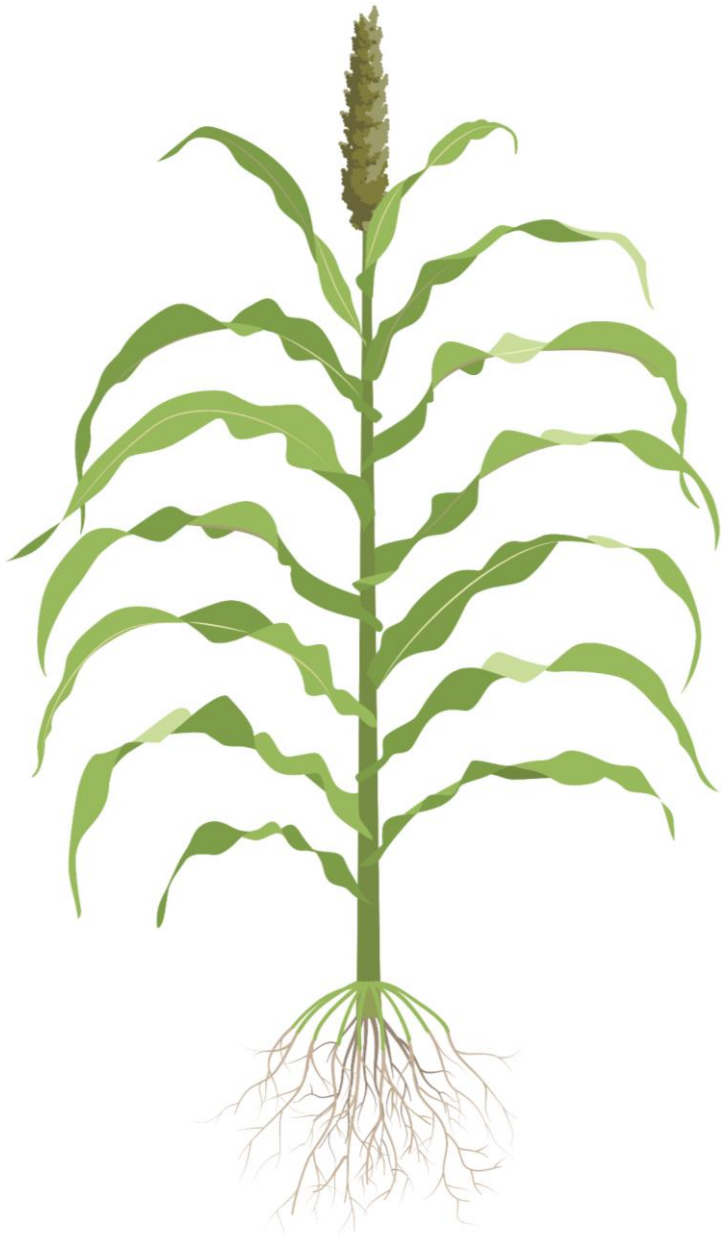
Population is encreasing and arable lands decreasing



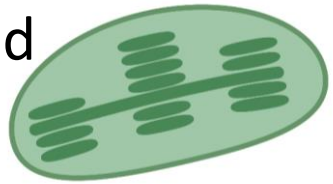
Food security against climatic stress that limits crop yields



Traits to increase crop yield in suboptimal environments



1. Optimize photosynthesis and carbon allocation



2. Improve flooding survival and drought resistance

3. Improve pest resistance

4. Optimize microbial communities and nutrient uptake

ENVIRONMENTAL PLANT BIOTECHNOLOGY

Context

CLIMATE CHANGE

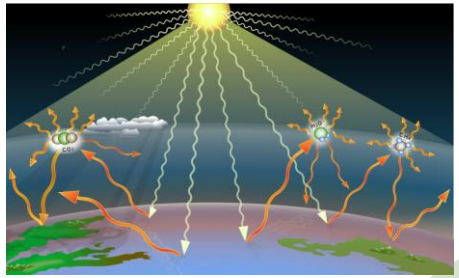
POPULATION GROWTH

Aim of the course

providing an overview of the **plant biochemistry and physiology** to be exploited for the development of innovative crops/processes

1. adapted to current global climate change
2. to reduce the environmental impact of industrial and agricultural practices

Course will focus on 3 main topics

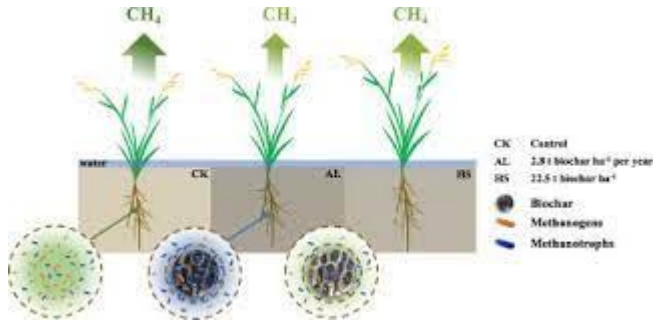


Introduction to climate change: greenhouse gases; temperature; acidification of water (both marine and rain); ozone and stress from UV rays.

Plant engineering: inspiration from nature (algae, model plants, crops)

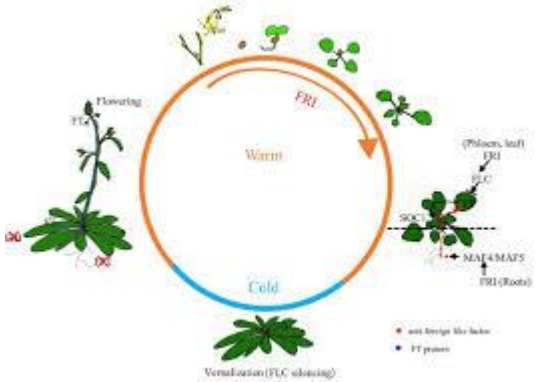
Biotechnological strategies to improve plant productivity and plant stress resistance

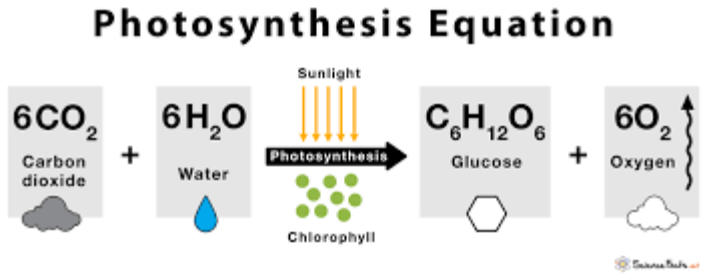
- Lectures based on recent specific literature in the field of plant biotechnology and climate change



SOME TOPICS:

- mitigation of climate change
- resistance to floodings
- improvement of plant productivity (aka photosynhtesis)
- season and flowering time
- nutrient and seed germination
- corals





Examination methods:	Group work on a relevant topic proposed by the students (during classes). Written test related to the topics covered during lectures.

Podcast, why?

- Work as a team
- Peer-to-peer observation and evaluation
- Soft skills
- Science communication
- Work but fun (you'll tell me later)

Podcast presentation in May

Workflow:

- Divide into groups (Before March 15th)
- Pick up a topic
- Search for an original high quality article about that topic
- Describe the paper to the class
- Record a podcast with your groupmates

2 ways

1. Preprints

   https://www.biorxiv.org/
   https://peerj.com/

2. Classic

   https://www.ncbi.nlm.nih.gov/pubmed
   Journal websites

Peer-to-peer evaluation

Environmental plant biotechnology 2021

- https://mediaspace.unipd.it/channel/Podcast+Project+-+Environmental+Plant+Biotechnology/219374233

Some podcast proposal for you

- Focus on Plant biotechnology for the agenda 2030
- Sustainable goals

Some podcast proposal for you

- Focus on Timeline of Scientific discoveries in a specific field or discoveries of a specific research group

Just to better know each other

https://app.wooclap.com/TRZQLX

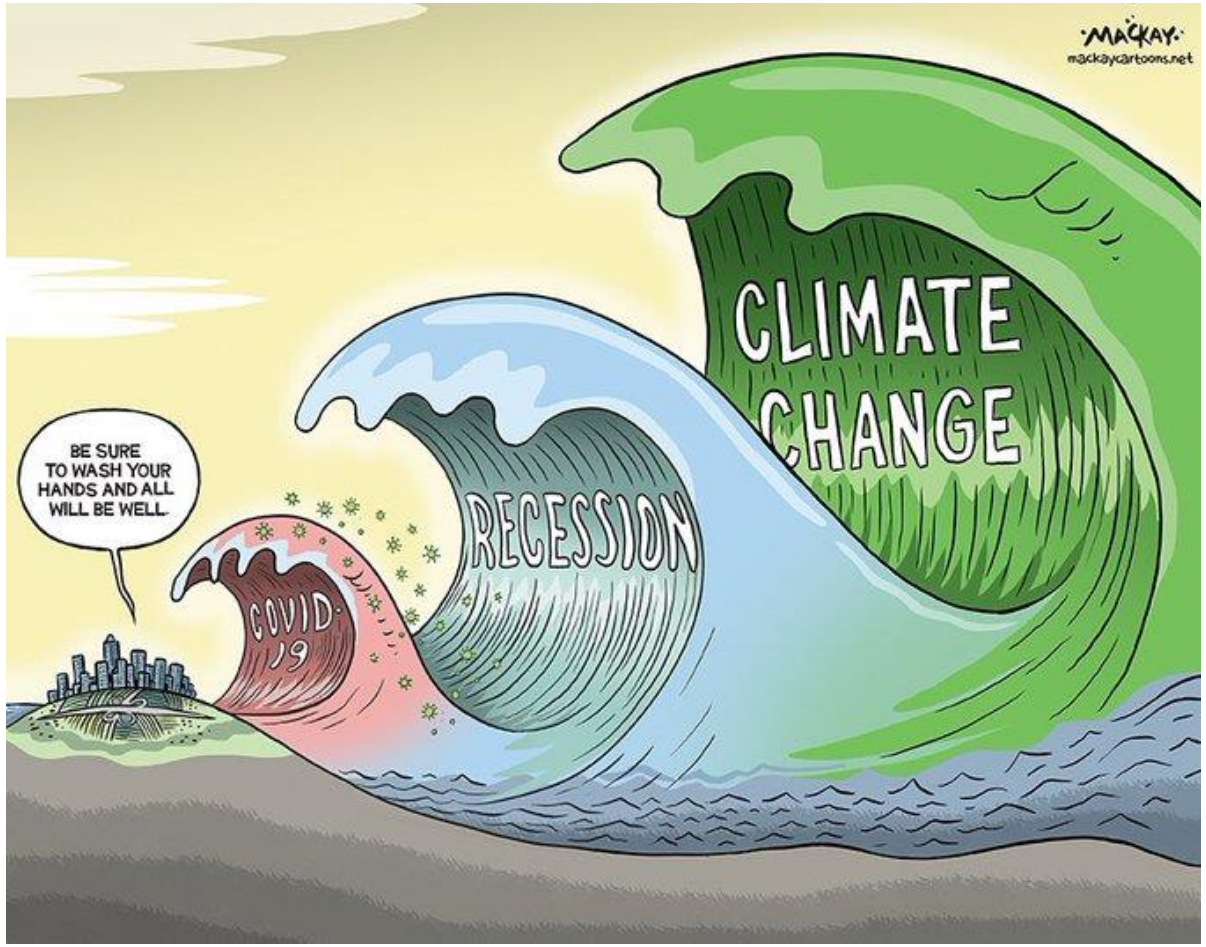
MIT News
ON CAMPUS AND AROUND THE WORLD

SUBSCRIBE

How will Covid-19 ultimately impact climate change?

Study probes pandemic's long-term effects on the global effort to reduce greenhouse gas emissions.

Mark Dwortzan | MIT Joint Program on the Science and Policy of Global Change
January 29, 2021



Credits:
the cartooninst Graeme MacKay

nature climate change

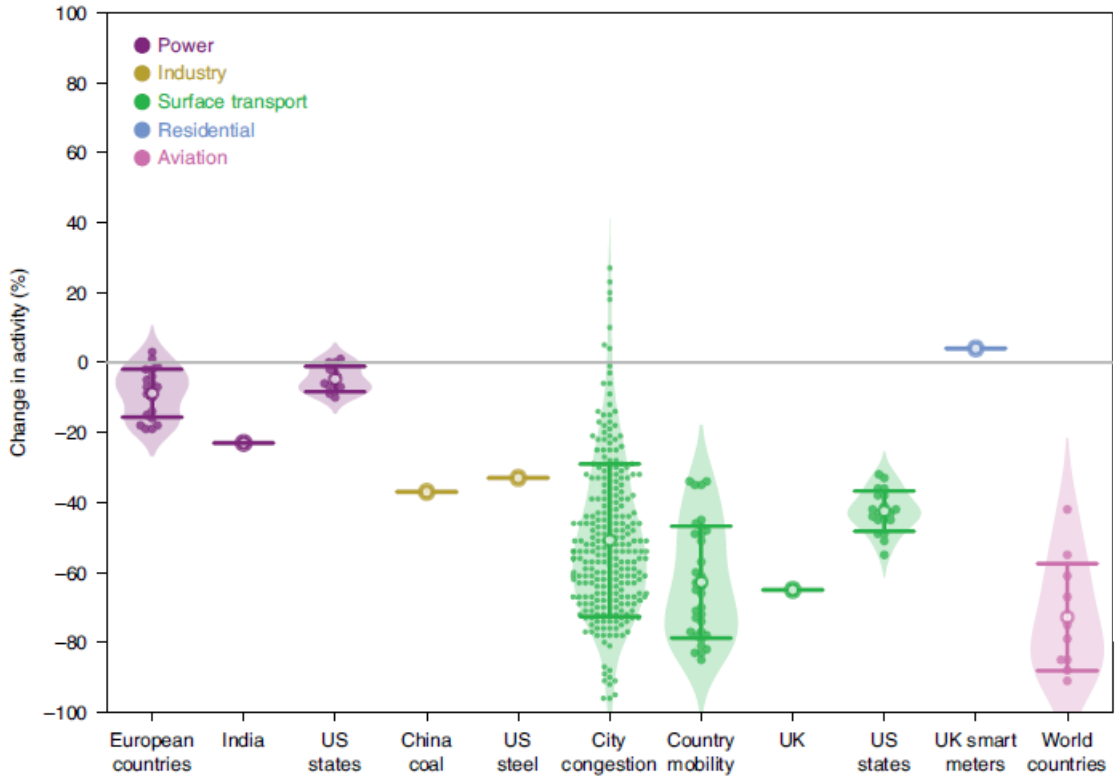
ARTICLES

https://doi.org/10.1038/s41558-020-0797-x

Check for updates

Temporary reduction in daily global CO_2 emissions during the COVID-19 forced confinement

Corinne Le Quéré[1,2]✉, Robert B. Jackson[3,4,5], Matthew W. Jones[1,2], Adam J. P. Smith[1,2], Sam Abernethy[3,6], Robbie M. Andrew[7], Anthony J. De-Gol[1,2], David R. Willis[1,2], Yuli Shan[8], Josep G. Canadell[9], Pierre Friedlingstein[10,11], Felix Creutzig[12,13] and Glen P. Peters[7]



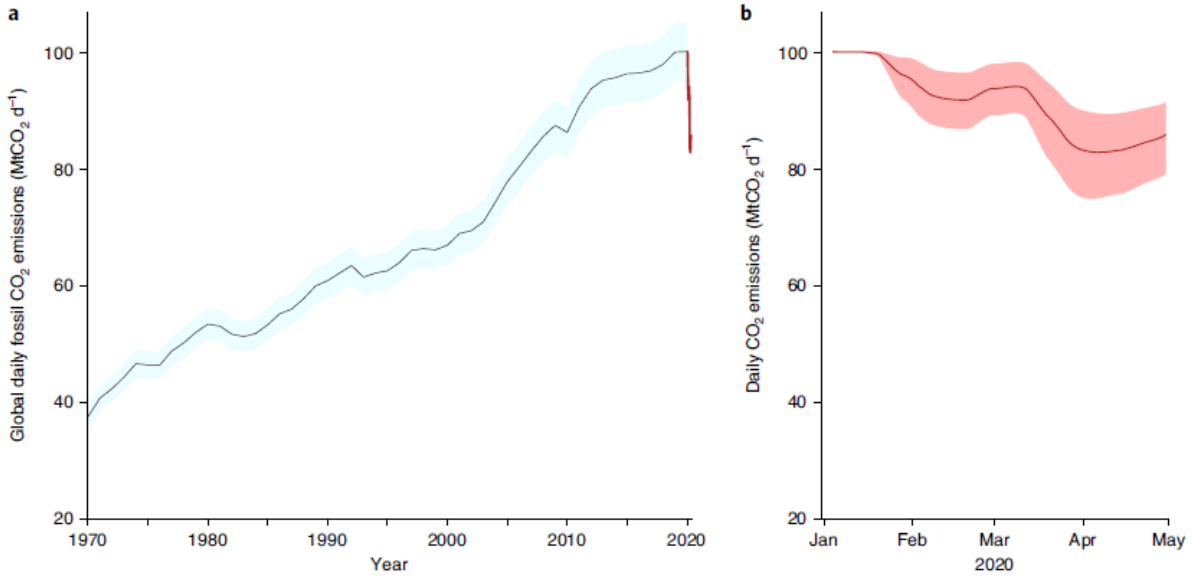


Fig. 3 | Global daily fossil CO_2 emissions ($MtCO_2$ d^{-1}). a, Annual mean daily emissions in the period 1970–2019 (black line), updated from the Global Carbon Project[1,3] (Methods), with uncertainty of ±5% (±1σ; grey shading). The red line shows the daily emissions up to end of April 2020 estimated here. **b**, Daily CO_2 emissions in 2020 (red line, as in **a**) based on the CI and corresponding change in activity for each CI level (Fig. 2) and the uncertainty (red shading; Table 2). Daily emissions in 2020 are smoothed with a 7-d box filter to account for the transition between confinement levels.

A European Green Deal

Striving to be the first climate-neutral continent

Climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, Europe needs a new growth strategy that will transform the Union into a modern, resource-efficient and competitive economy, where

- there are no net emissions of greenhouse gases by 2050
- economic growth is decoupled from resource use
- no person and no place is left behind

The European Green Deal is our plan to **make the EU's economy sustainable.** We can do this by turning climate and environmental challenges into opportunities, and making the transition just and inclusive for all.

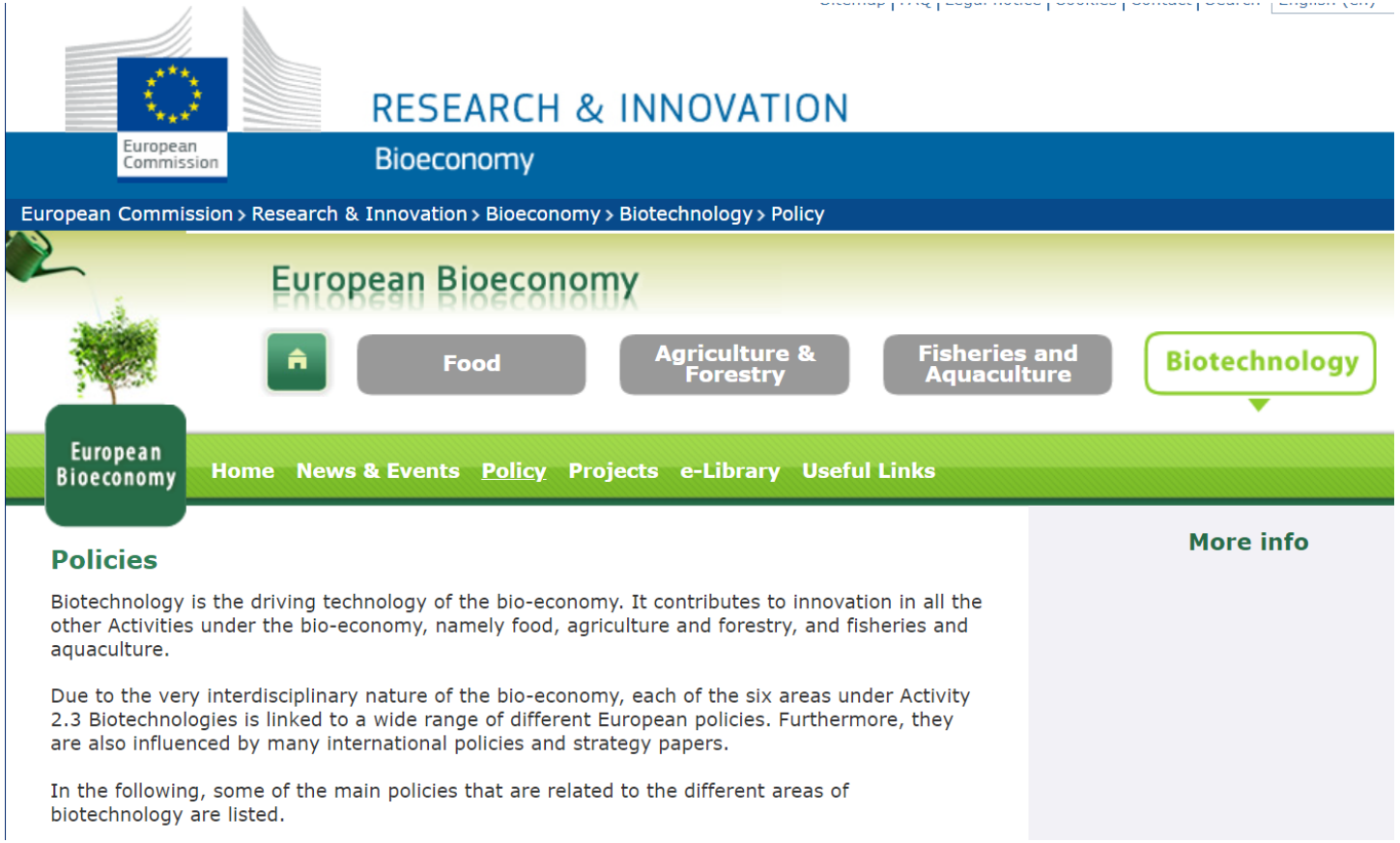
COMMENT · 26 OCTOBER 2020 · CORRECTION 12 NOVEMBER 2020 , CORRECTION 21 DECEMBER 2020

Europe's Green Deal offshores environmental damage to other nations

Importing millions of tonnes of crops and meat each year undercuts farming standards in the European Union and destroys tropical forests.

Richard Fuchs ✉, Calum Brown & Mark Rounsevell

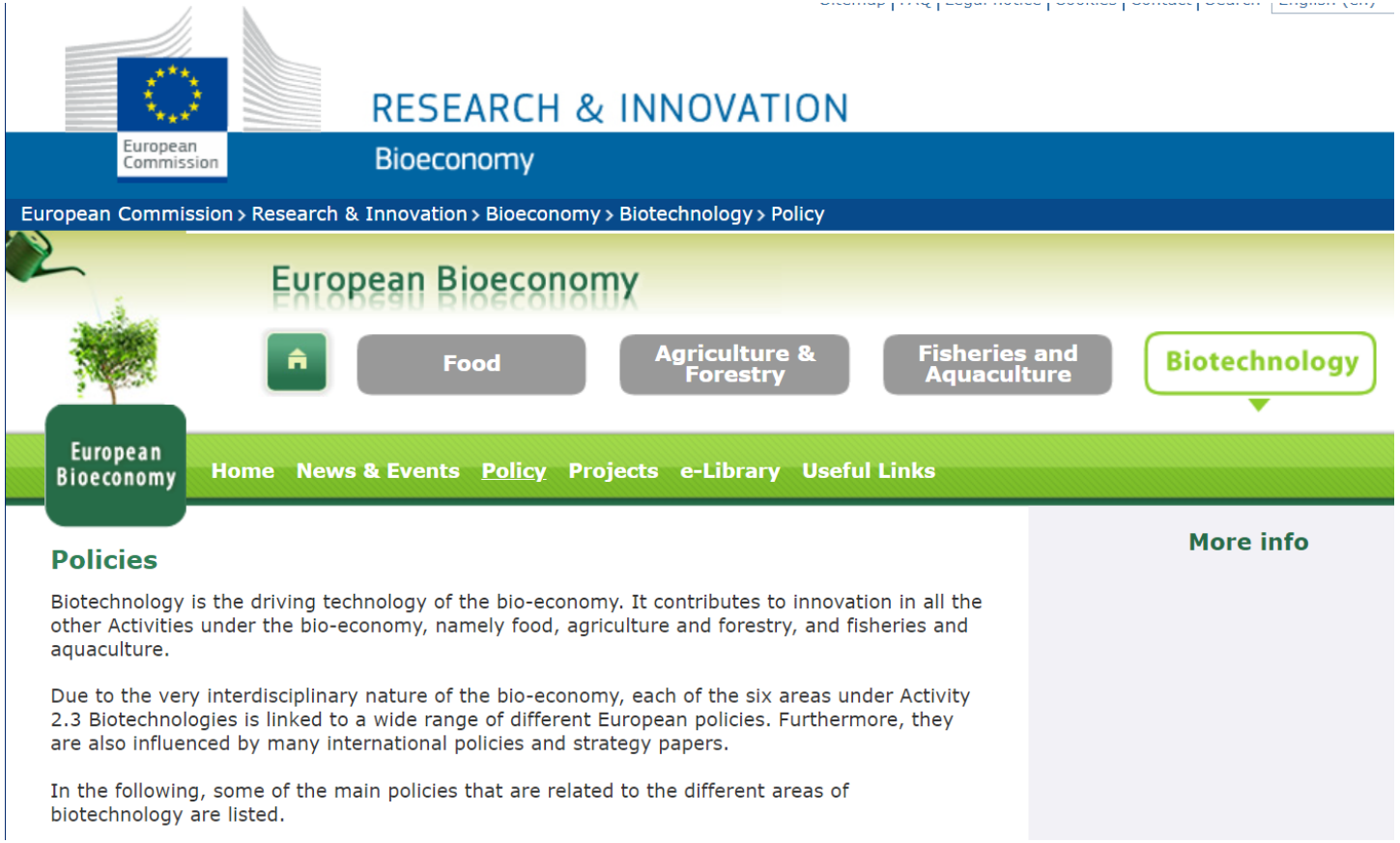
Workers pile palm fruits onto a truck at an Indonesian oil-palm plantation in North Sumatra. Credit: Jefta Images/Barcroft Media/Getty



https://ec.europa.eu/research/bioeconomy/biotechnology/policy/index_en.htm

In the following, some of the main policies that are related to the different areas of biotechnology are listed.

- Novel sources of biomass and bio-products
- Marine and fresh-water biotechnology (blue biotechnology)
- Industrial biotechnology: added-value bio-products and bio-processes (white biotechnology)
- Bio-refinery
- Environmental biotechnology
- Emerging trends in biotechnology



https://ec.europa.eu/research/bioeconomy/biotechnology/policy/index_en.htm

New Genomic Techniques: MEPs back rules to support green transition of farmers

Press Releases PLENARY SESSION ENVI 07-02-2024 - 14:03

- Easier procedure for NGT plants considered equivalent to conventional plants
- All products from NGT plants will still need mandatory labelling
- The European Food Safety Authority has evaluated potential safety issues of NGTs

Further information

> Adopted text will become available here (07.02.2024)

> Procedure file

https://www.europarl.europa.eu/news/en/press-room/20240202IPR17320/new-genomic-techniques-meps-back-rules-to-support-green-transition-of-farmers

SCIENCEINSIDER | EUROPE

European Parliament votes to ease regulation of gene-edited crops

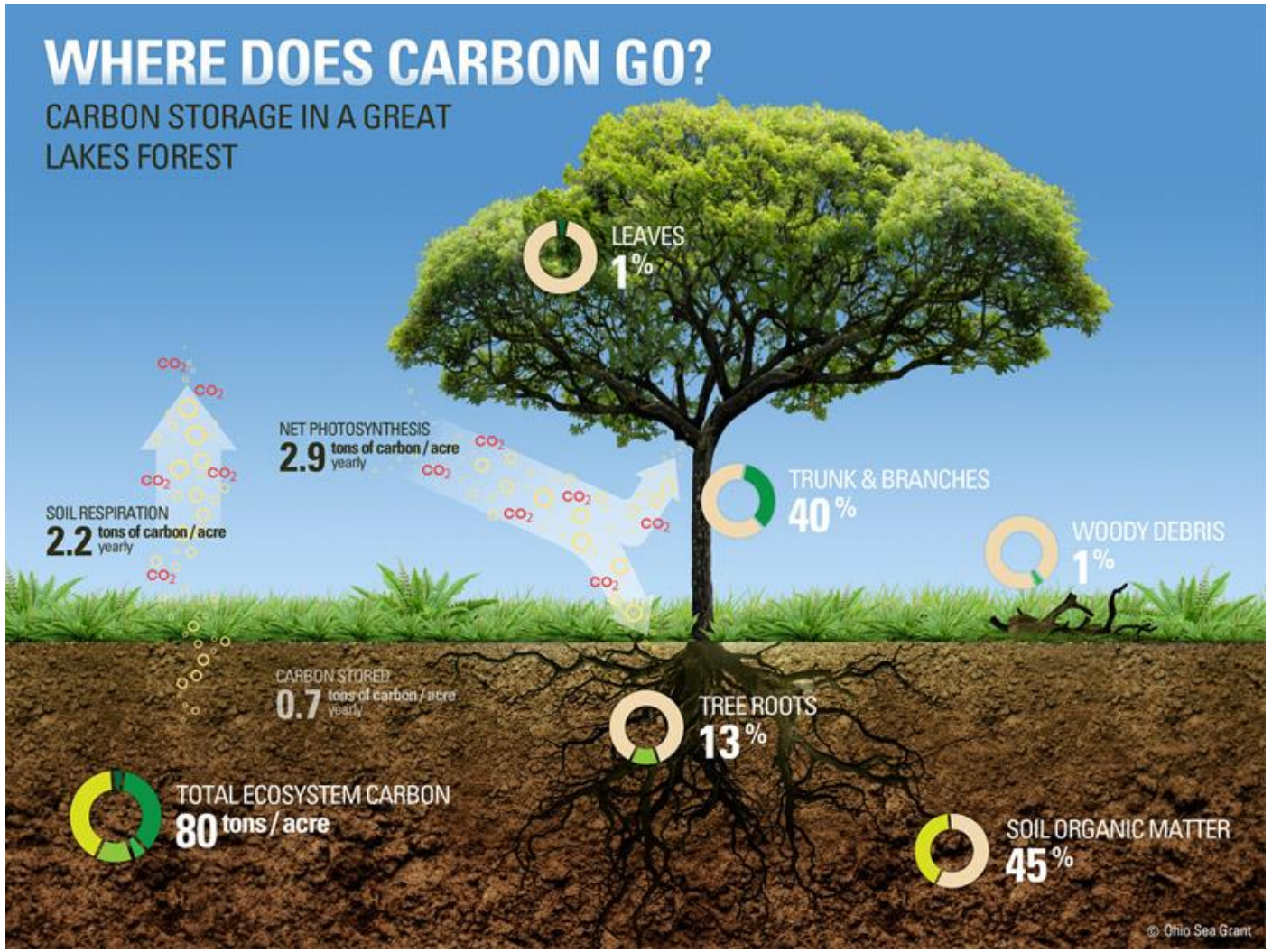
Move is a major victory for biotechnology, but debate remains over patents and labels

7 FEB 2024 · 6:20 PM ET · BY ERIK STOKSTAD

https://www.science.org/content/article/european-parliament-votes-ease-regulation-gene-edited-crops

Deforestation and land use account for 1/3 of the excess greenhouse gas emission

Decrease of CO_2
by Rain Forest cut



What is the COP and COP21 in particular?

Conference of the Parties = COP

United Nations
Climate Change

Conference of the Parties = COP

United Nations
Climate Change

What is the COP?
The COP is the supreme decision-making body of the Convention. All States that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements.

The first COP meeting was held in Berlin, Germany in March, 1995.

The 21st session of the Conference of the Parties (COP21 - 2015) is the largest international diplomatic conference ever organized and took place in Paris (France). This event is part of the cycle of major UN conferences on climate change.

<u>IMPORTANT OBJECTIVES:</u>

196 attending parties. The agreement was supposed to enter into force when joined by at least 55 countries which together represent at least 55 % of global greenhouse emissions. On 22 **April 2016 (Earth Day)**, 174 countries signed the agreement in New York, and began adopting it within their own legal systems (through ratification, acceptance, approval, or accession).

- COP 27 tool place in Sharm El Sheikh, Egypt
- COP 28 will take place in UNITED ARAB EMIRATES from 30 November until 12 December 2023. Pre-sessionals will take place from 24 to 29 November.

https://unfccc.int/cop28

- **8 November 2016 -> Donald Trump president elected of USA**
- **14 – 15 November 2016 -> COP22\ in Marocco**

Nicaragua has announced it will sign the Paris Agreement on climate change (2016), Syria is also on board (2017), the US is the only country that will not participate in the global accord.

In June 2017, U.S. President Donald Trump announced his intention to withdraw the United States from the agreement, causing widespread condemnation in the European Union and many sectors in the United States. Under the agreement, the earliest effective date of withdrawal for the U.S. is **November 2020**.

Donald J. Trump ✓
@realDonaldTrump

Following

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

RETWEETS 104,728 LIKES 67,204

7:15 PM - 6 Nov 2012

12K 105K 67K

Donald J. Trump ✓
@realDonaldTrump

Patrick Moore, co-founder of Greenpeace: “The whole climate crisis is not only Fake News, it’s Fake Science. There is no climate crisis, there’s weather and climate all around the world, and in fact carbon dioxide is the main building block of all life.” @foxandfriends Wow!

58.2K 12:29 PM - Mar 12, 2019

38.5K people are talking about this

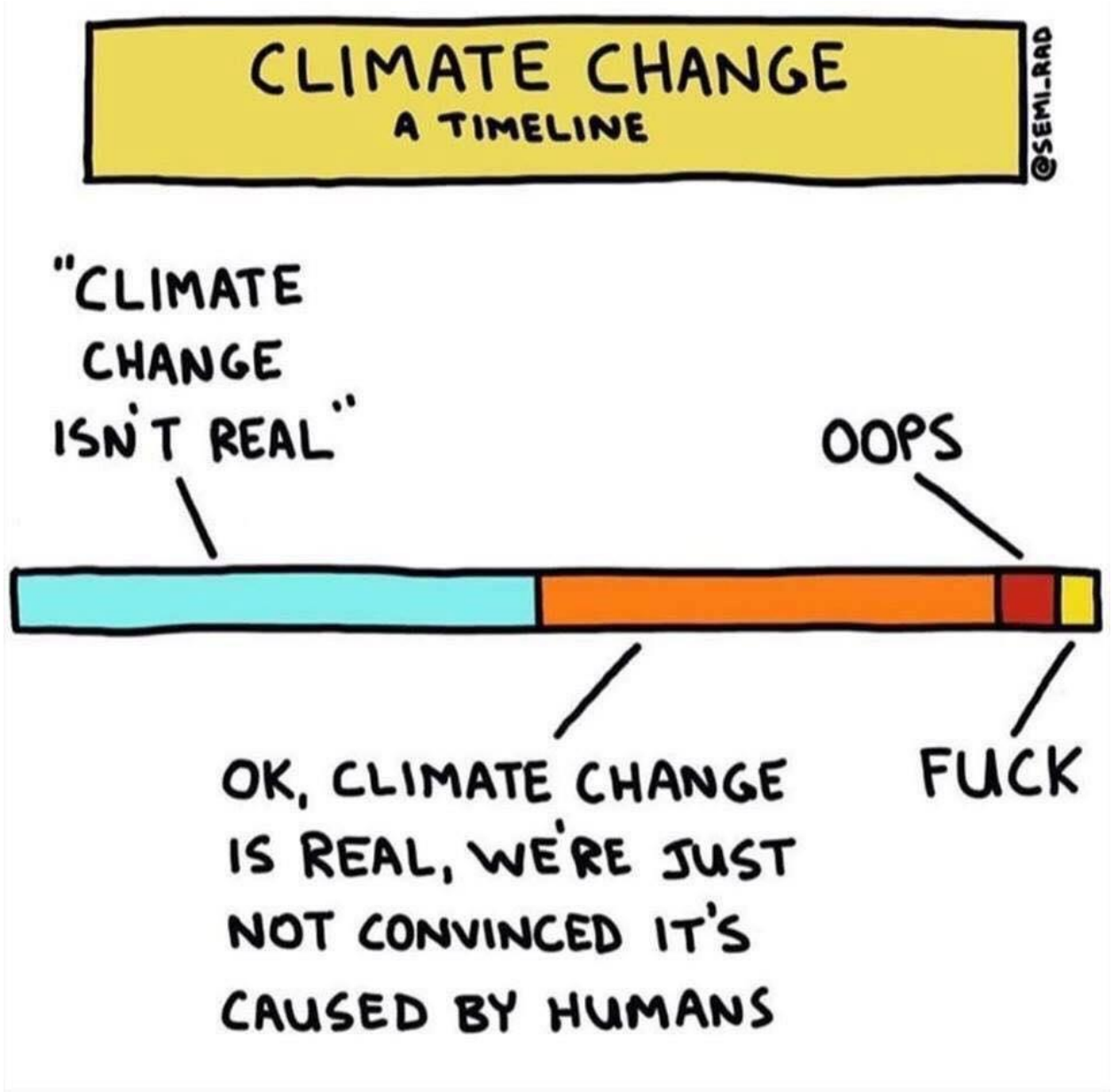
Donald J. Trump ✓
@realDonaldTrump

Following

Snowing in Texas and Louisiana, record setting freezing temperatures throughout the country and beyond. Global warming is an expensive hoax!

RETWEETS 428 LIKES 358

1:27 AM - 29 Jan 2014



The expected key result was an agreement to set a goal of limiting global warming to "well below 2 °C" Celsius compared to pre-industrial levels. The agreement calls for zero net anthropogenic greenhouse gas emissions to be reached during the second half of the 21st century.

In the adopted version of the Paris Agreement, the parties will also pursue efforts to limit the temperature increase to 1.5 °C. The 1.5 °C goal will require zero emissions sometime between 2030 and 2050, according to some scientists.

COP 23 in Bonn (2017)

The Kyoto Protocol was written in 1997 at COP3, but was not officially adopted until February 16 of 2005.

- Climate Action Zone -> important funding to bring affordable insurance and other financial protection to millions of **vulnerable people around the world**. Launched the Resilience Global Partnership for Climate and **Disaster Risk Finance** and Insurance Solutions with the contribution of US$125 million.

- Separately, Michael Bloomberg used pledged $50 million to expand his **anti-coal US** campaign into Europe.

- The Fijian COP23 Presidency also launched the Ocean Pathway Partnership, which will be co-chaired by Fiji and Sweden, in an effort the strengthen the link between global warming and the health of the **world's oceans**.

https://unfccc.int/index.php/process-and-meetings/conferences/un-climate-change-conference-november-2017/sessions-of-negotiating-bodies/cop-23#eq-39

More than 30,000 people attended COP23 in Bonn, Germany.

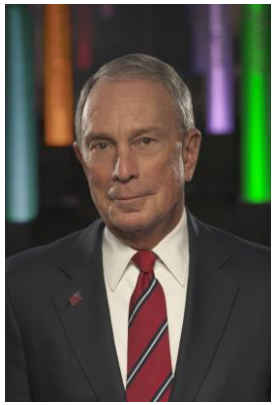
French President Emmanuel Macron

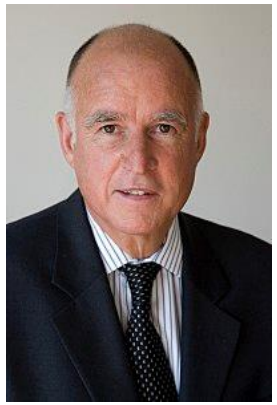
German Chancellor Angela Merkel

California Governor Jerry Brown, Michael Bloomberg and Arnold Schwarzenegger

David Banks (climate adviser) attended representing the Trump Administration.







COP24 - 2018
Katowice Climate Change Conference – December 2018

- The IPCC confirmed that an average increase in global temperature of at least **1.5 ° C on pre-industrial levels is now inevitable** - it will take place over the next 12 years. In the absence of radical action, the average temperature will rise above 2 ° C leading to more extreme weather events and changing the climate of entire geographical areas, with consequences for millions of people.

Climate Clock – Time Square, New York

https://climateclock.world/

The Climate Clock shows two numbers. The first, in red, is a timer, counting down how long it will take, at current rates of emissions, to burn through our “carbon budget” — the amount of CO2 that can still be released into the atmosphere while limiting global warming to 1.5°C above pre-industrial levels. This is our deadline, the time we have left to take decisive action to keep warming under the 1.5°C threshold. The second number, in green, is tracking the growing % of the world’s energy currently supplied from renewable sources. This is our lifeline. Simply put, we need to get our lifeline to 100% before our deadline reaches 0.

COP25 - 2019
Madrid, Spain. Climate Change Conference

- Jair Bolsonaro withdrew Brazil from hosting the event

- Following the 2019 Chilean protests, Chilean President Sebastián Piñera announced Chile's withdrawal from hosting the summit in late October 2019.

- 2020 -> postponed to 2021

Jail Bolsonaro

The Intergovernmental Panel on Climate Change (IPCC) is the international body for assessing the science related to climate change. It provides policymakers with regular assessments of the **scientific basis of climate change**, its impacts and future risks, and options for adaptation and mitigation.

Nobel Peace Price 2007

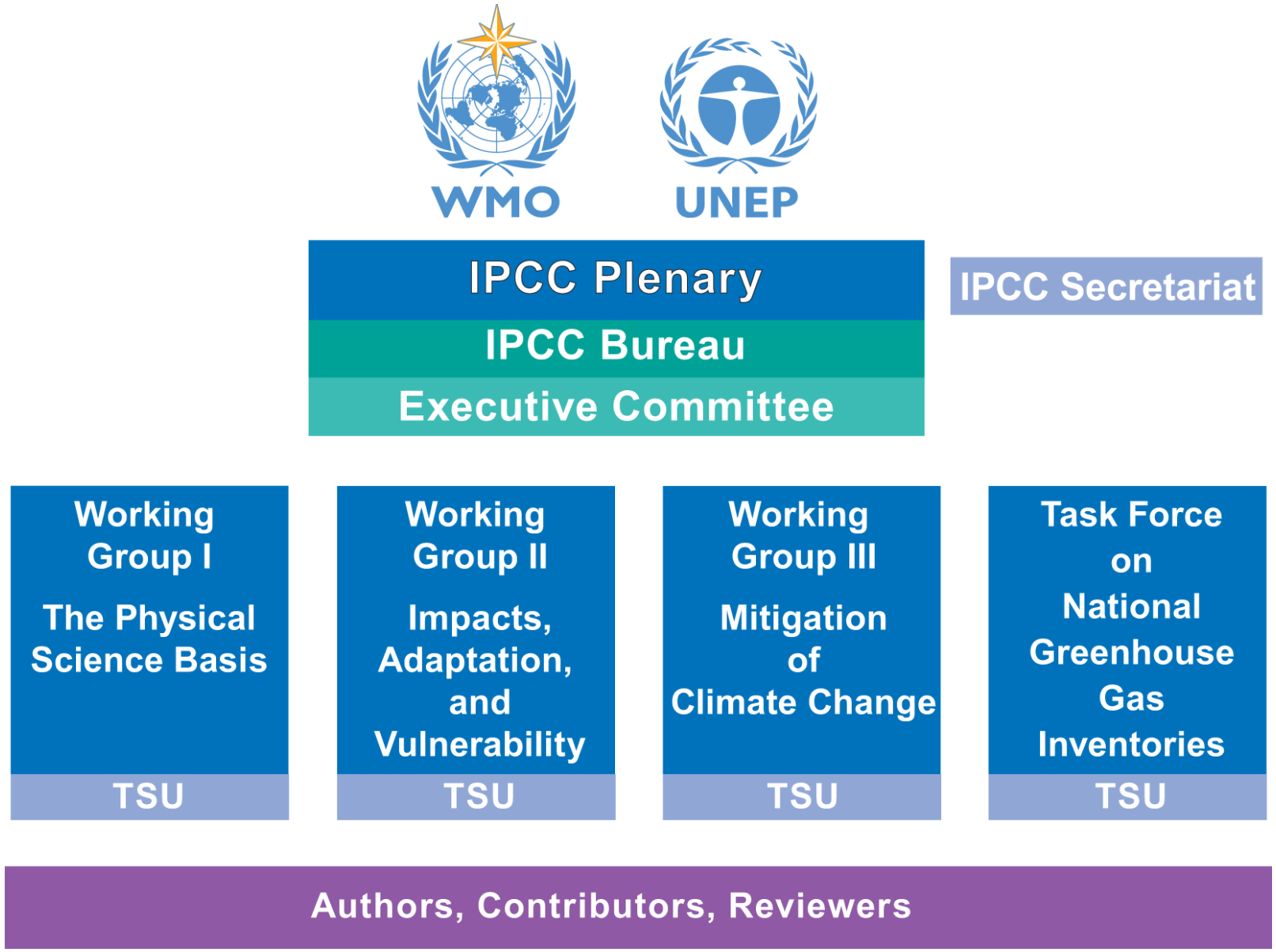
It was established by the **United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO)** to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.

The Intergovernmental Panel on Climate Change (**IPCC**) is the leading international body for the assessment of climate change.

Established in 1998 when the UN General Assembly endorsed the action by WMO and UNEP in jointly establishing the IPCC.

Currently **195 countries are Members of the IPCC**. Governments participate in the review process and the plenary Sessions. **The IPCC Bureau Members, including the Chair, are also elected during the plenary Sessions. Thousands of scientists** from all over the world contribute to the work of the IPCC.

The World Meteorological Organization Headquarters in Geneva. IPCC Secretariat is hosted by WMO



IPCC has scientific and intergovernmental nature.

The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-prescriptive.

5 things to do

The IPCC indicates a sort of route with forced stages to avoid exceeding 1.5 ° C:

- reduce global CO2 emissions to arrive in 2030 to produce 45 percent of those produced in 2010;
- produce 85% of electricity from renewable sources by 2050;
- bring carbon consumption to zero as soon as possible;
- allocate at least 7 million square kilometers (the equivalent of the surface of Australia) to crops for biofuels;
- reach equilibrium and therefore be zero emissions by 2050.

ONU ambassador - 2016

Link youtube in italiano
https://www.youtube.com/watch?v=_C4Rd8g1Iwg

OV
https://www.youtube.com/watch?v=zbEnOYtsXHA