

Sustainability

Global Societal Challenges

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SAG Part 1

The state of our World

Combining ecological and social challenges in one overview

The Anthropocene

Article

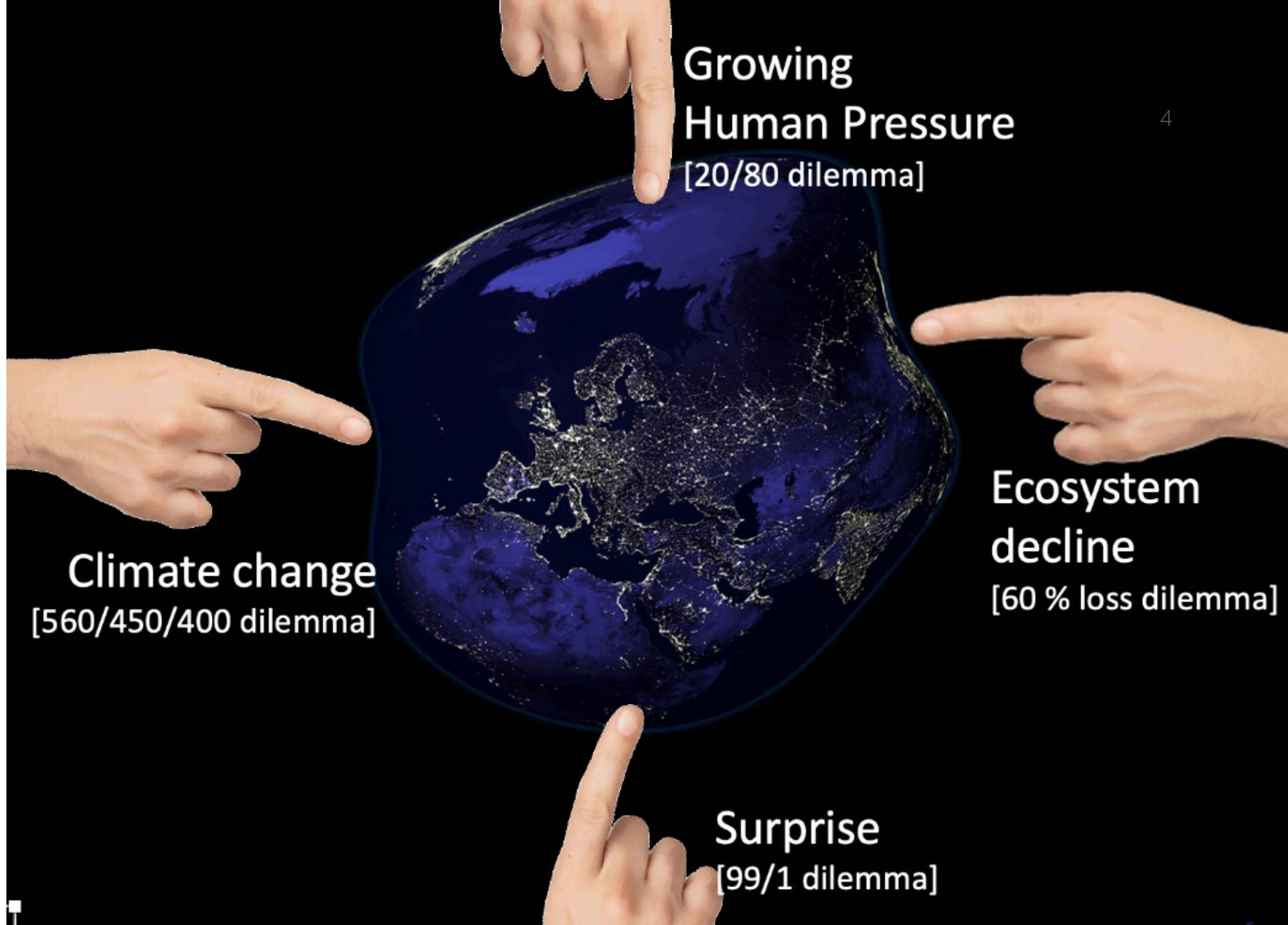
Will Steffen, Paul J. Crutzen and John R. McNeill

The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?



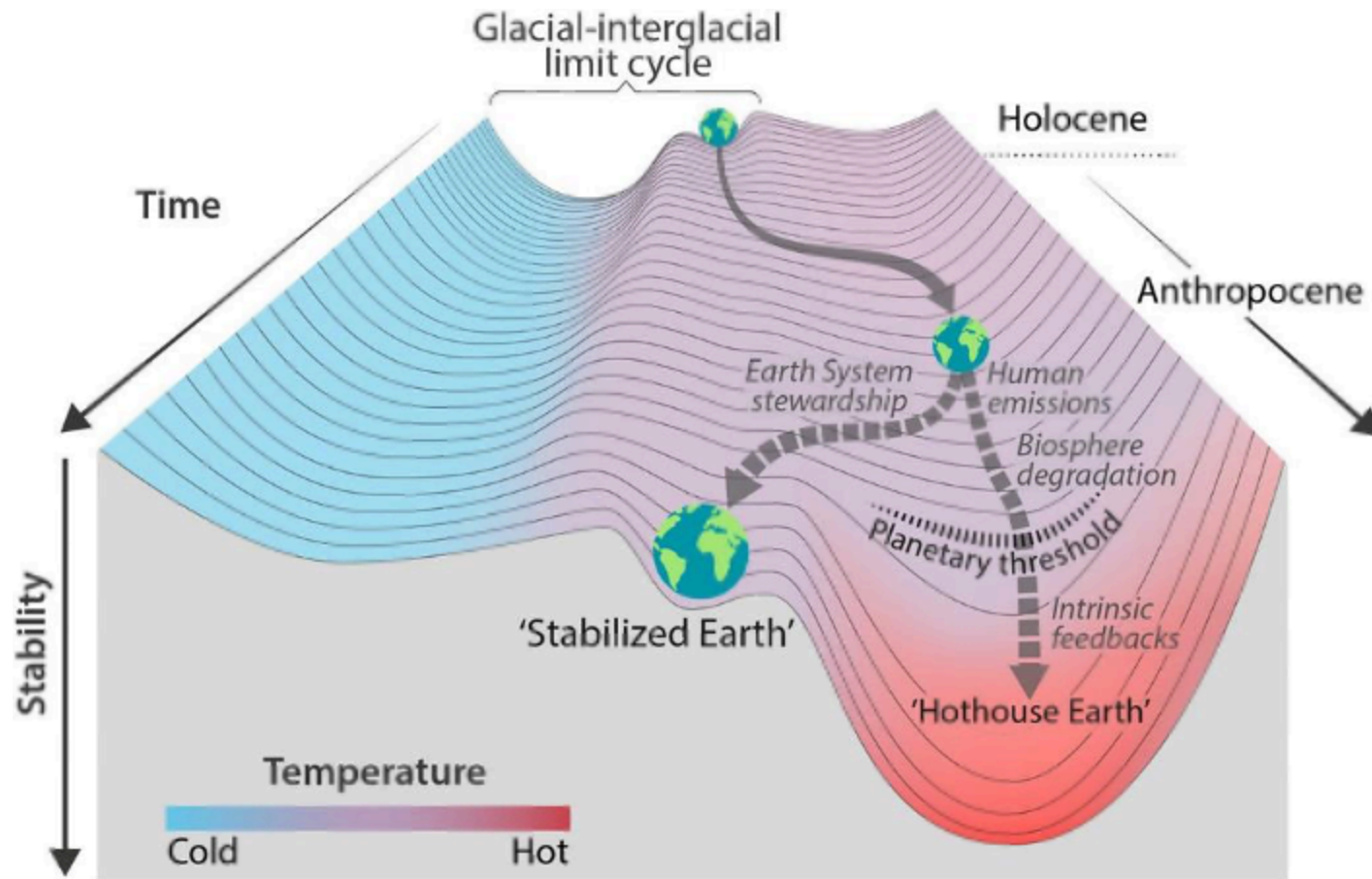
State of the world

An [Introduction by Johan Rockström \(TED Talk, 2010\)](#) on the state of the world.

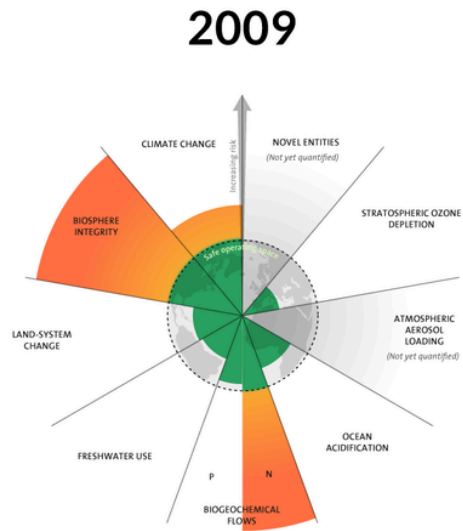


Pathways of the earth system

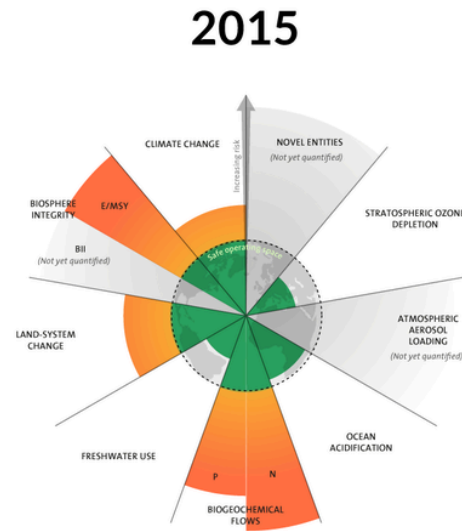
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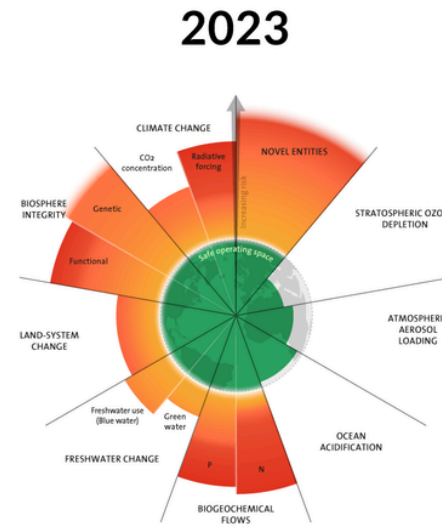
Planetary Boundaries



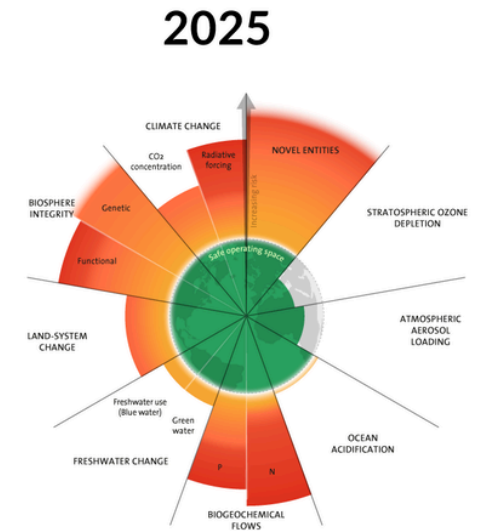
7 boundaries assessed,
3 crossed



7 boundaries assessed,
4 crossed



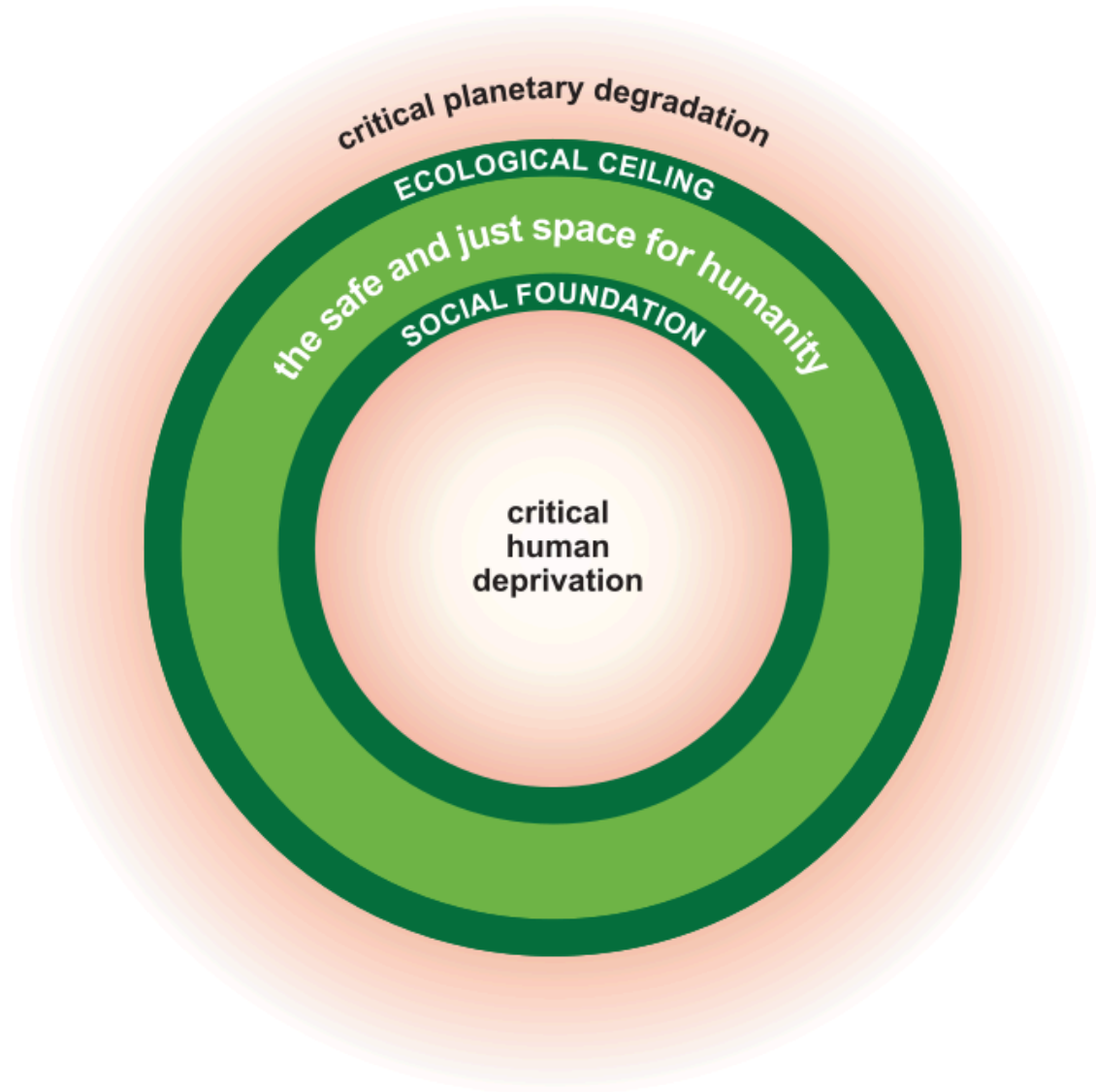
9 boundaries assessed,
6 crossed



9 boundaries assessed,
7 crossed

Defining a safe operating space for humanity.

Sources: Sakschewski et al., 2025; Richardson et al., 2023; Steffen et al., 2015; Rockström et al., 2009.
Visualization: Azote for Stockholm Resilience Centre



The "Doughnut-View"⁷ of the world

***The social foundation** – below which lies critical human deprivation

The ecological ceiling – beyond which lies critical planetary degradation

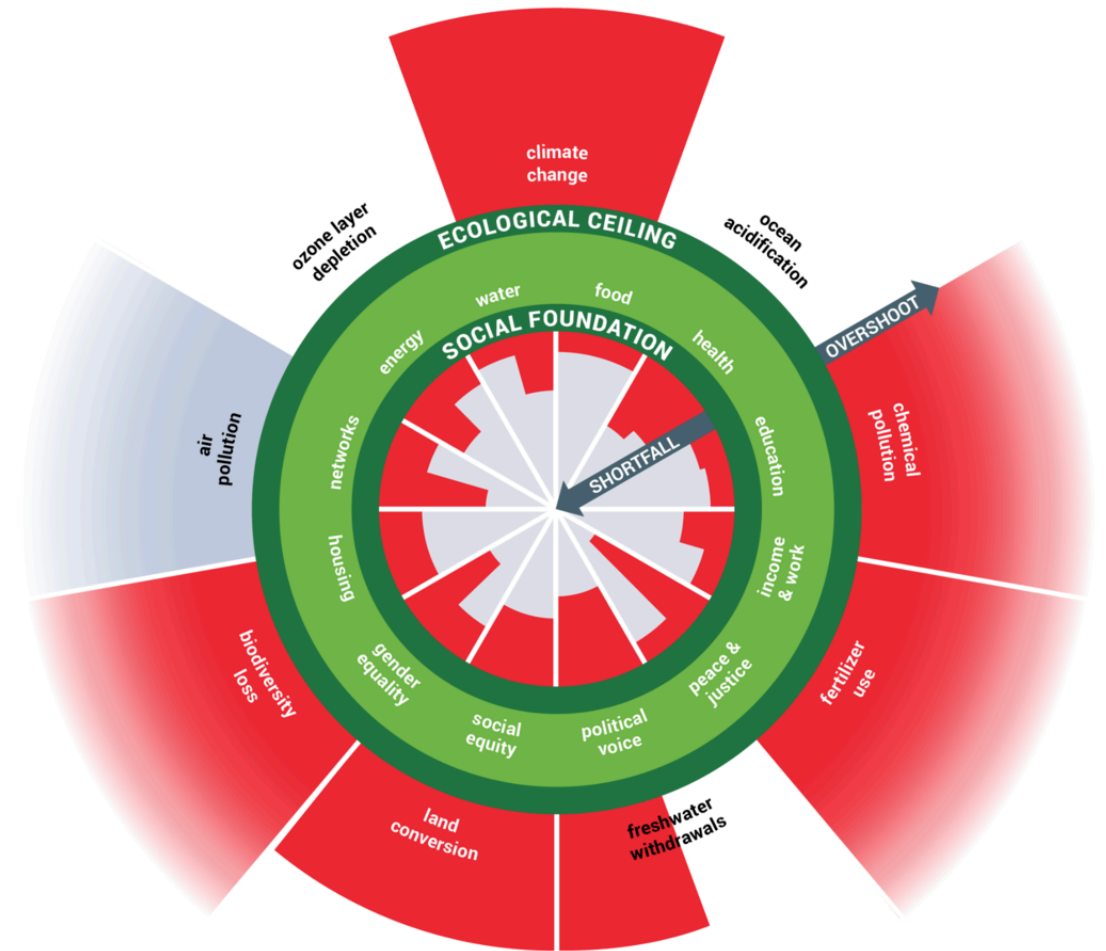
The Doughnut explained

The inner ring of the Doughnut, the "Social Foundation", sets a boundary for meeting the needs of all people. It includes life's essentials for human wellbeing - inspired by and derived from the Sustainable Development Goals of the United Nations. Millions of people worldwide still cannot meet their essential needs.

The outer ring of the Doughnut, the "Ecological Ceiling", sets a boundary for a healthy planetary home. This ceiling has been defined by the framework of 9 planetary boundaries. Since its creation in 2009 the framework has been revised several times. In the latest update (2023), six of the nine boundaries have been transgressed. Human activity is overshooting many of the planetary boundaries.

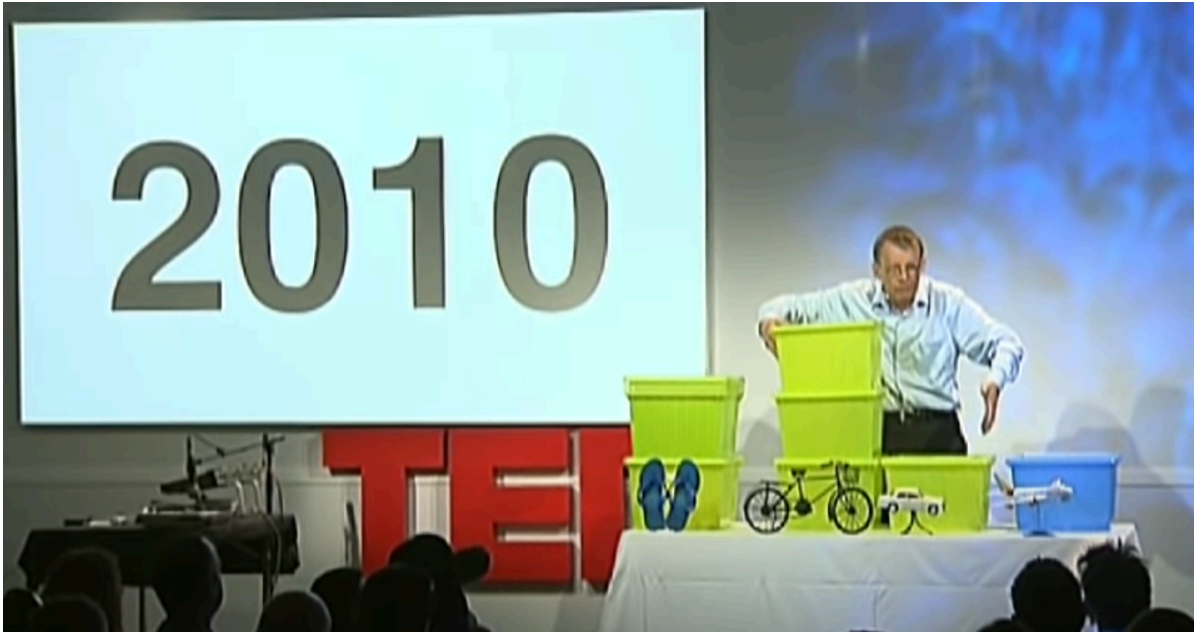
Humanity's selfie

Humanity is currently living far outside the Doughnut, on both sides - social and ecological - as all of the red wedges show. Billions of people still cannot meet their most essential needs while humanity has already collectively overshoot multiple planetary boundaries.



Links between social, ecological and economic issues explored

10



An interesting take on the connections between the issues by [Hans Rosling \(TED Talk, 2010\)](#).

Sustainability and Sustainable Development

History and Definitions

Defining Sustainability

Looking at standard dictionary definitions of 'sustainable' or 'sustainability' it can be seen that although sustainability does not have a rigid 'one size fits all' definition, it generally refers to **the ability for something to last for a long time or indefinitely.**

- Oxford Dictionary (2011) defines sustainability as being "able to be maintained at a certain rate or level"
- Cambridge Dictionary (2011) describes sustainability as something that is "able to continue over a period of time"

Sylvicultura oeconomica

1713, **Hans Carl von Carlowitz** "Sylvicultura oeconomica" or the "economic news and instructions for the natural growing of wild trees (...) requires the careful management of sustainable forestry resources."

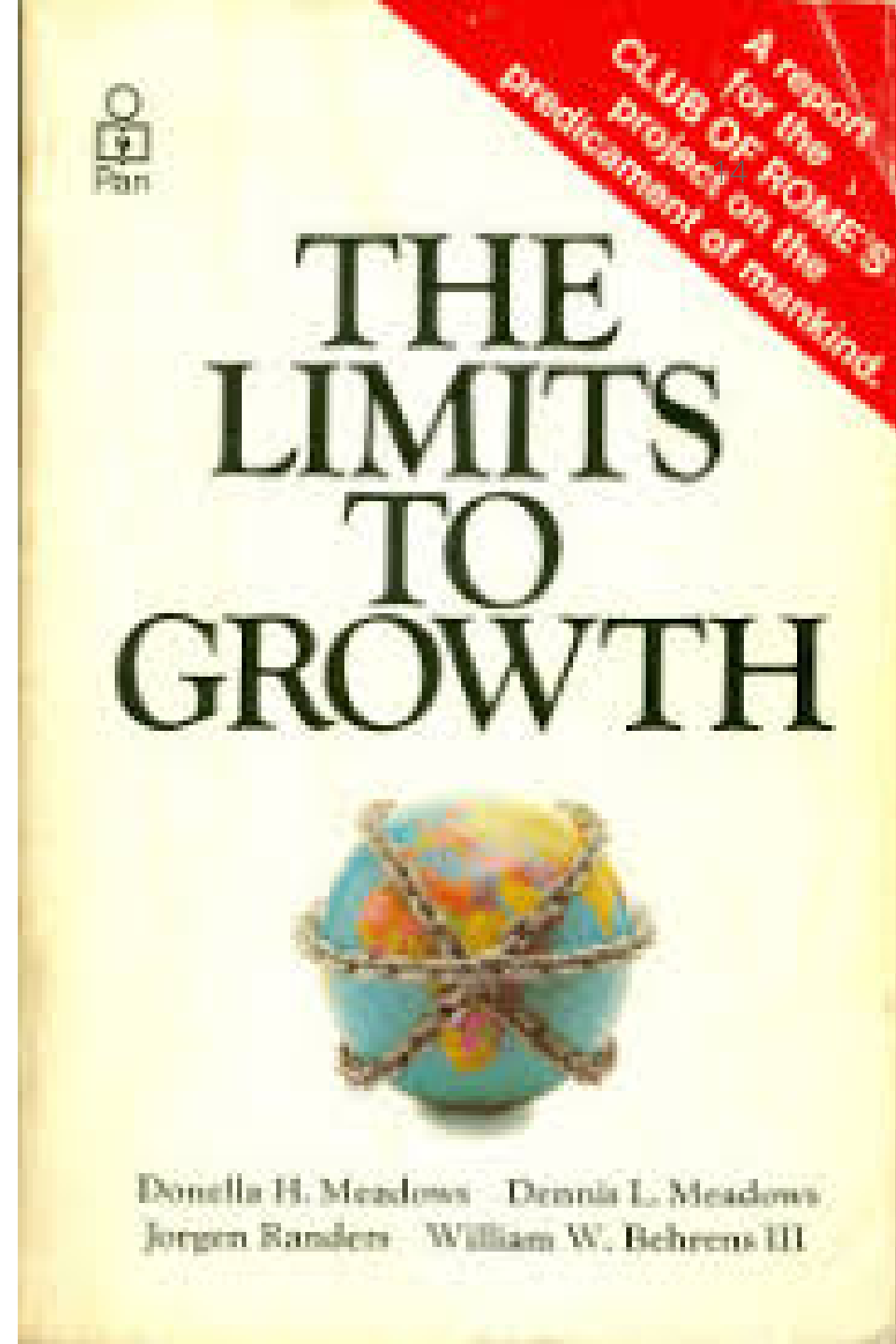
His book *Sylvicultura oeconomica*, oder **haußwirthliche Nachricht und Naturmäßige Anweisung zur wilden Baum-Zucht** (1713) was the first comprehensive treatise about forestry. He is considered to be the father of sustainable yield forestry.



Club of Rome "Limits of Growth" (1972)

The first time the term 'sustainable' was used "in the modern sense" was by the Club of Rome. In its publication of **The Limits to Growth**, a report that described a particular state in which the global population would achieve balance or equilibrium.

"We are searching for a model output that represents a world system that is: sustainable without sudden and uncontrolled collapse; and capable of satisfying the basic material requirements of all of its people."



"Our Common Future"

United Nations Report (1987)

"Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

It contains two key concepts: the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given; And the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."



Weak and Strong Sustainability

Two different schools of economics.

Weak sustainability

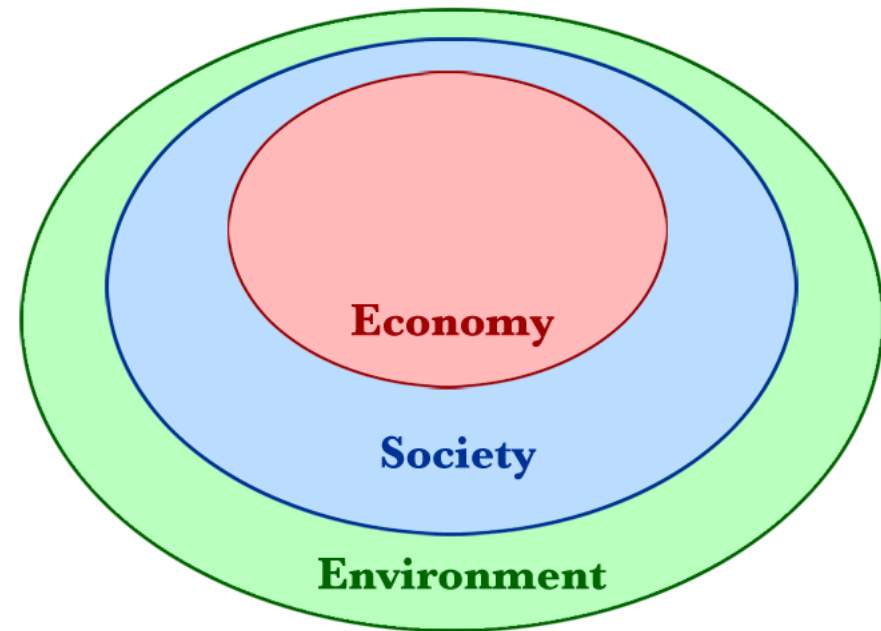
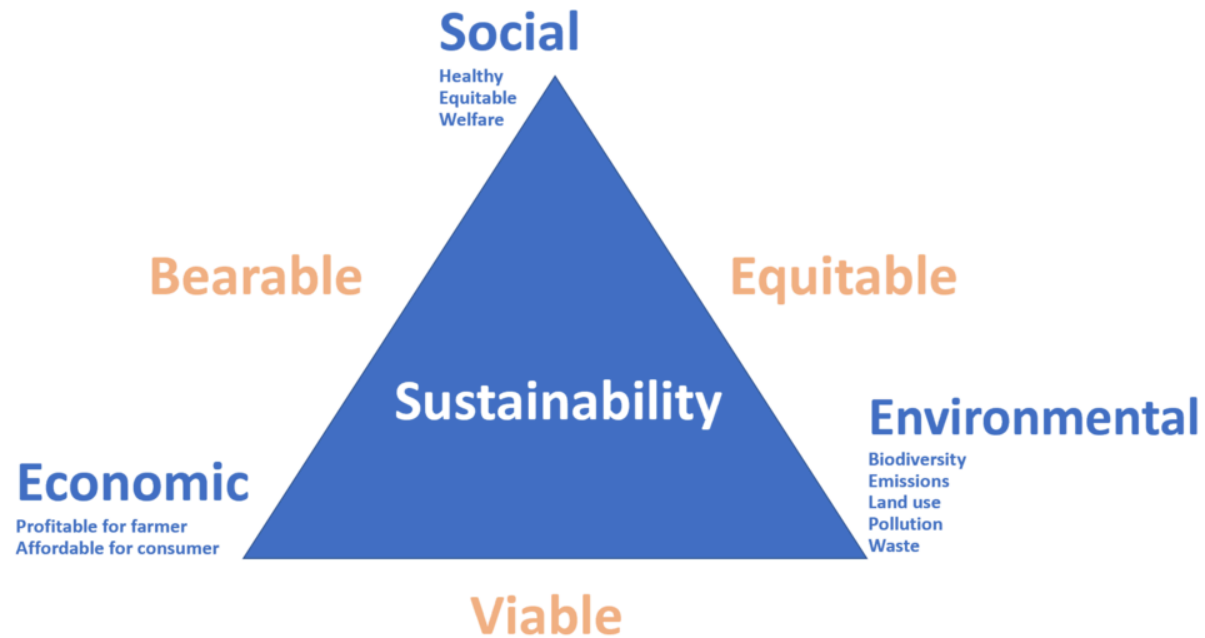
is an idea within environmental economics which states that human capital can substitute natural capital.

Strong sustainability

as used in ecological economics assumes that human capital and natural capital are complementary, but not interchangeable.

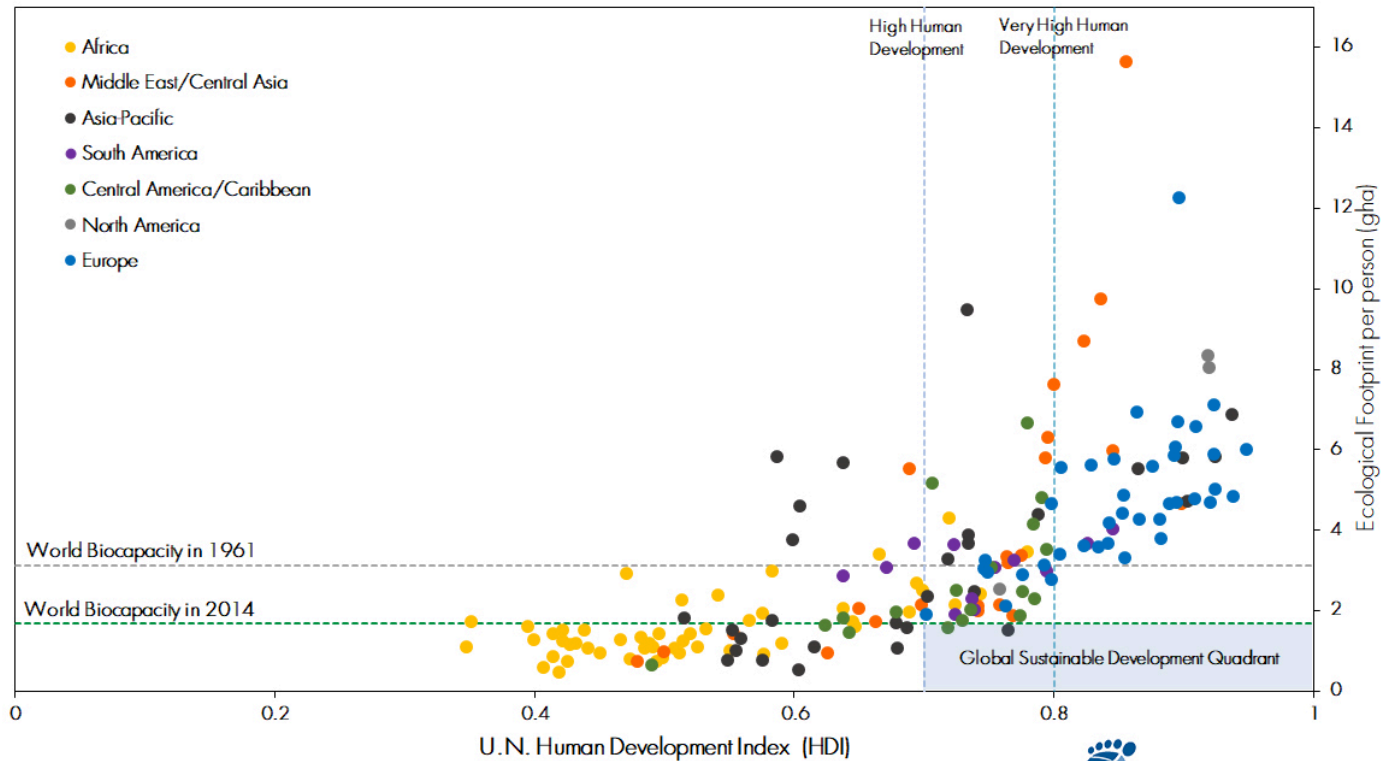
Dimensions of Sustainability

Two visualisations: Triangle vs. Shell



Ecological Footprint

Ecological Footprint per person and HDI of countries by world regions (2014)



Source: Ecological Footprint per person: National Footprint Accounts 2018 Edition, Global Footprint Network
Human Development Index: Human Development Report, UNDP 2016



We should aim for a high human development and low ecological impact.

Sustainable Development Goals (SDGs)



17 goals until 2030: universal, indivisible, transformative.

The 2030 Agenda

The Sustainable Development Goals (SDGs) are a global agenda, adopted by countries in 2015, with a vision of ending poverty, protecting the planet and ensuring that all people enjoy peace and prosperity. The 17 SDGs and 169 targets are part of what is known as the 2030 Agenda, which recognizes "that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development."

In adopting the agenda, countries resolved to take the "bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind." The goals and targets are universal, meaning they apply to all countries around the world, not just poor countries. Reaching the goals requires action on all fronts – governments, businesses, civil society and people everywhere all have a role to play.

SDGs: Five thematic areas



Identifying the major themes .

SDGs according to the „shell model“

