A Planetary Health

perspective



on the climate crisis

Prof. Dr. Dr. med. Sabine Gabrysch

Potsdam Institute for Climate Impact Research

Charité - Universitätsmedizin Berlin

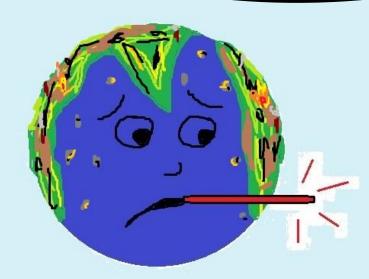
Heidelberg Institute of Global Health

Be-cause health, 23.11.2021

Oh dear, this does not look good...

You have sustained severe forest burns and are running a fever from an excess of greenhouse gases...

This seems a case of advanced-stage Homo sapiens infestation!

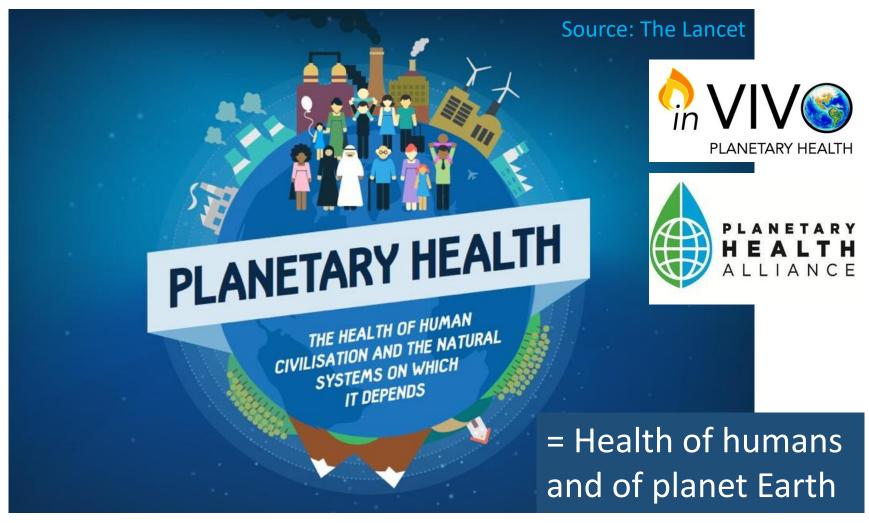




Structure

- 1. What is Planetary Health?
- 2. Medical history and exam
- 3. Diagnosis and prognosis
- 4. Therapy options







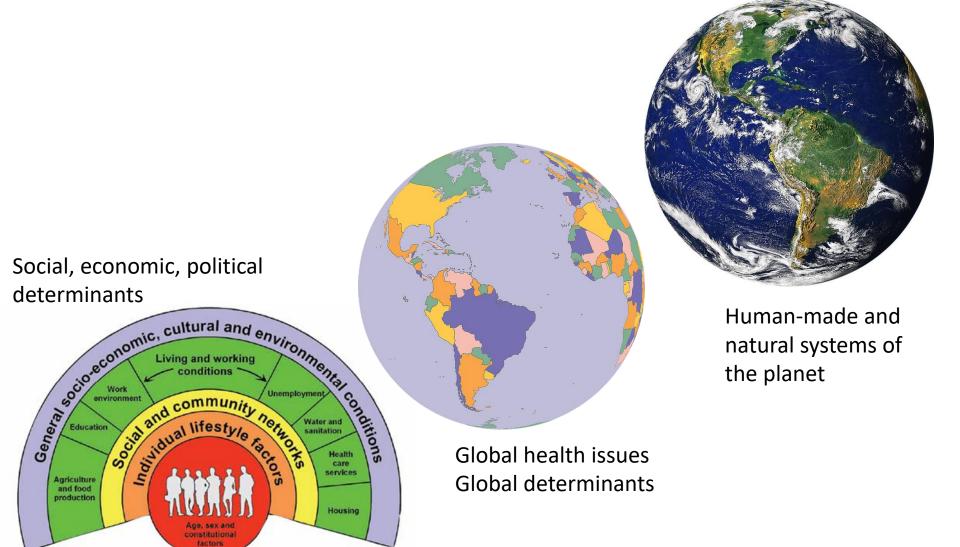


CONSERVATION

APPLIED CASES OF MEDICINE
ECOLOGICAL HEALTH MEDICINE



Public → Global → Planetary Health



Specific populations

Source: Dahlgren and Whitehead, 1991

Sources: Dahlgren&Whitehead, Pixabay

2014

THE LANCET

From public to planetary health: a manifesto

A new vision for planetary health

This manifesto for transforming public health calls for a social movement to support collective public health action at all levels of society. Our aim is to respond to the threats we face: threats to human health and wellbeing, threats to the sustainability of our civilisation, and threats to the natural and human-made systems that support us.



Our vision is for a planet that nourishes and sustains the diversity of life with which we co-exist and on which we depend. Our goal is to create a movement for planetary health. Scroll down this page to read the full manifesto.

"The harms we continue to inflict on our planetary systems are a threat to our very existence as a species.

The gains made in health and wellbeing over recent centuries, including through public health actions, are not irreversible; they can easily be lost..."



The Rockefeller Foundation-Lancet Commission on planetary health

Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–*Lancet* Commission on planetary health

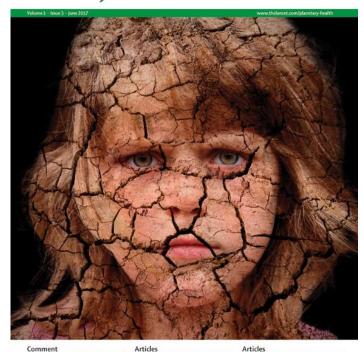
Whitmee et al. 2015

www.planetaryhealthalliance.org



since 2015

THE LANCET Planetary Health



Climate change and depression in young Human and environmental factors associated with Plasmodium knowlesi malaria in Malaysia See page e94 See page e97

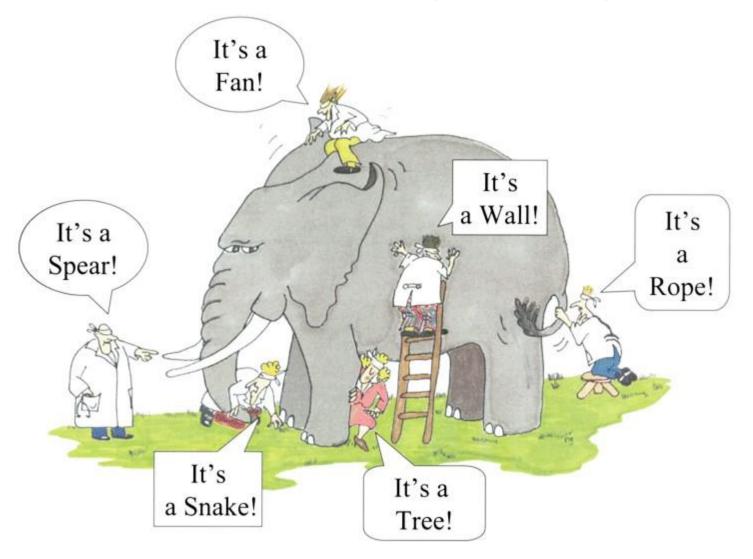
Social participation prevents cognitive decline after a natural disaster
See page e105

since 2017

Planetary Health

Ansolisciolinan. Relationships Human health Political, economic, social systems Natural systems of the planet

Transdisciplinarity

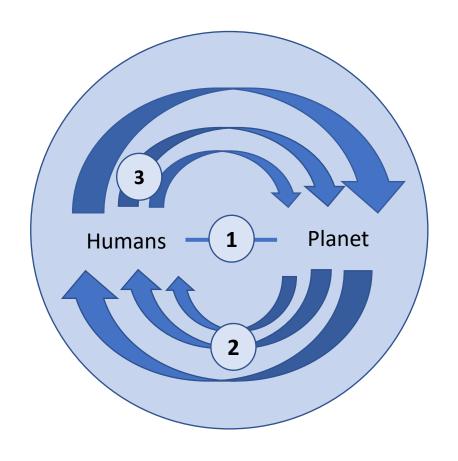


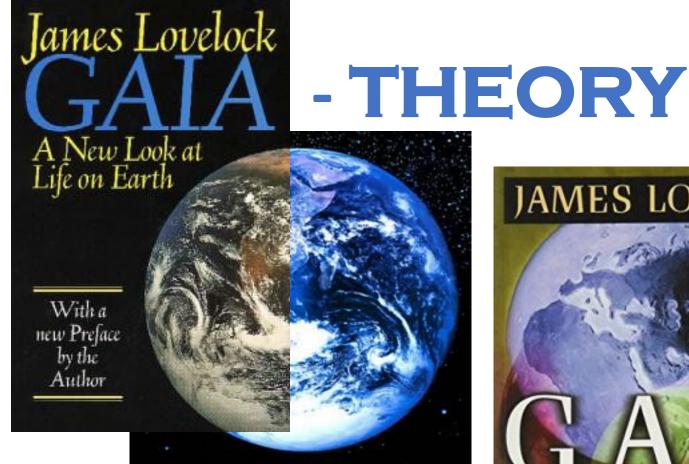
Graphic: G.R. Guzlas, Copyright: J.G. Saxe, available at www.nature.com

Planetary Health: Key challenges

according to Lancet Commission 2015

- (1) *Imagination challenge*: Rethink the relationship between humans and the planet
- (2) Knowledge challenge:
 Quantify health impacts of global environmental change
- (3) *Implementation challenge:*Develop and evaluate solution strategies for a sustainable lifestyle



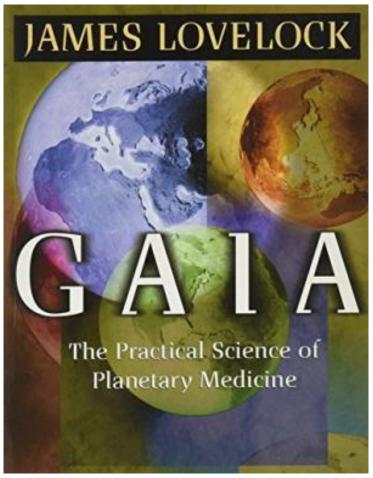




- Self-regulation
- Emerging properties
- Homeostasis



Source: Pixabay



Structure

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Medical history: key symptoms

1. Climate change

- Higher temperatures and more extreme weather events
- Melting of polar ice, glaciers and permafrost

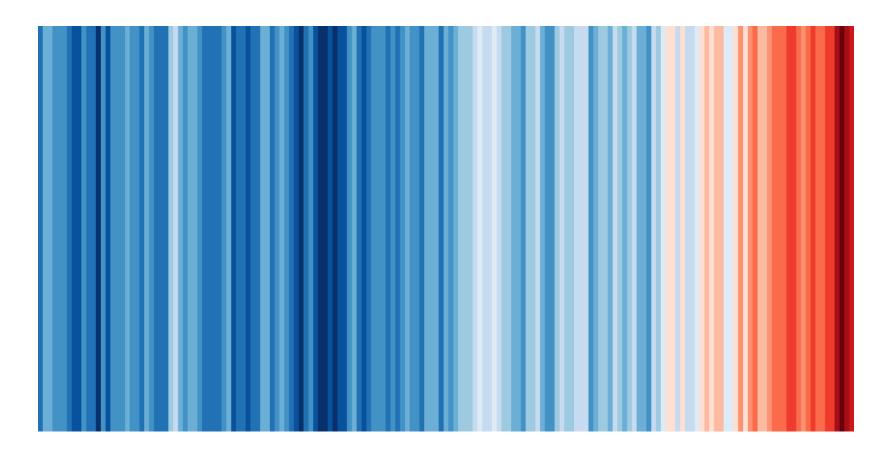
2. Pollution

- Air pollution with aerosols from combustion processes
- Release of chemicals and plastics into water and soils
- Overfertilization of water bodies with nitrogen and phosphate

3. Biodiversity loss

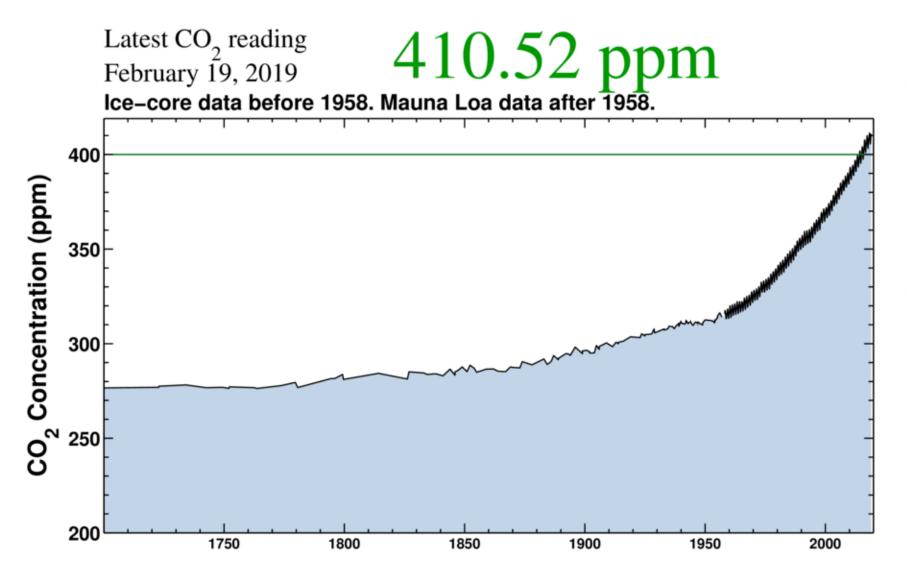
- Loss of natural ecosystems, incl. tropical forests, swamps, reefs
- Massive decrease of populations of wild mammals, birds, reptiles, amphibians, fish, insects, etc.
- Extinction of species

Global mean temperature 1850 - 2018

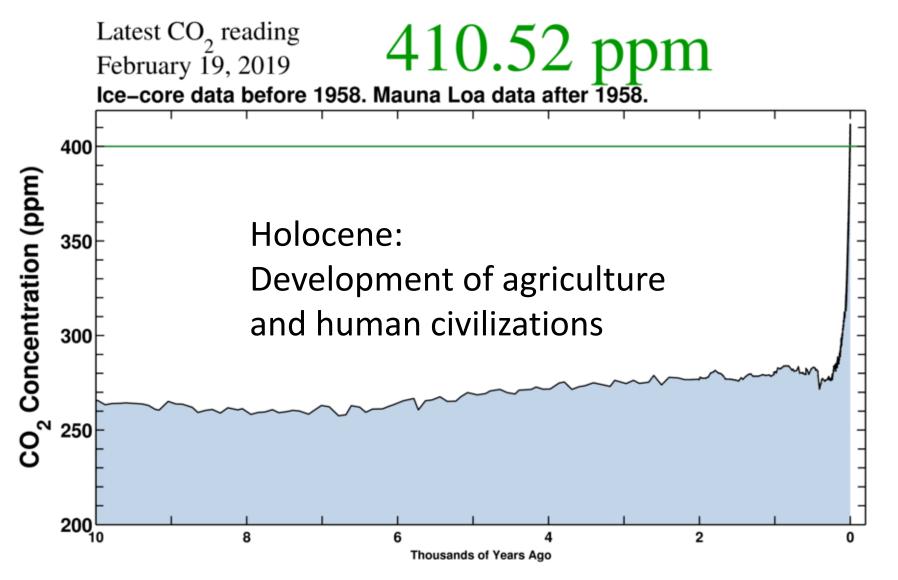


The range from dark blue to dark red represents a difference of 1.35°C. Source: World Meteorological Association, www.climate-lab-book.ac.uk

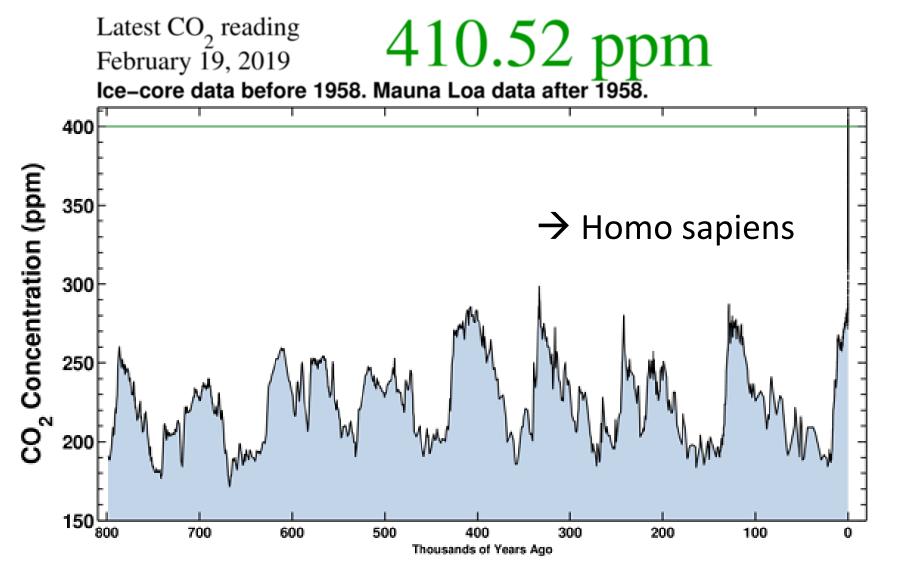
CO₂ concentration over last 300 years



CO₂ concentration over 10,000 years



CO₂ concentration over 800,000 years



Medical history: key symptoms

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Source: Wikimedia, Adityamadhav83



Medical history: key symptoms

1. Climate change

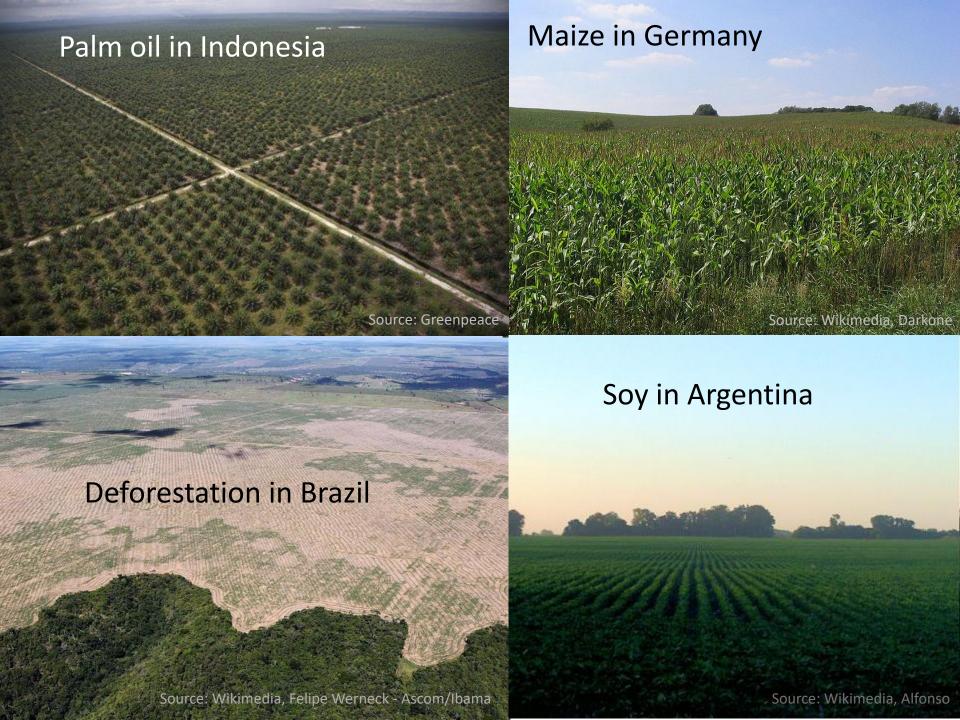
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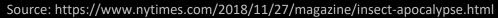


The Telegraph

'Mass extinction event' that could wipe out a million species is already underway, says UN-backed report 6 MAY 2019 - 12:00PM

By David Chazan

https://www.telegraph.co.uk/news/2019 /05/06/mass-extinction-event-cou wipe-million-species-already-underway/ ECOLOGICAL CRIME SCENE PLANETE EN DANGER ACT NOW AGISSONS MAINTENANT ECOLOGICAL CRIME SCENE



The New Hork Times Magazine

FEATURE

The Insect Apocalypse Is Here

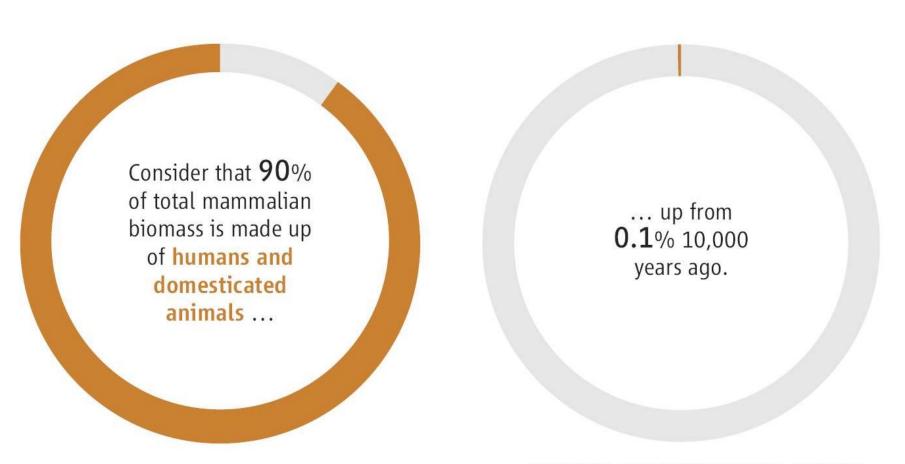
What does it mean for the rest of life on Earth?





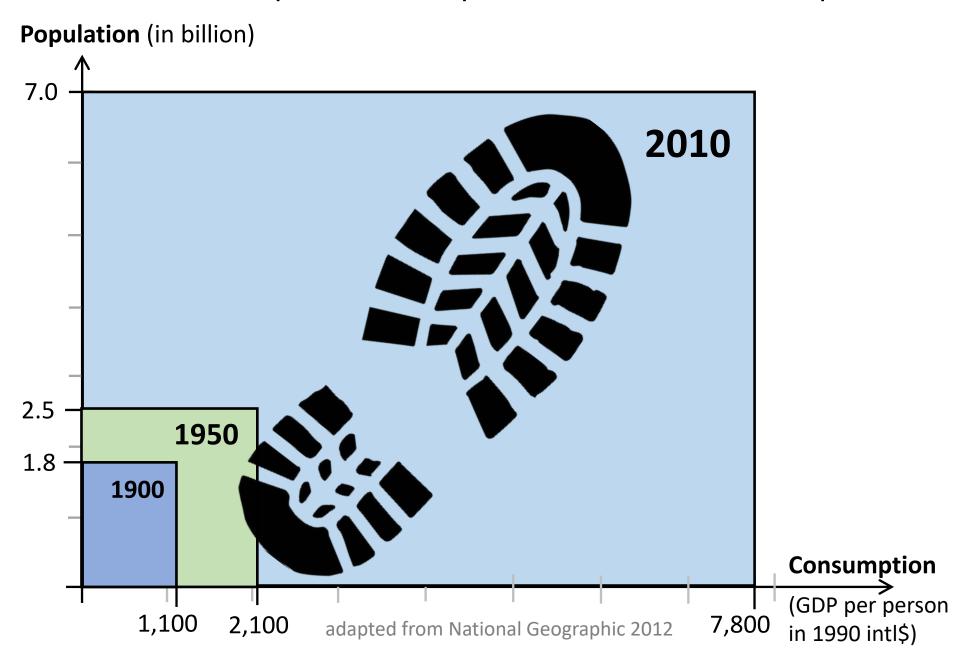


Planet of humans



VACLAV SMIL, THE EARTH'S BIOSPHERE: EVOLUTION, DYNAMICS, AND CHANGE. MIT PRESS (2002)

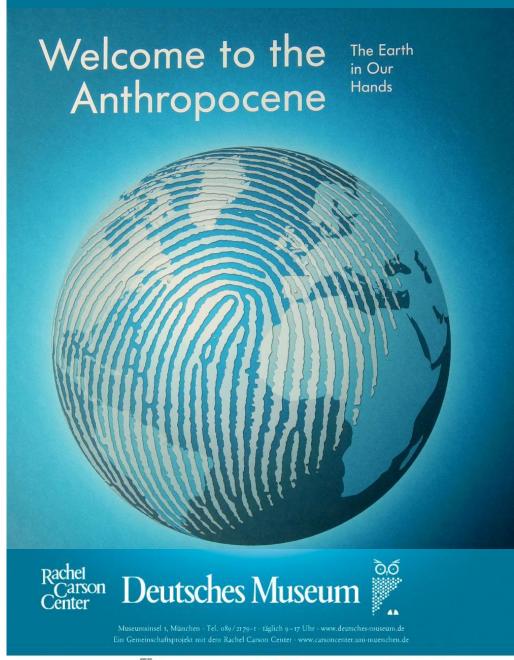
Human footprint = Population x Consumption



Anthropocene

- = Age of humans
- New geological era
- Humans as the most influencial factor on planet Earth

Or rather "Capitalocene"?















Human health

Better health and survival for most

- Child mortality ↓
 to 4%
- Life expectancy 1
 to 72 years
- Fertility ↓ to 2-3 babies per woman

Suffering of the poorest

- 820 million people hungry
- 5 million child deaths per year

Chronic diseases

- Overweight 个 to 2 billlion
- Diabetes ↑ > 400 million
- Heart attacks, strokes

Pandemics

Influenza, HIV, COVID-19

Source: Eero Pitkanen

Sources: WHO, FAO

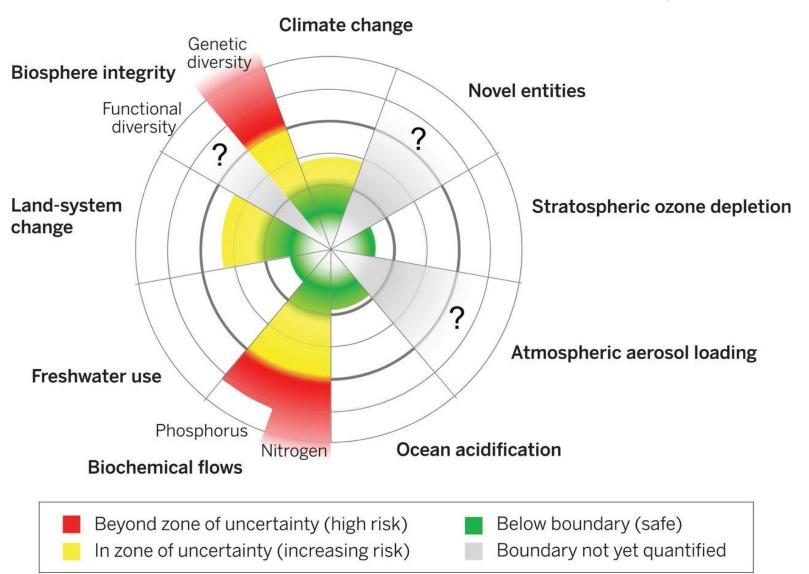
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Planetary boundaries

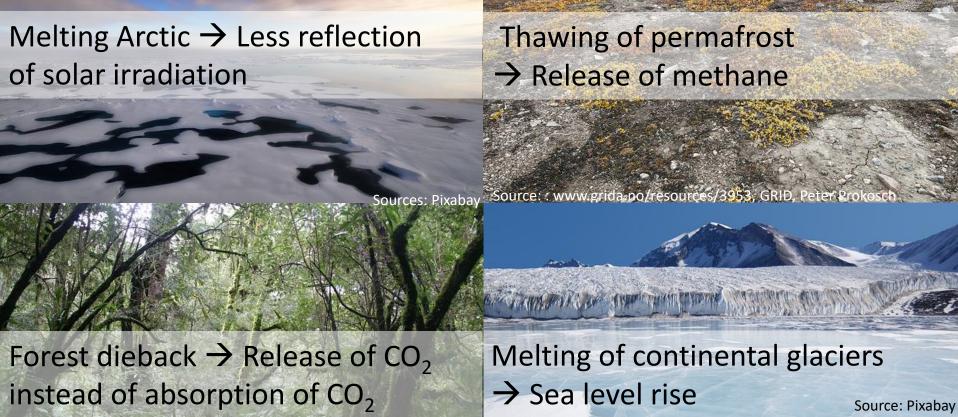
Steffen et al., Science 2015



Tipping elements

Non-linear changes Self-amplifying feedback loops





Prognosis: climate scenarios

(IPCC report 2018)

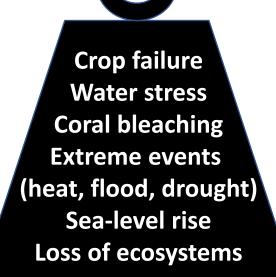
+3.0°C

+1.5°C



+2.0°C

Crop failure
Water stress
Coral bleaching
Extreme events
(heat, flood, drought)
Sea-level rise
Loss of ecosystems



Crop failure
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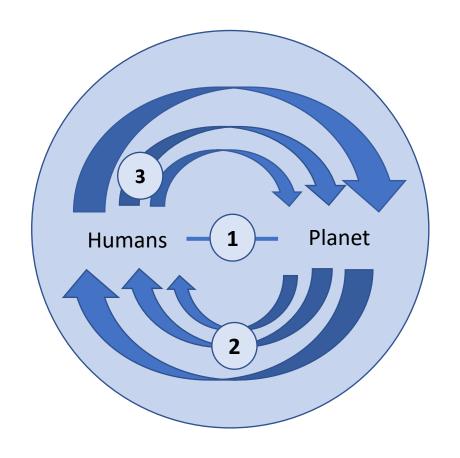




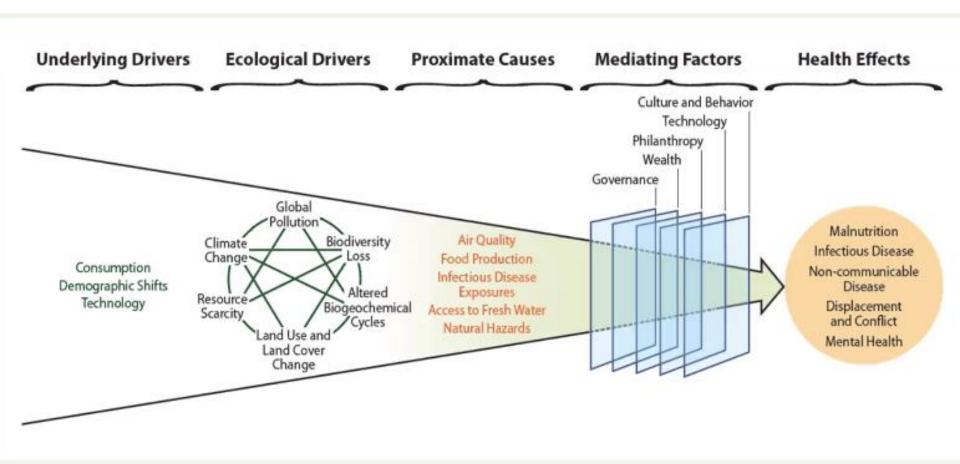
Planetary Health: Key challenges

according to Lancet Commission 2015

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Health impacts of anthropogenic global environmental change



Source: Sam Myers, Lancet 2017

http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)32846-5.pdf

Direct health effects

- Storms
- Floods
- Droughts → fire
- Heat



SCIENCE ADVANCES | RESEARCH ARTICLE

CLIMATOLOGY

Deadly heat waves projected in the densely populated agricultural regions of South Asia

Eun-Soon Im,1* Jeremy S. Pal,2* Elfatih A. B. Eltahir3†

The risk associated with any climate change impact reflects intensity of natural hazard and level of human vulnerability. Previous work has shown that a wet-bulb temperature of 35°C can be considered an upper limit on human survivability. On the basis of an ensemble of high-resolution climate change simulations, we project that extremes of wet-bulb temperature in South Asia are likely to approach and, in a few locations, exceed this critical threshold by the late 21st century under the business-as-usual scenario of future greenhouse gas emissions. The most intense hazard from extreme future heat waves is concentrated around densely populated agricultural regions of the Ganges and Indus river basins. Climate change, without mitigation, presents a serious and unique risk in South Asia, a region inhabited by about one-fifth of the global human population, due to an unprecedented combination of severe natural hazard and acute vulnerability.





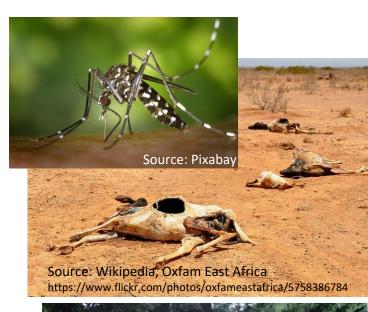
Indirect health effects

Ecologically mediated

- Mosquitoes → Infections
- Crop failures → Undernutrition
- Pollen → Allergies

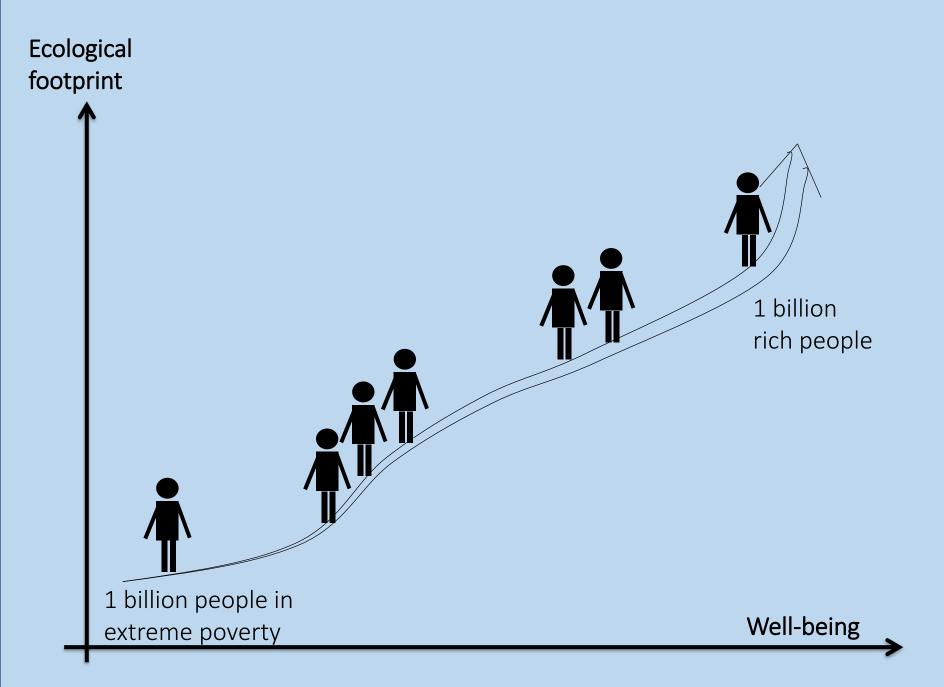
Socially mediated

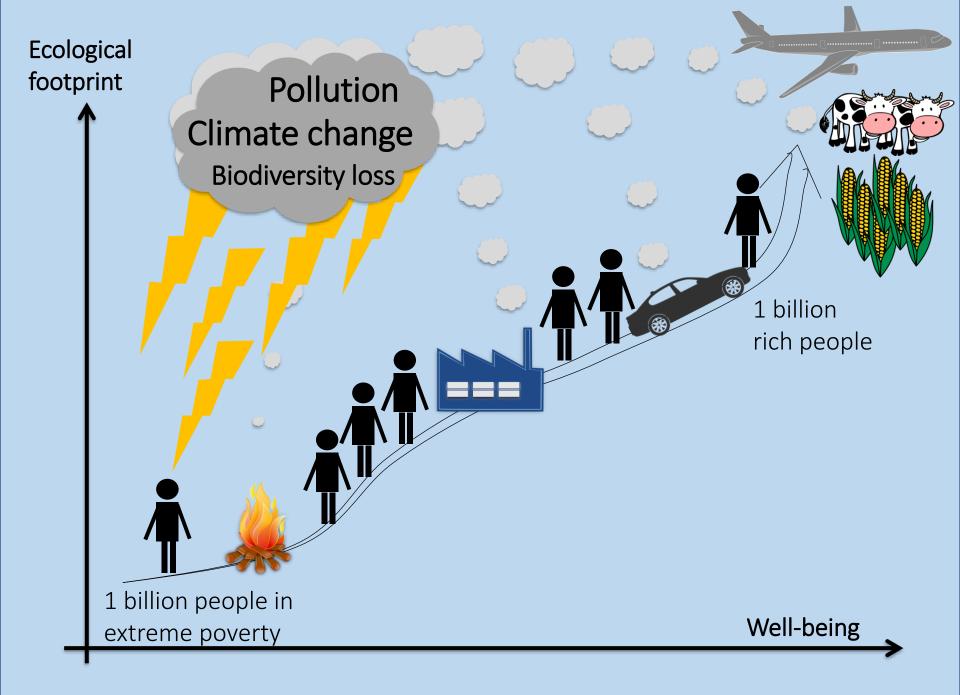
- Poverty
- Conflicts
- Migration

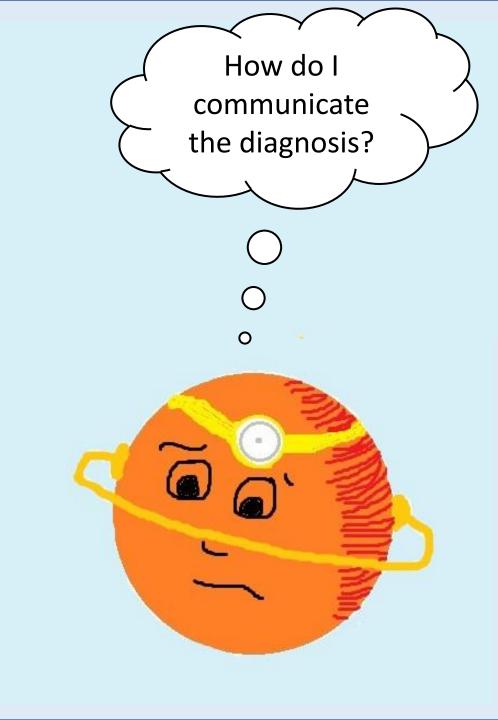


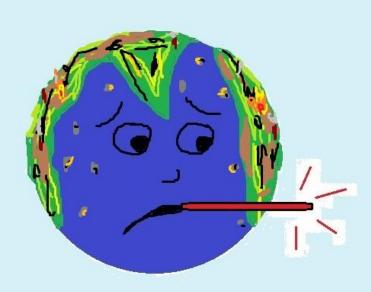


Source: Wikipedia, Andy Hall/Oxfam









Shared diagnosis? Urgency clear?

REALLY, AN OPERATION ?!?
NO DOCTOR, THAT DOESN'T SUIT
ME NOW.
I NEED TO GET A HAIRCUT TODAY
AND I AM
EXPECTING VISITORS TOMORROW...



Source: Bettina Nutz: www.bettinanutz.de; CC-BY-NC-ND: https://creativecommons.org/licenses/by-nc-nd/4.0

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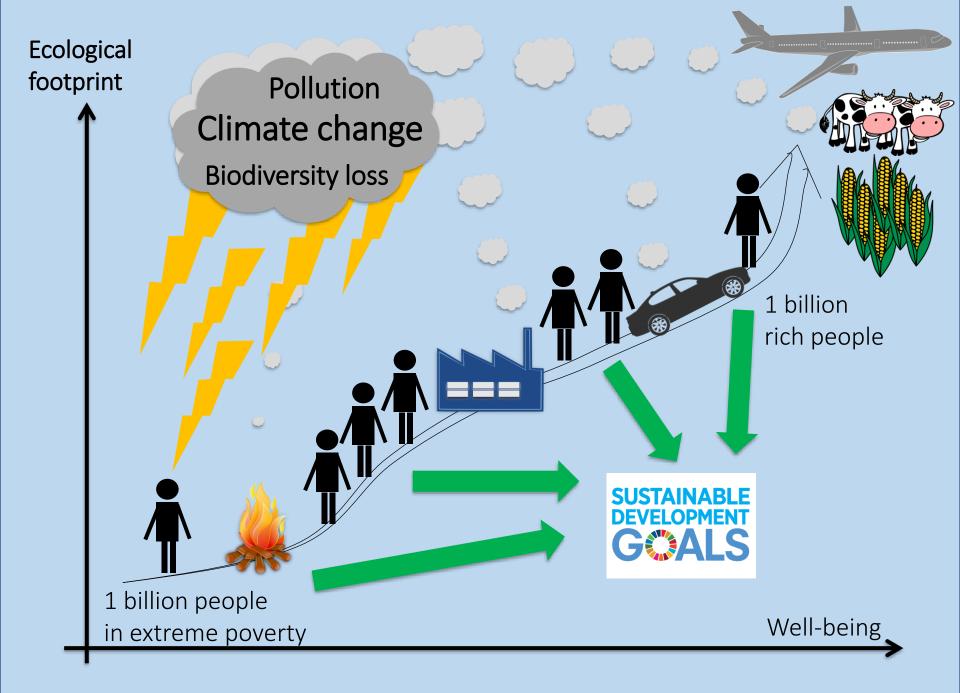






Reduce speed quickly! Then change course...

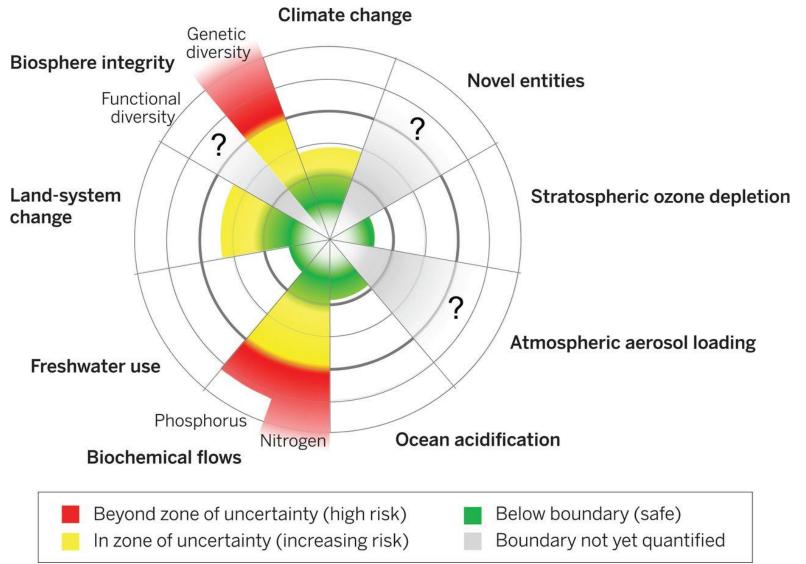
- 1. Stop ecologically harmful subsidies (air travel, coal, meat production, etc.)
- 2. Stop building new fossil fuel mines and power plants
- 3. Stop destruction of nature (swamps, forests, etc.)
- 4. Stop humus loss in soils
- 5. Stop release of harmful chemicals and plastics



Source: Pixabay

Planetary boundaries

Steffen et al., Science 2015



Remaining carbon budget

= How much CO₂ can we still emit to have a good chance to keep global warming under **1.5°C** in the long term? (considering other greenhouse gases)

Remaining from 2020 according to IPCC:

For 1.5°C (in 67% of models): approx. 400 Gt

Global emissions per year: approx. 42 Gt

CO₂ budget: 400 Gt

Sources: www.mcc-berlin.net/en/research/co2-budget.html

Source: Pixabay

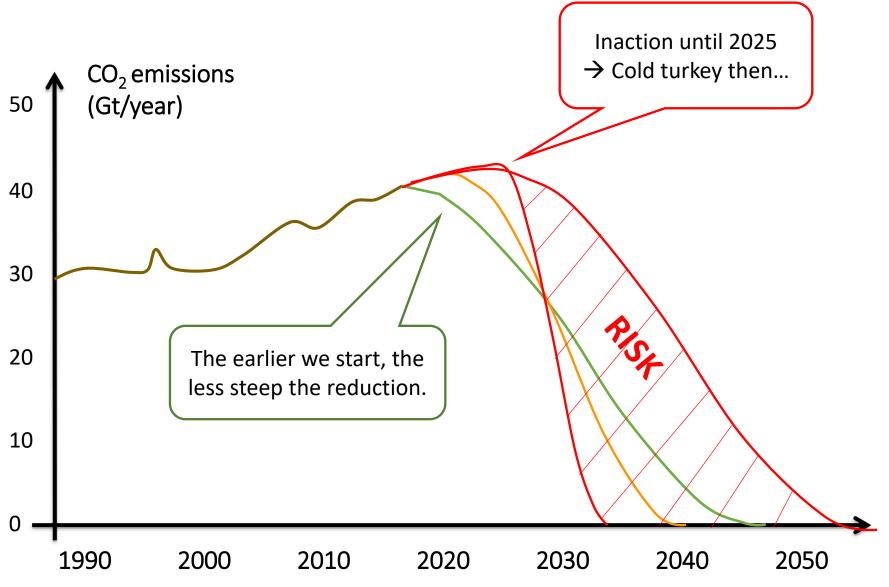
What does that mean?

CO₂ budget: 400 Gt

- → Detox! Become clean
 - Achieve net-zero carbon emissions as soon as possible
- → Limited amount of drugs until then
 - Emit a maximum of 400 Gt CO₂ during the detox
- → Organize and distribute wisely
 - Ration, minimize withdrawal symptoms
 - Distributional justice

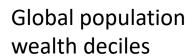


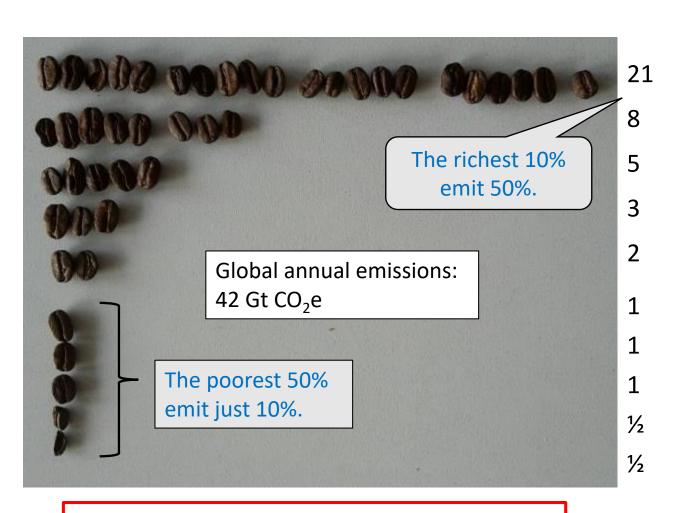
Reduction scenarios



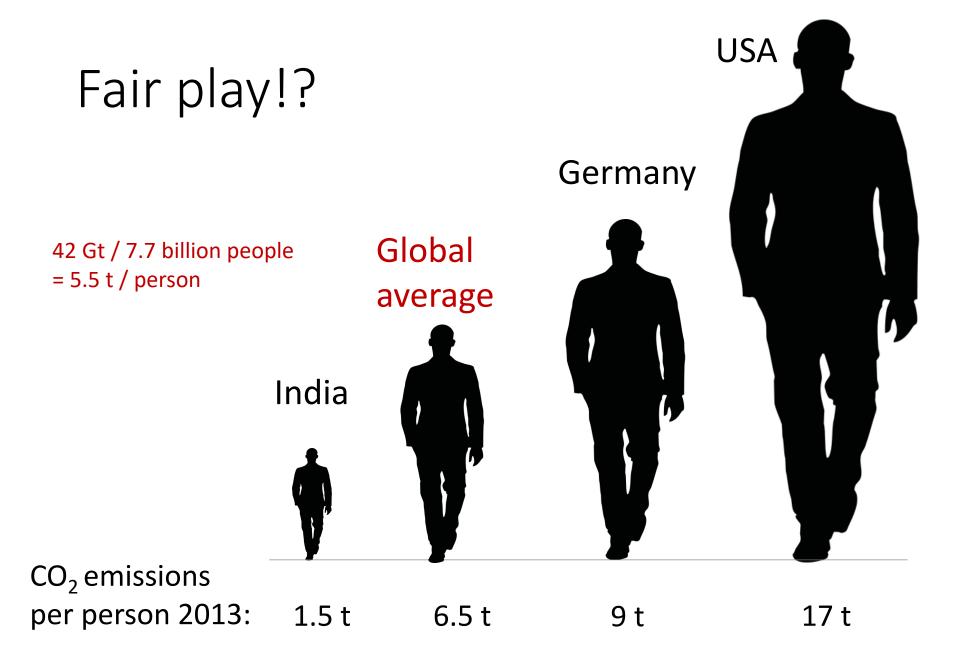
Carbon inequality

- Richest 10%
- 2nd
- 3rd
- 4th
- 5th
- 6th
- 7th
- 8th
- 9th
- Poorest 10%



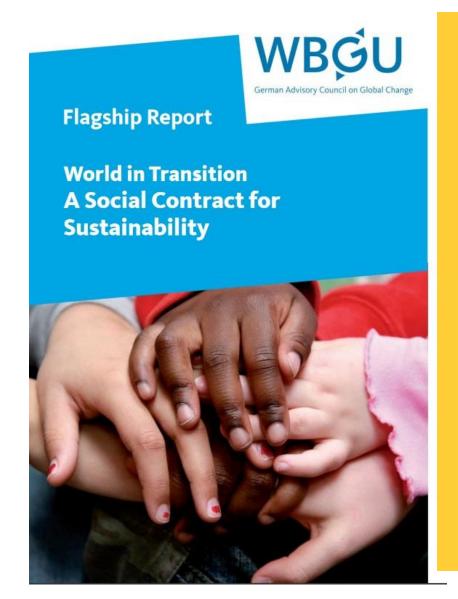


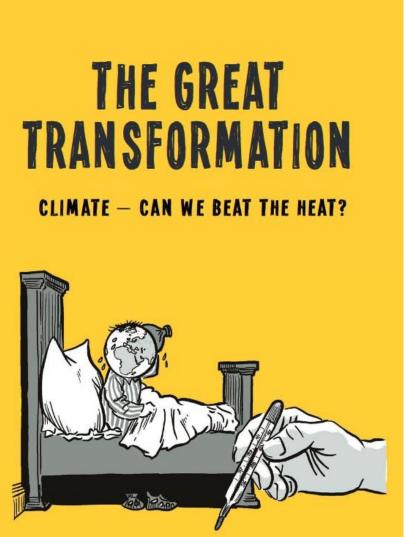
Quiz question: Where should we start to reduce?



Source: A change of course 2017. https://www.boell.de/sites/default/files/change-of-course.pdf

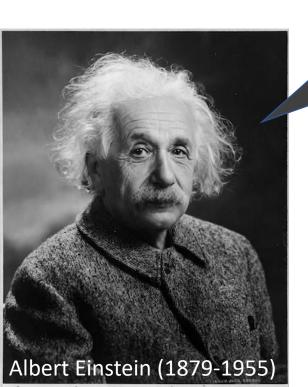
Great Transformation





Source: WBGU

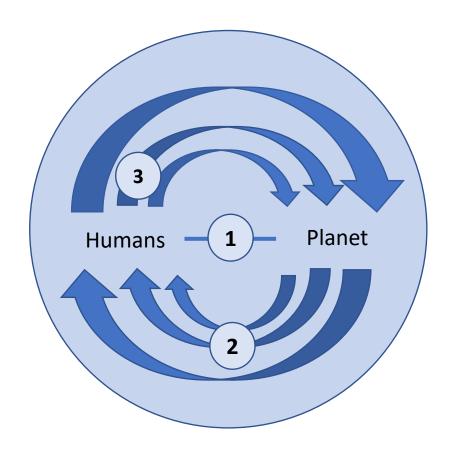
Problems can never be solved with the same mindset that created them.



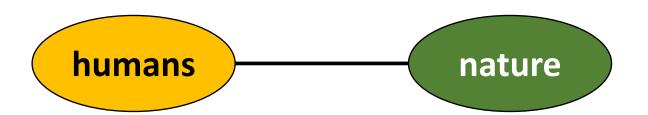
Planetary Health: Key challenges

according to Lancet Commission 2015

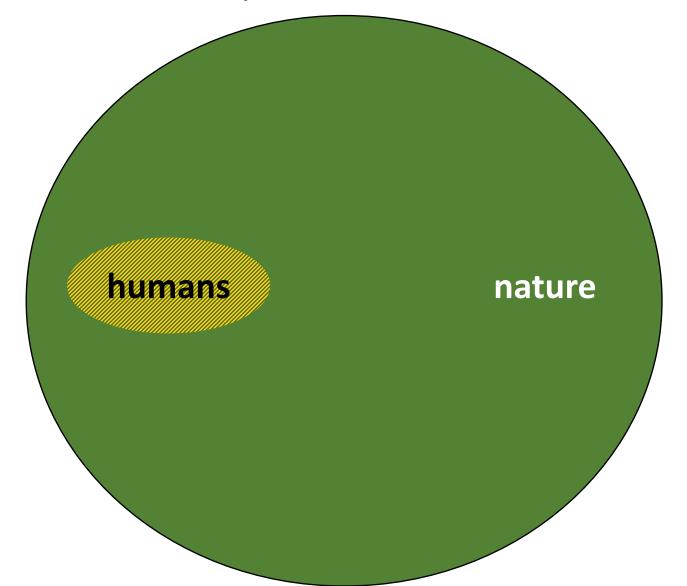
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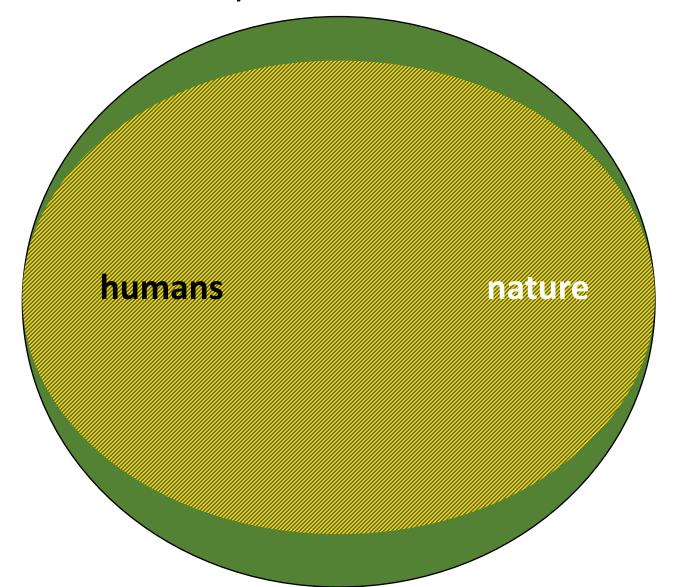
Relationship with nature

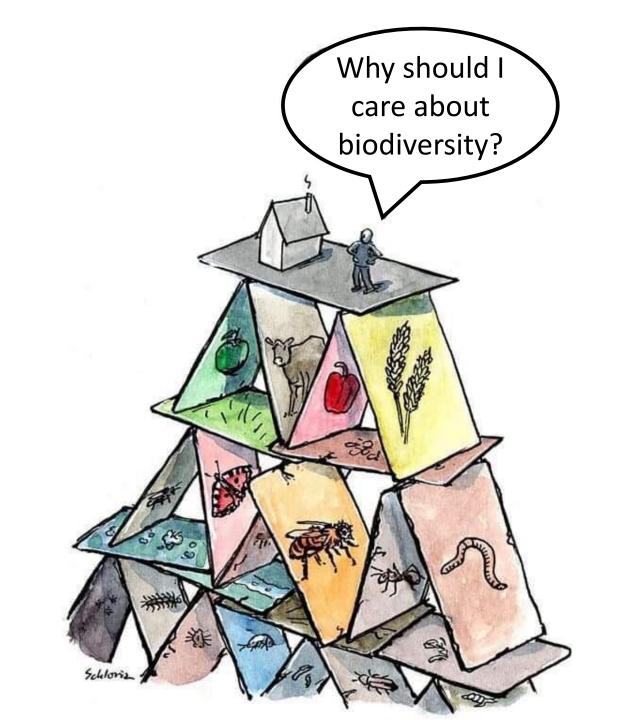


Relationship with nature

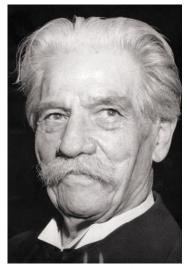


Relationship with nature

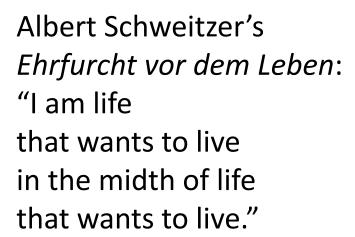








Source: Deutsches Bundesarchiv





Source: Wikimedia, author: Christopher Michel

The Dalai Lama:
"Love and compassion are necessities, not luxuries. Without them, humanity cannot survive."



Pope Francis



2015

ENZYKLIKA

LAUDATO SI'

VON

PAPST FRANZISKUS

ÜBER DIE SORGE

FÜR DAS GEMEINSAME HAUS

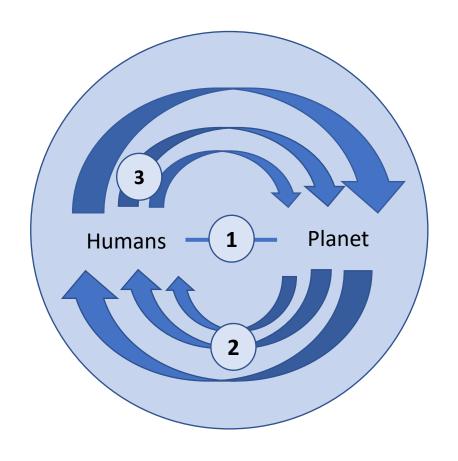
Old wisdom...



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Taking action!

ECOLOGICAL FOOTPRINT

- = human demand on nature www.footprintcalculator.org
- change own consumption



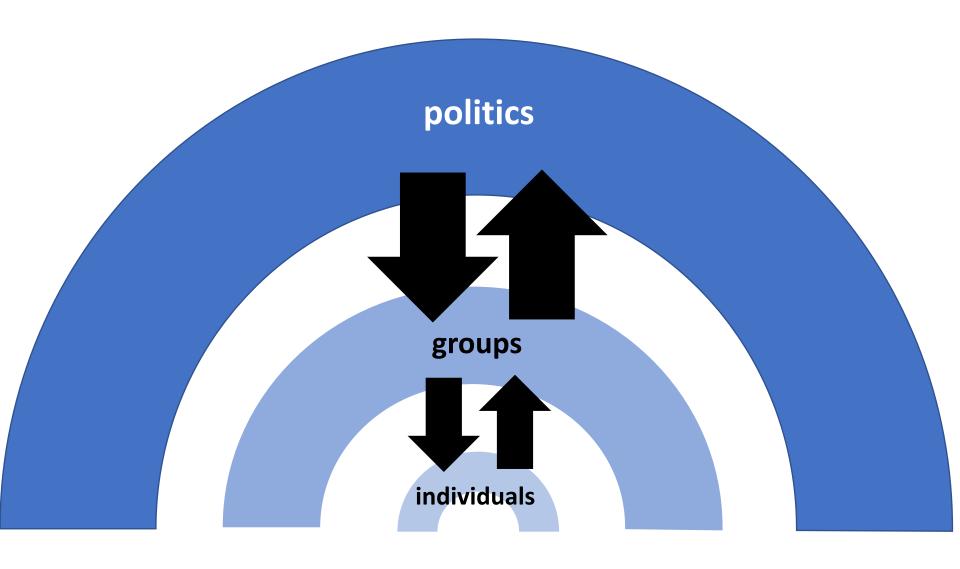
ECOLOGICAL HANDPRINT

- Jointly influence political decision-making
- change structures

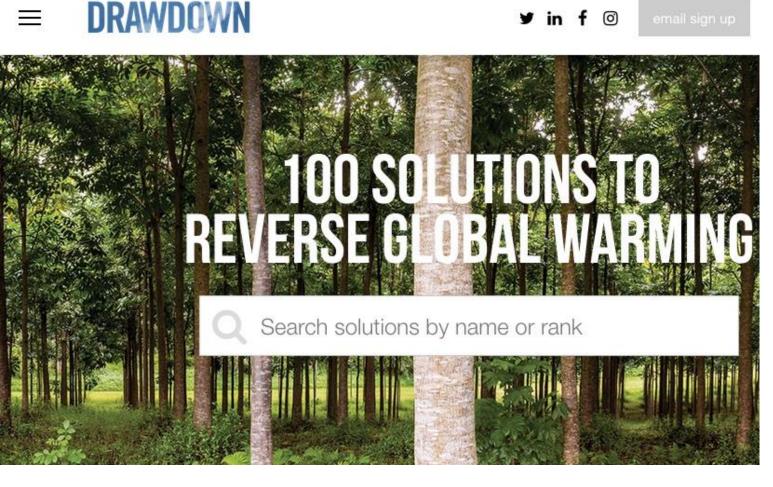


Source: Pixabay

Change the rules!



Solutions with synergies: Win-win!



Spread!
Connect!
Expand!

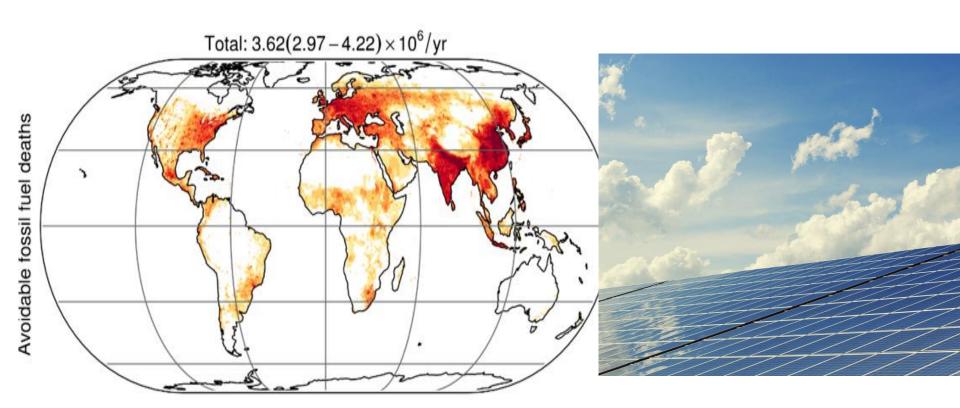
https://www.drawdown.org/solutions

Transport and mobility



Renewable instead of fossil fuels

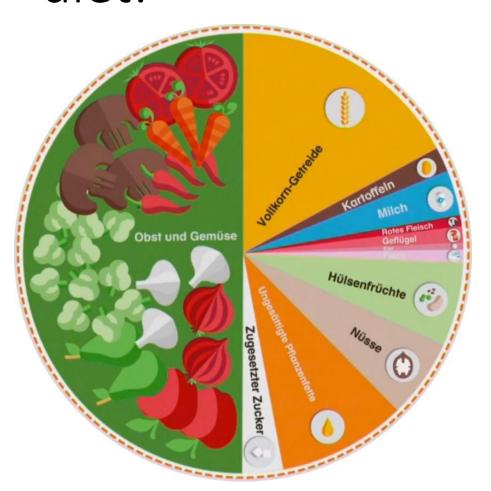
→ Avoiding 3.6 million deaths per year globally due to outdoor air pollution

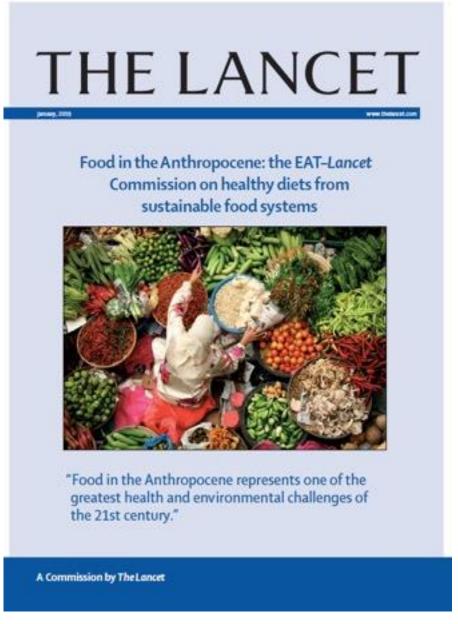


Source: Lelieveld et al., PNAS 2019; https://www.pnas.org/cgi/doi/10.1073/pnas.1819989116 Photo right: Pixabay; andreas160578; https://pixabay.com/de/photos/photovoltaik-photovoltaikanlage-2138992/



Planetary Health diet:





Source: www.daserste.de/information/wissen-kultur/w-wie-wissen/ernaehrung-136.html

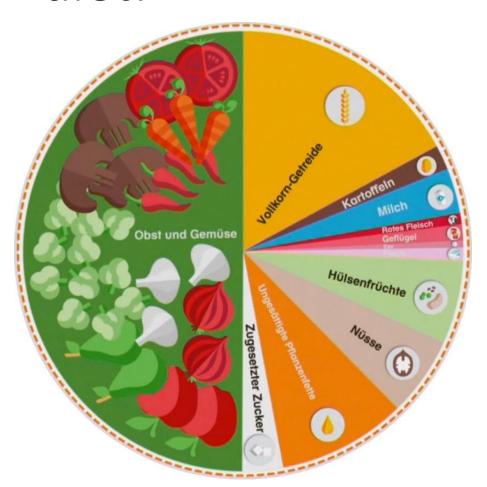
Planetary Health diet:

Germany:



Source: www.daserste.de/information/wissen-kultur/w-wie-wissen/ernaehrung-136.html

Planetary Health diet:



- → Can avoid about 11 million premature deaths per year globally, a reduction by around 20%!
- → Can feed about 10 billion people within planetary boundaries

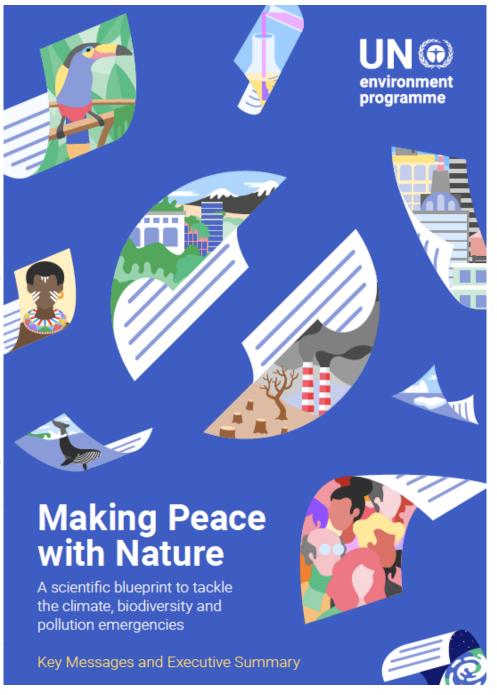
Conclusions

"Climate change is the biggest global health threat of the 21st century."

"Tackling climate change could be the **greatest global health opportunity**of the 21st century."

The Lancet 2009

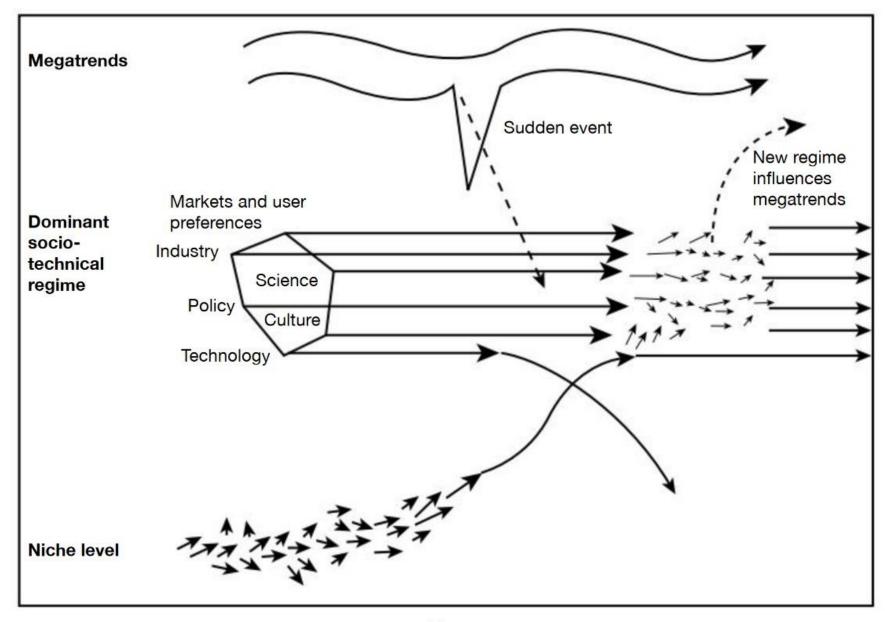
The Lancet 2015



Given the interconnected nature of climate change, loss of biodiversity, land degradation, and air and water pollution, it is essential that these problems are tackled together.

Human well-being, now and in the future, depends on a healthy planet.

Transforming humankind's relationship with nature is the key to a sustainable future.



Time

Source: WBGU main report Great Transformation 2011, fig. 3.4.1, from Grin et al. 2010

















Charité Berlin, Climate strike, 20 Sept 2019. Source: Dominik Butzmann

Societal change

- Social mobilisation
- Power structures
- Alliances

- Positive vision
- Experiments
- Creativity
- Enthusiasm



"First they ignore you, then they laugh at you, then they fight you, then you win."

Mahatma Gandhi



https://climateemergencydeclaration.org/wp-content/uploads/2018/09/DontMentionTheEmergency2018.pdf



"THIS IS AN EMERGENCY AND FOR EMERGENCY SITUATIONS WE NEED EMERGENCY ACTION."

United Nations (UN) Secretary-General Ban Ki Moon, 2007.

MAKING THE CASE FOR EMERGENCY CLIMATE ACTION

JANE MORTON

"Our house is on fire!" or Business-as-usual?



Source: Kristi McCluer, via Twitter

Planetary Health: What we need to talk about

The COVID-19 pandemic has shown us how vulnerable we are and how closely connected we are with Nature. Health cannot be taken for granted. Do we take the prerequisites for healthy living seriously enough? Or are we, as a civilization, systematically jeopardizing our health?



https://www.wbgu.de/en/publications/publication/discussionpaper-health

Many thanks

→ More material at www.pik-potsdam.de/members/gabrysch



Contact: sabine.gabrysch@pik-potsdam.de

Prof. Dr. med. Sabine Gabrysch

Potsdam Institute for Climate Impact Research

Charité – Universitätsmedizin Berlin

Heidelberg Institute of Global Health

Be-cause health, 23.11.2021