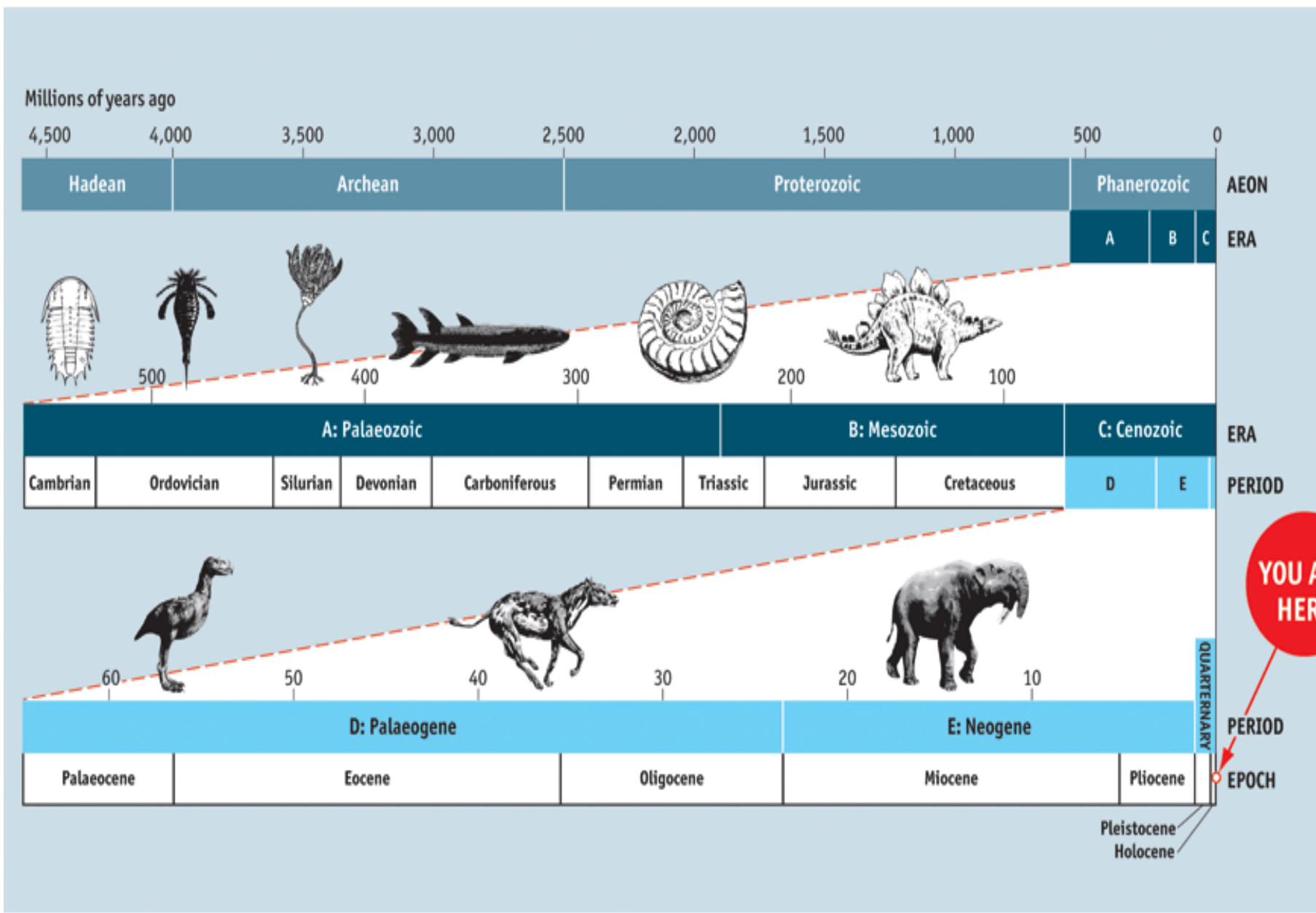


E' ancora possibile la sostenibilità nell'Antropocene ?

Gianfranco Bologna

**Pres. On. Comitato Scientifico WWF Italy, Seg.
Gen. Fondazione Aurelio Peccei , Full Member Club
of Rome**






YOU ARE HERE

QUARTERNARY

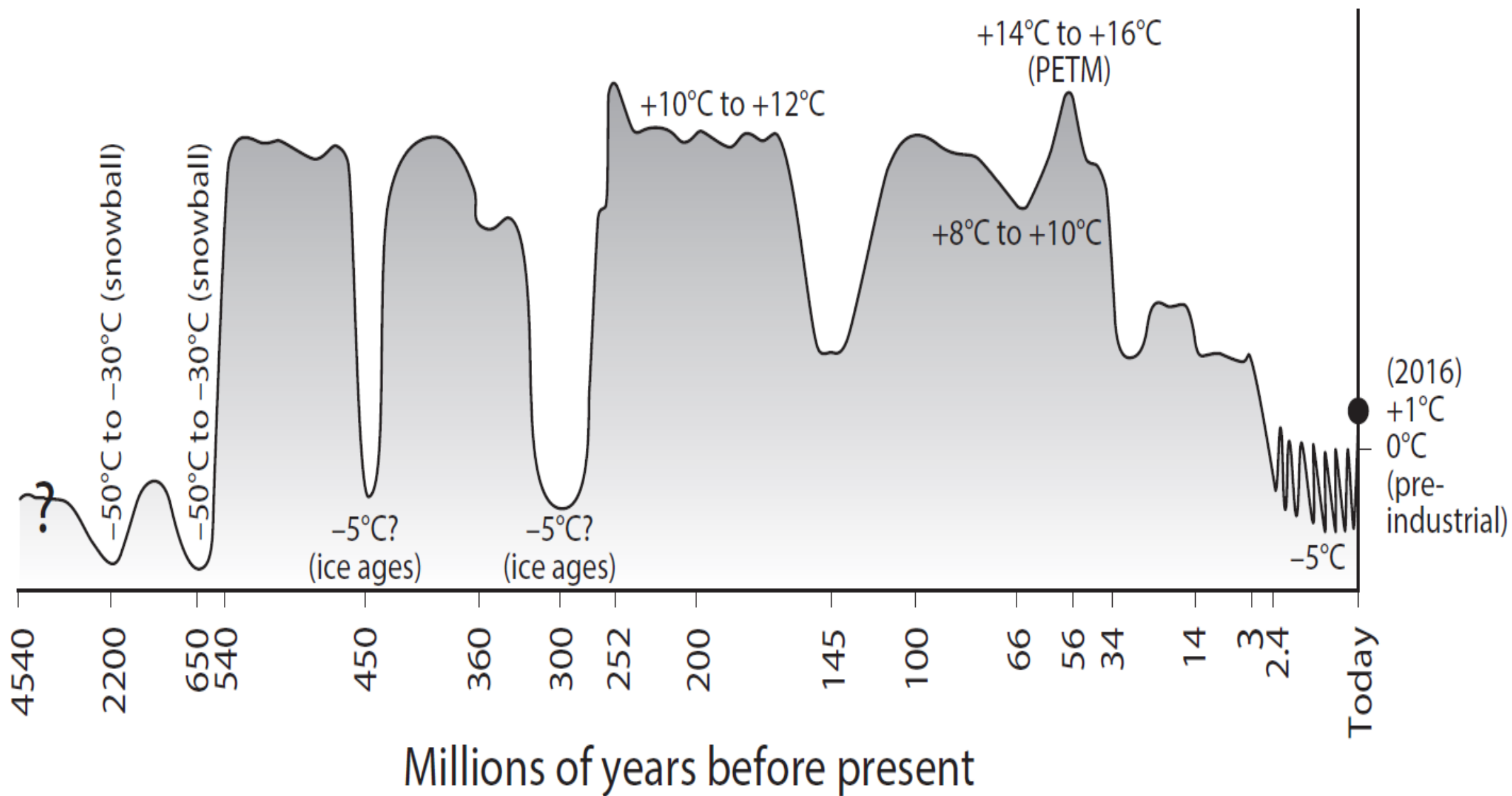
PERIOD

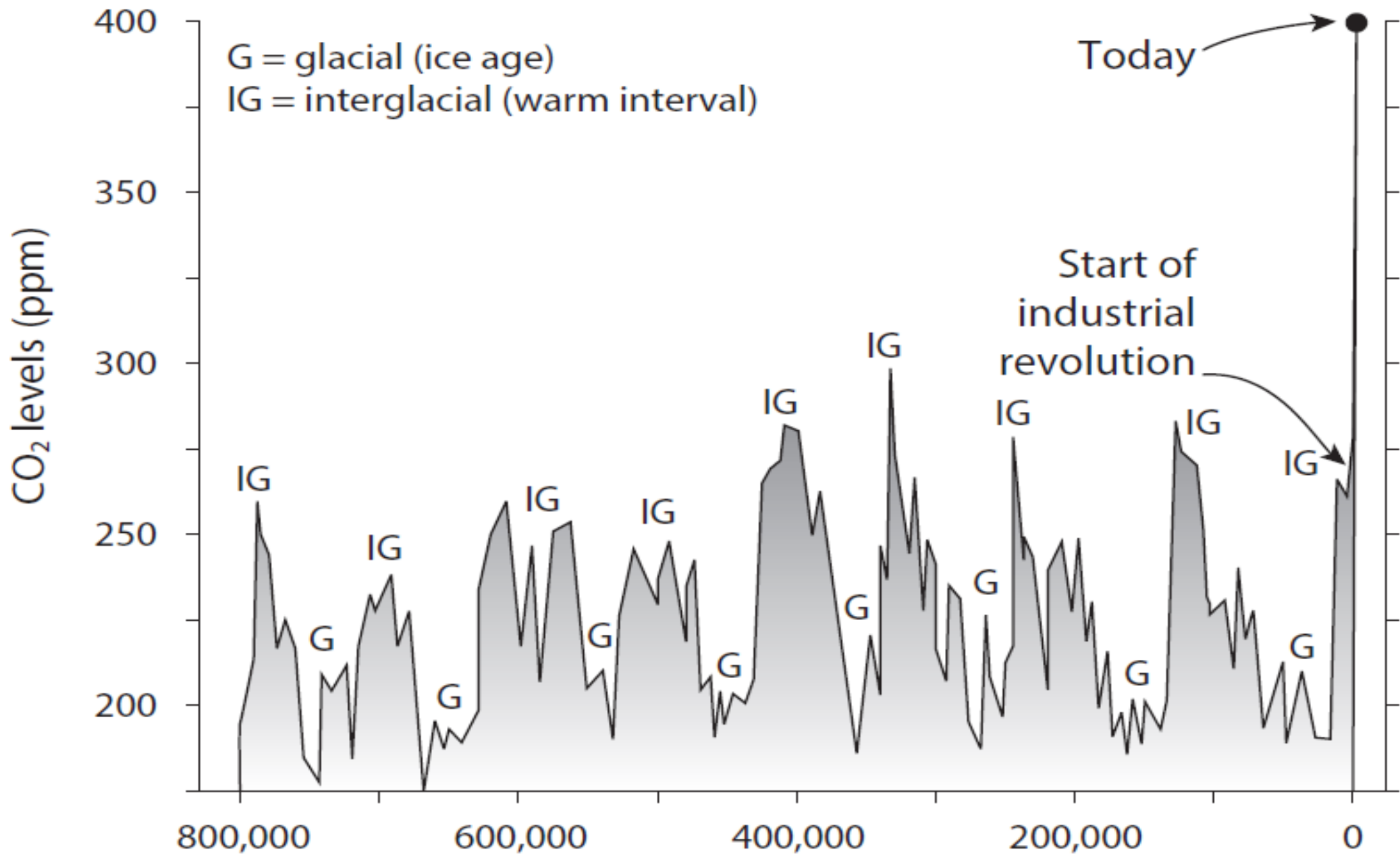
EPOCH

Pleistocene
Holocene



THE 10,000-YEAR PERIOD
OF REMARKABLE STABILITY
AND HIGH BIOLOGICAL
DIVERSITY WHICH ENABLED
THE EMERGENCE OF
HUMAN CIVILISATION,
IS NOW AT RISK







REVIEW

doi:10.1038/nature09678

Has the Earth's sixth mass extinction already arrived?

Anthony D. Barnosky^{1,2,3}, Nicholas Matzke¹, Susumu Tomiya^{1,2,3}, Guinevere O. U. Wogan^{1,3}, Brian Swartz^{1,2}, Tiago B. Quental^{1,2†}, Charles Marshall^{1,2}, Jenny L. McGuire^{1,2,3†}, Emily L. Lindsey^{1,2}, Kaitlin C. Maguire^{1,2}, Ben Mersey^{1,4} & Elizabeth A. Ferrer^{1,2}

- | | | |
|----------------------|-----------------------|-----------------------------------|
| • ORDOVICIANO | <i>ca 443 Myr ago</i> | <i>estimated 86% species lost</i> |
| • DEVONIANO | <i>ca 359 Myr ago</i> | <i>estimated 75% species lost</i> |
| • PERMIANO | <i>ca 251 Myr ago</i> | <i>estimated 96% species lost</i> |
| • TRIASSICO | <i>ca 200 Myr ago</i> | <i>estimated 80% species lost</i> |
| • CRETACEO | <i>ca 65 Myr ago</i> | <i>estimated 76% species lost</i> |

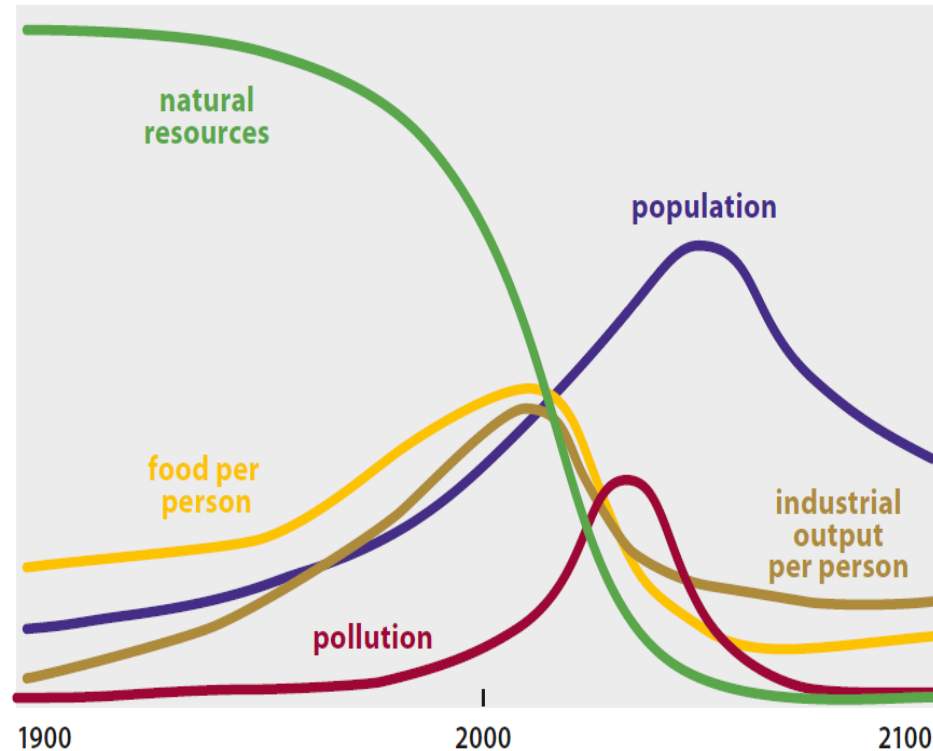
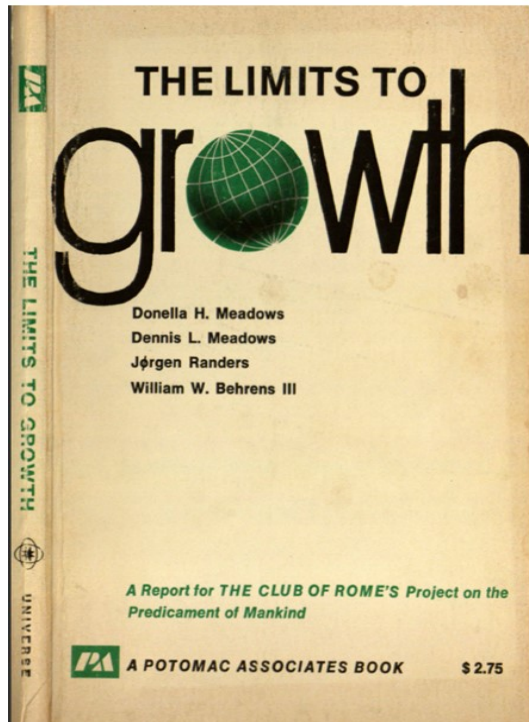
The Anthropocene:

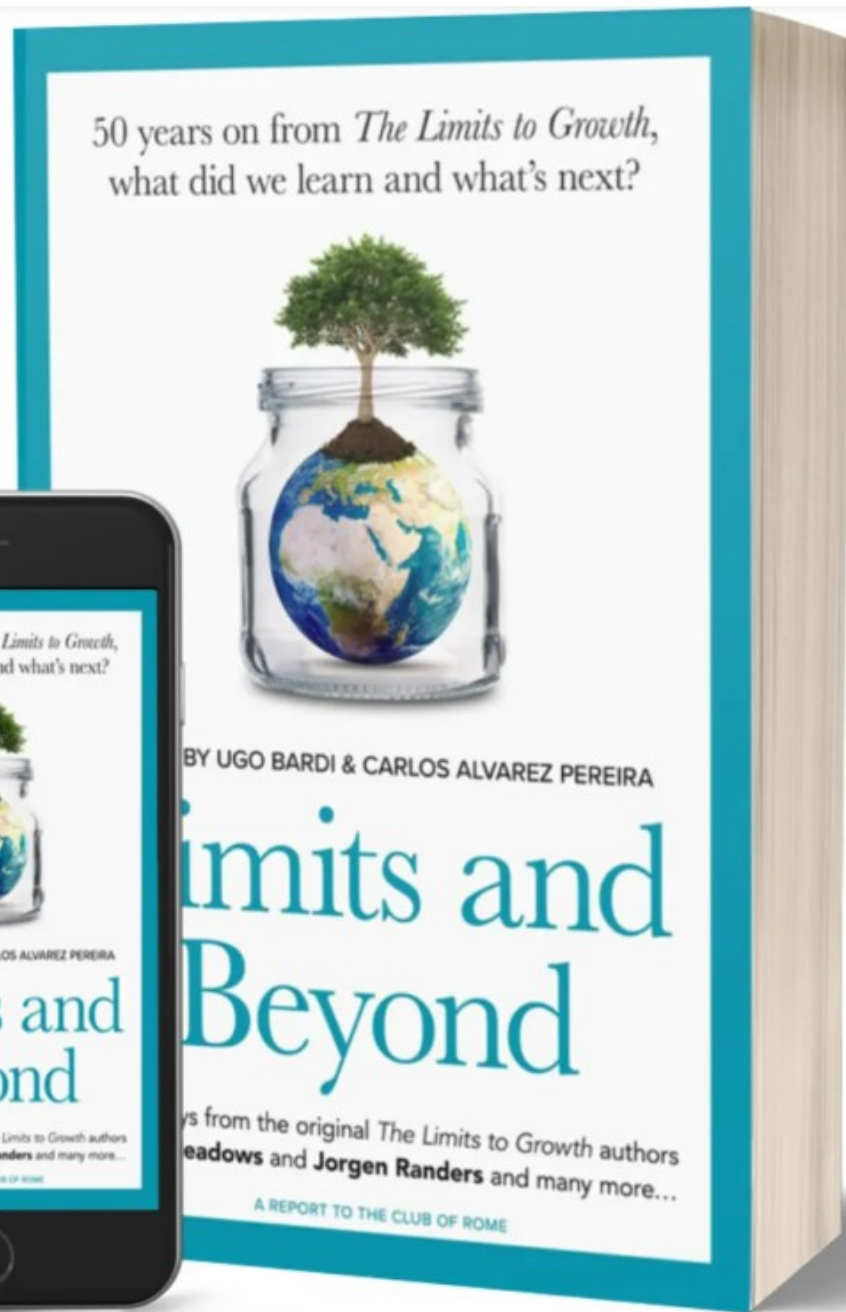
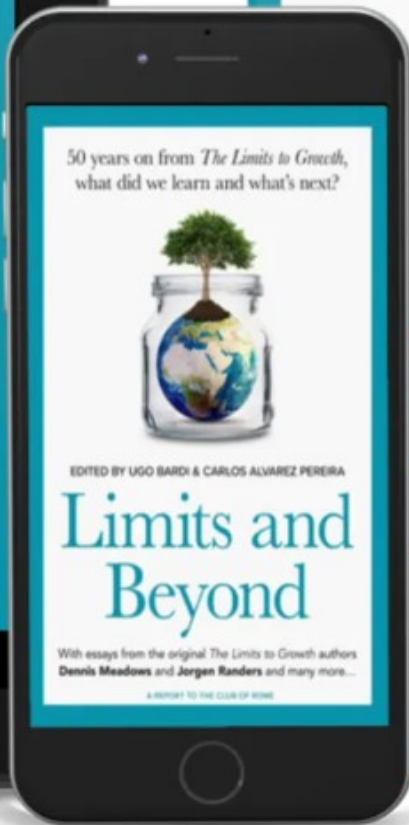
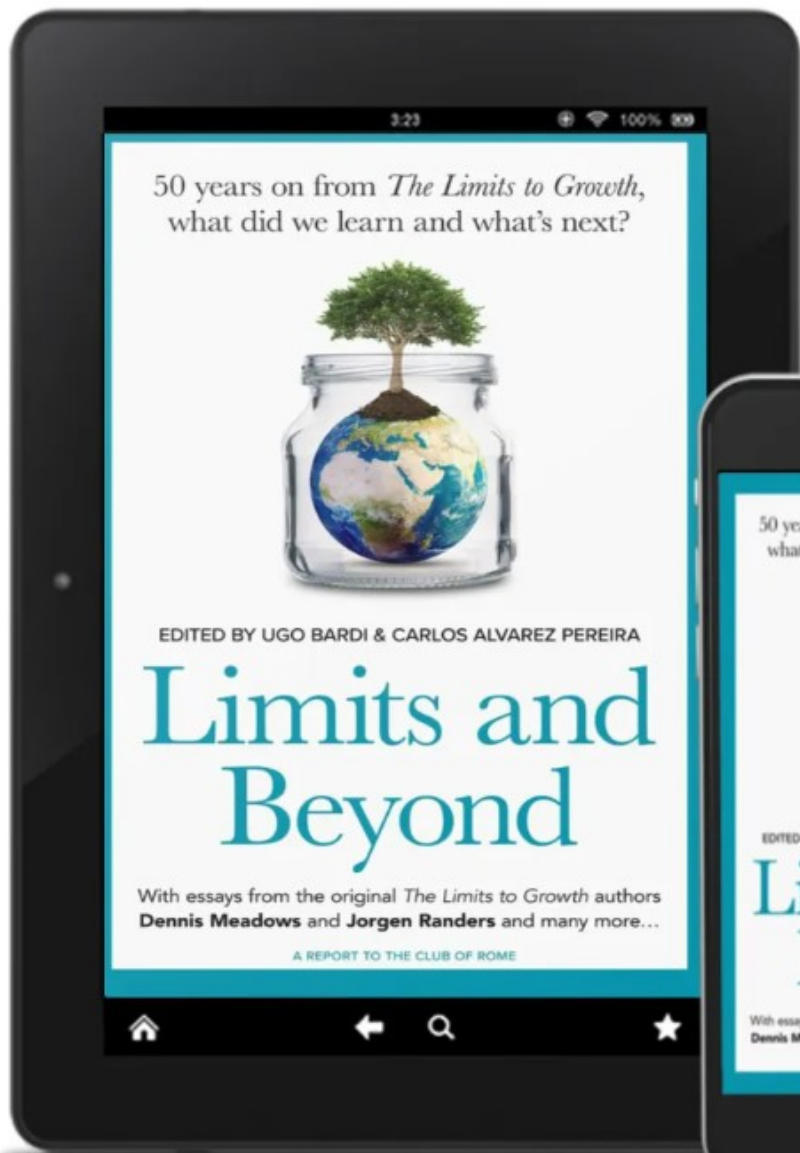
A New Epoch of Geological Time?



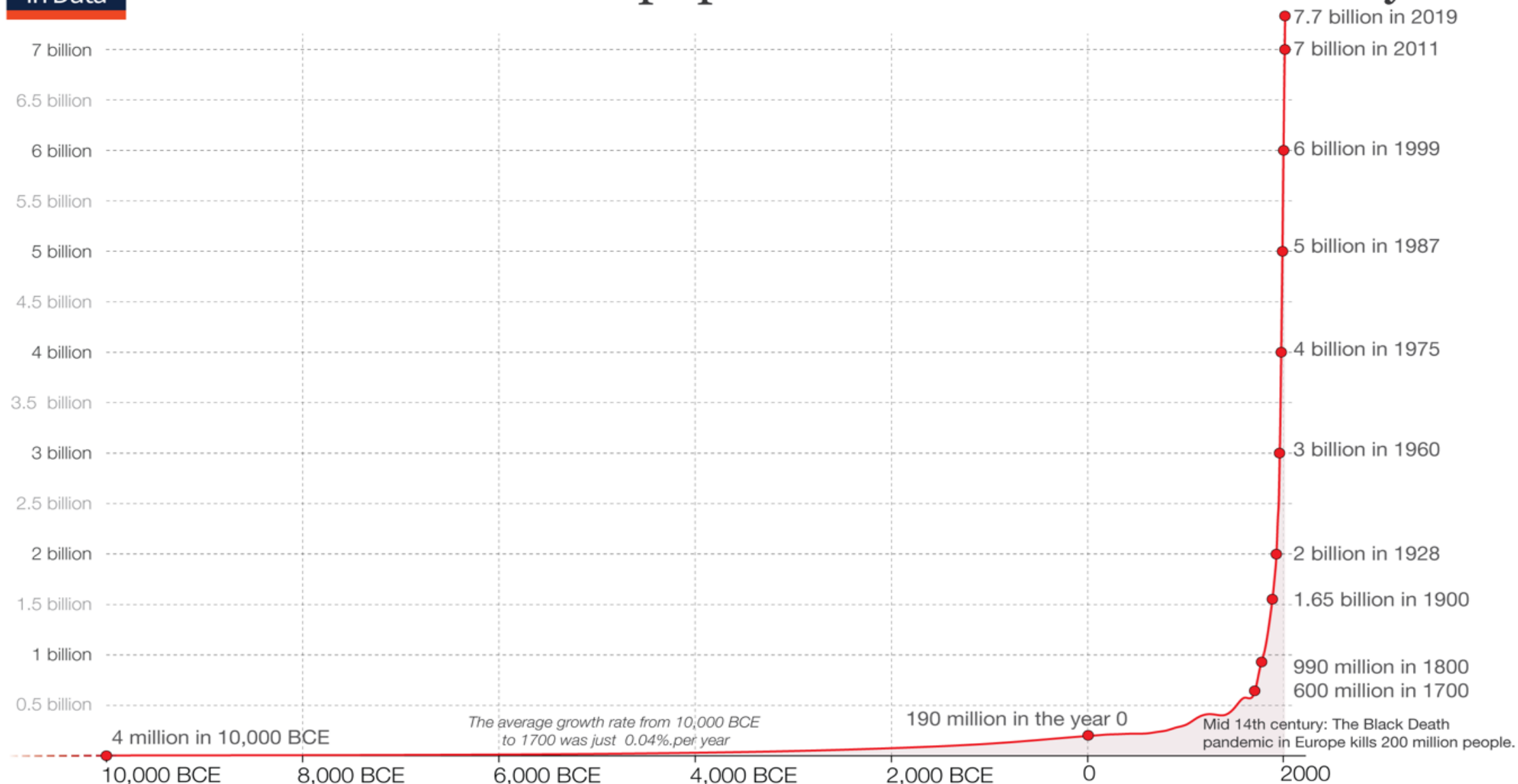
Sostenibilità

Non si può perseguire una crescita materiale e quantitativa illimitata in un Pianeta dai limiti biogeofisici definiti





The size of the world population over the last 12,000 years



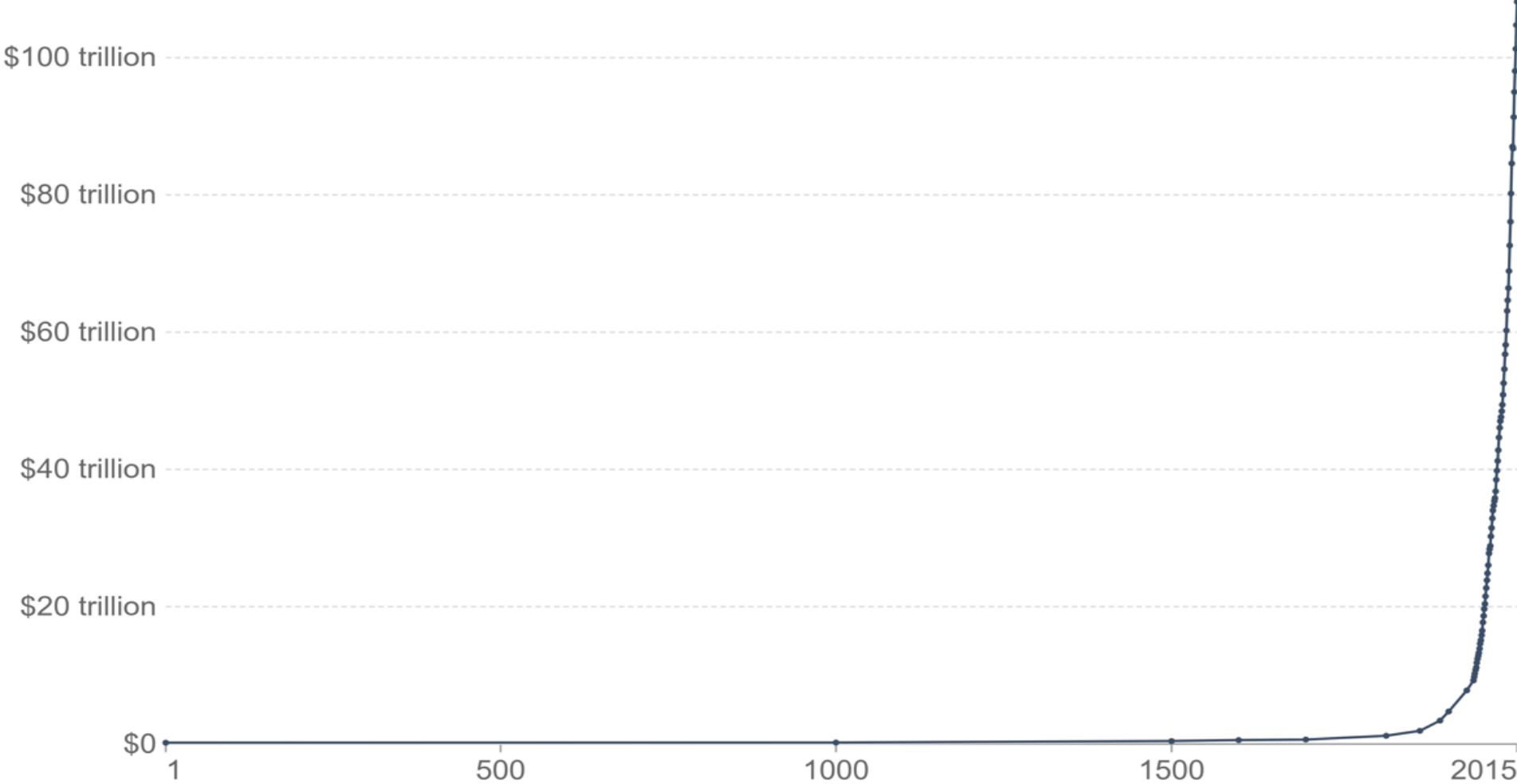
Based on estimates by the *History Database of the Global Environment* (HYDE) and the United Nations. On OurWorldinData.org you can download the annual data.

This is a visualization from OurWorldinData.org, where you find data and research on how the world is changing.

Licensed under [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) by the author Max Roser.

World GDP over the last two millennia

Total output of the world economy; adjusted for inflation and expressed in international-\$ in 2011 prices.



Source: World GDP - Our World In Data based on World Bank & Maddison (2017)

Table 1. The Great Acceleration reflected in the exceptional increase in magnitude of key environmental parameters from 1950 to 2015 (see Syvitski et al., 2020 for primary data and sources)

Indicator	1900	1950	2015	Relative increase since 1950 (%)
Population ($\times 10^6$)	1643	2499	7349	194
Global energy consumption (EJ/y)	41	100	514	414
Global GDP (billions 1990 Int'l \$/y)	1116	4656	73,902	1487
Global reservoir capacity (km ³)	19	705	15,534	2103
Number of dams	1587	7361	50,346	584
Plastic production (Mt/y)	0	2	381	18,950
Cement production (Mt/y)	5	130	4180	3115
NH ₃ production (Mt/y)	0	2	175	8650
Copper production (Mt/y)	0.50	2.38	19.10	703
Iron and steel production (Mt/y)	35	134	1160	765
Aluminium production (Mt/y)	0	2	58	2800

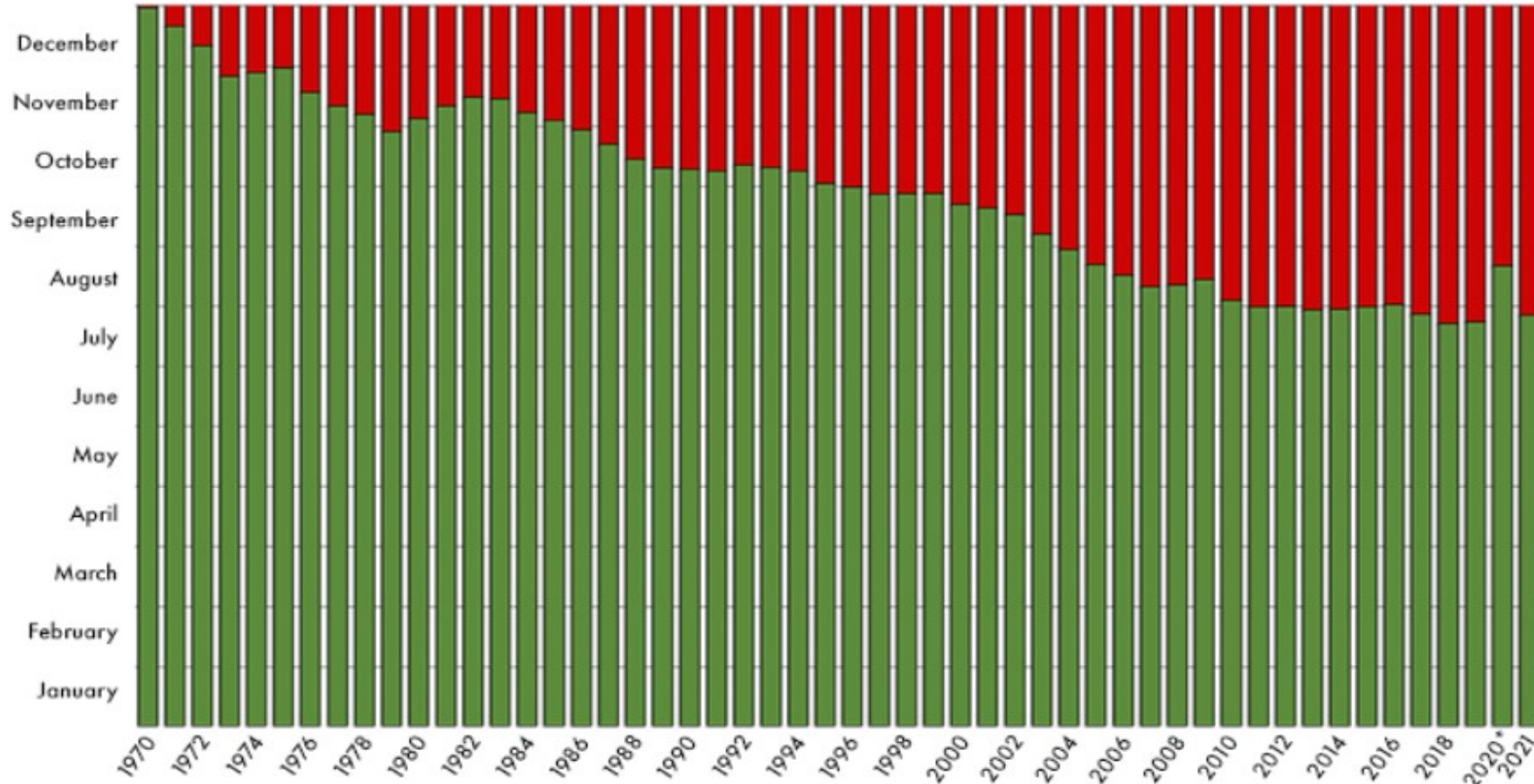


1 Earth

Earth Overshoot Day 1970 - 2021

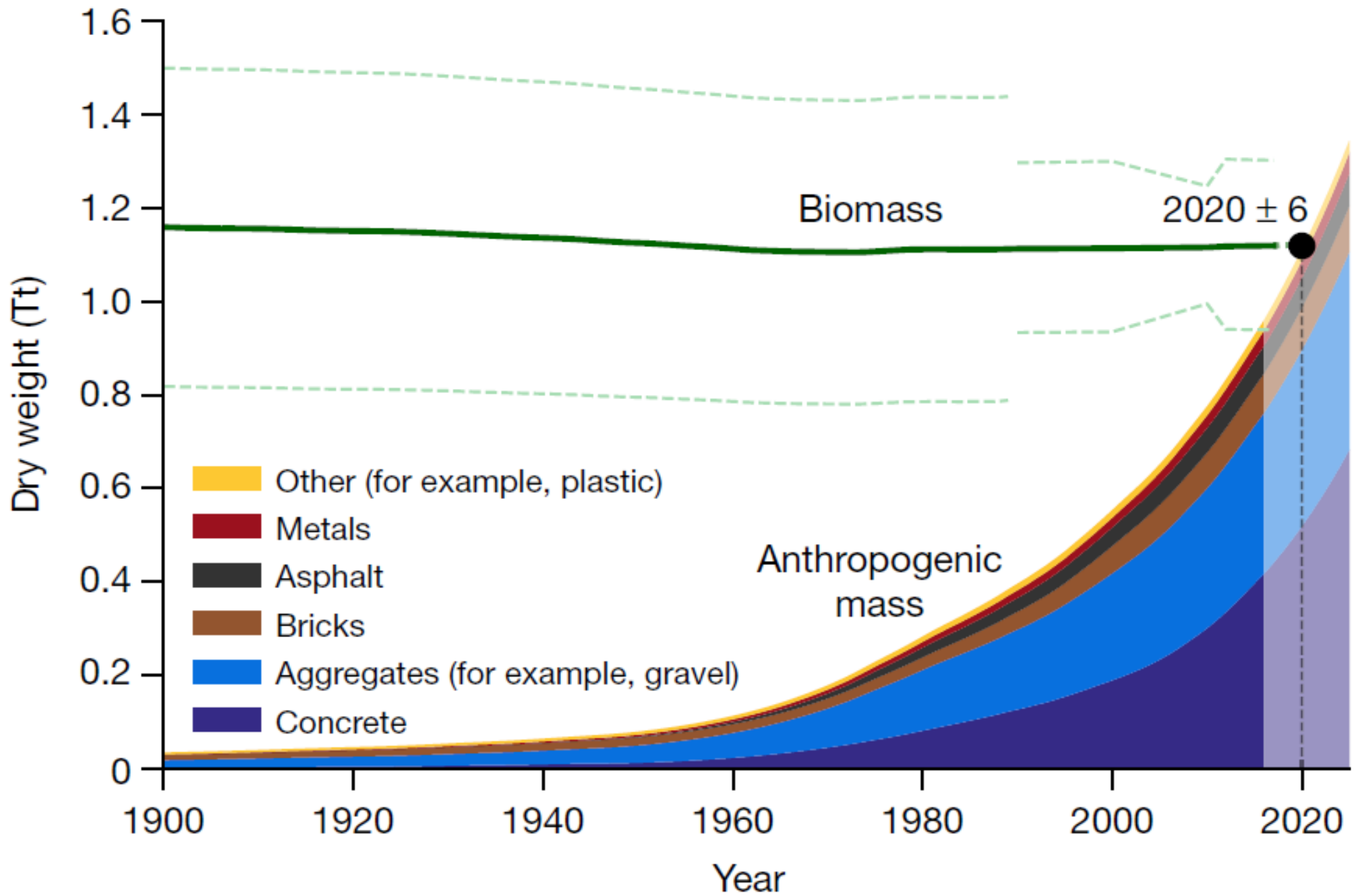


1.7 Earths



Source: National Footprint and Biocapacity Accounts 2021 Edition
data.footprintnetwork.org

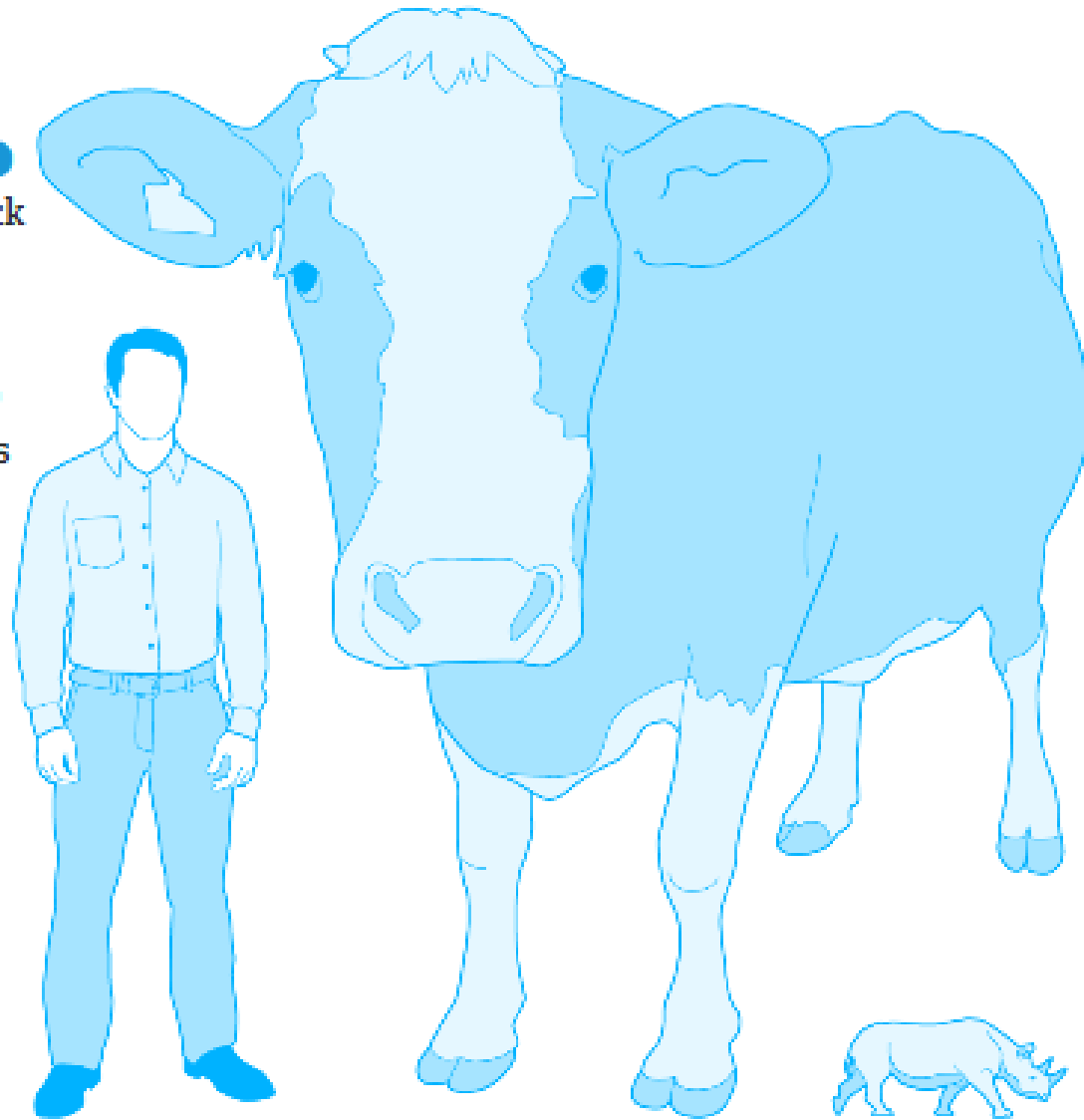
*The calculation of Earth Overshoot Day 2020 reflects the initial c
resource use in the first half of the year due to pandemic-induced lock
All other years assume a constant rate of resource use throughout th



Of all the mammals on Earth, 96% are livestock and humans, only 4% are wild mammals

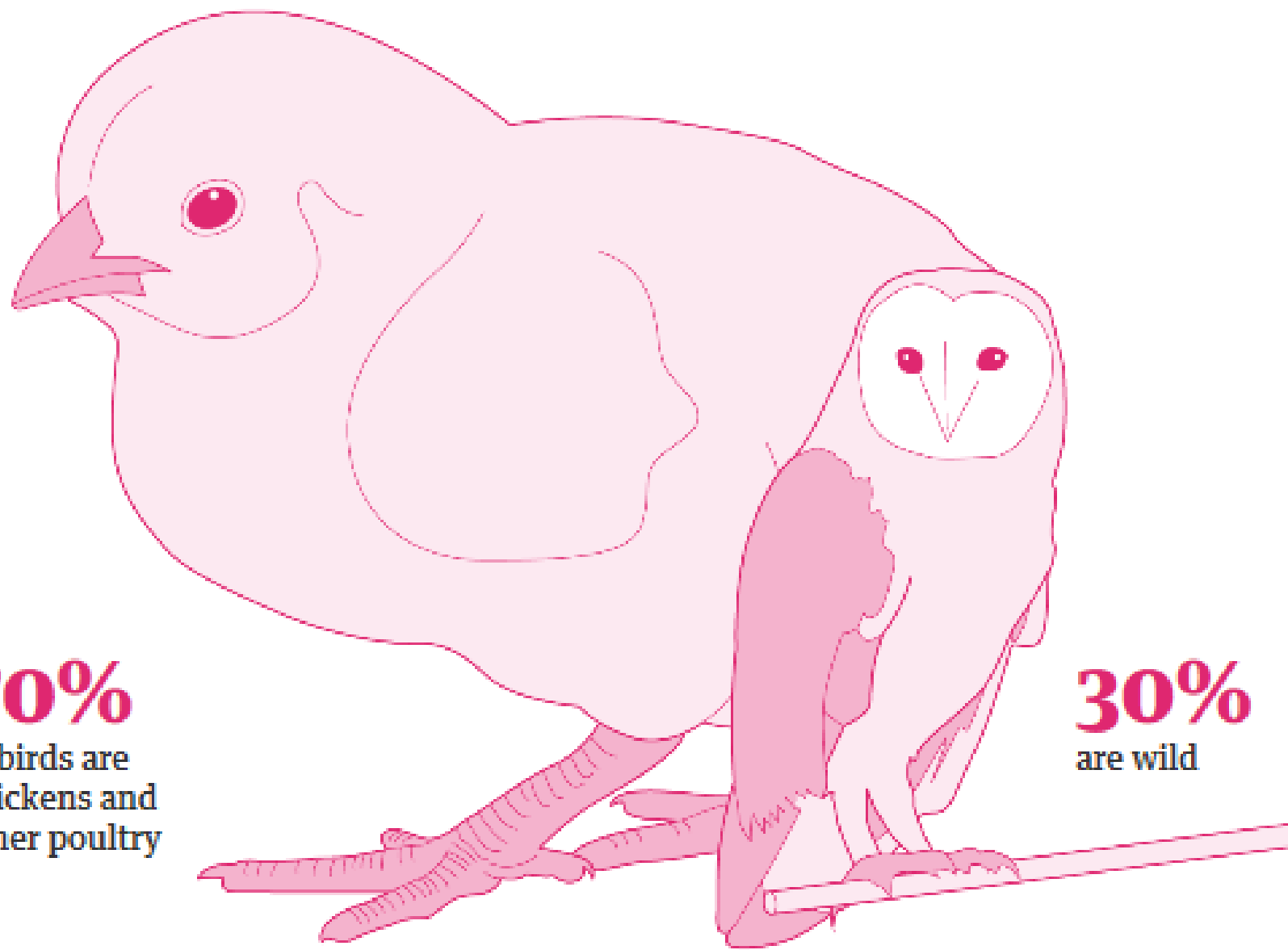
60%
are livestock

36%
are humans



4%
are wild
mammals

70%
of birds are
chickens and
other poultry



30%
are wild

The biosphere upon which humanity depends, has been deeply reconfigured by human activities

75%

of the land area has been significantly altered, negatively impacting the well-being of 3.2 billion people

66%

of the ocean area is experiencing increasing cumulative impacts only 3% of the oceans is unaffected by human activities

>85%

of wetland area has been lost

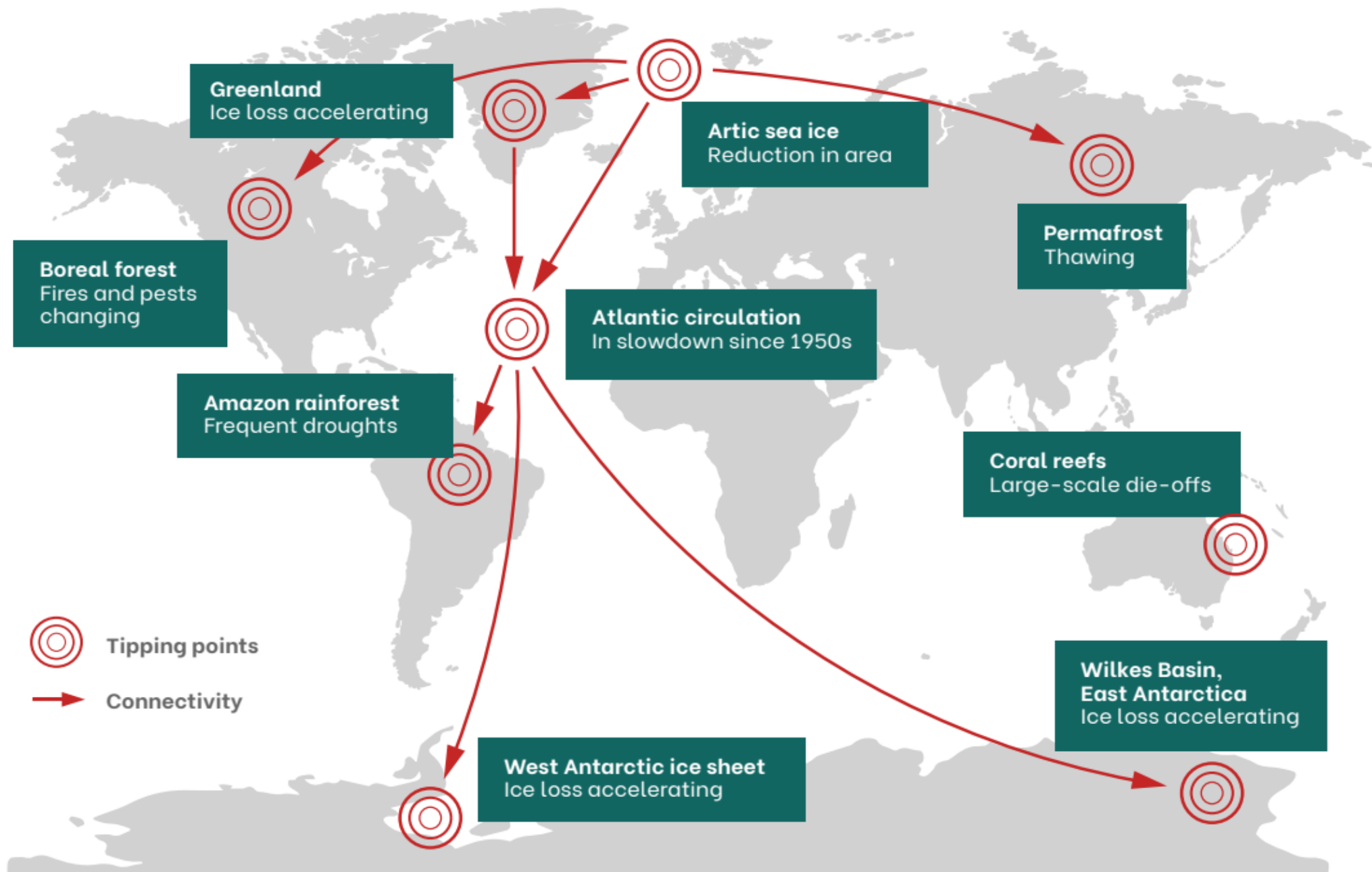


90%

of land is projected to be significantly altered, by 2050

1 million

species (500,000 plants and animals and 500,000 insects) are at risk of extinction assuming a total of 8.1 million species (2.6 million plants and animal and 5 million insects)

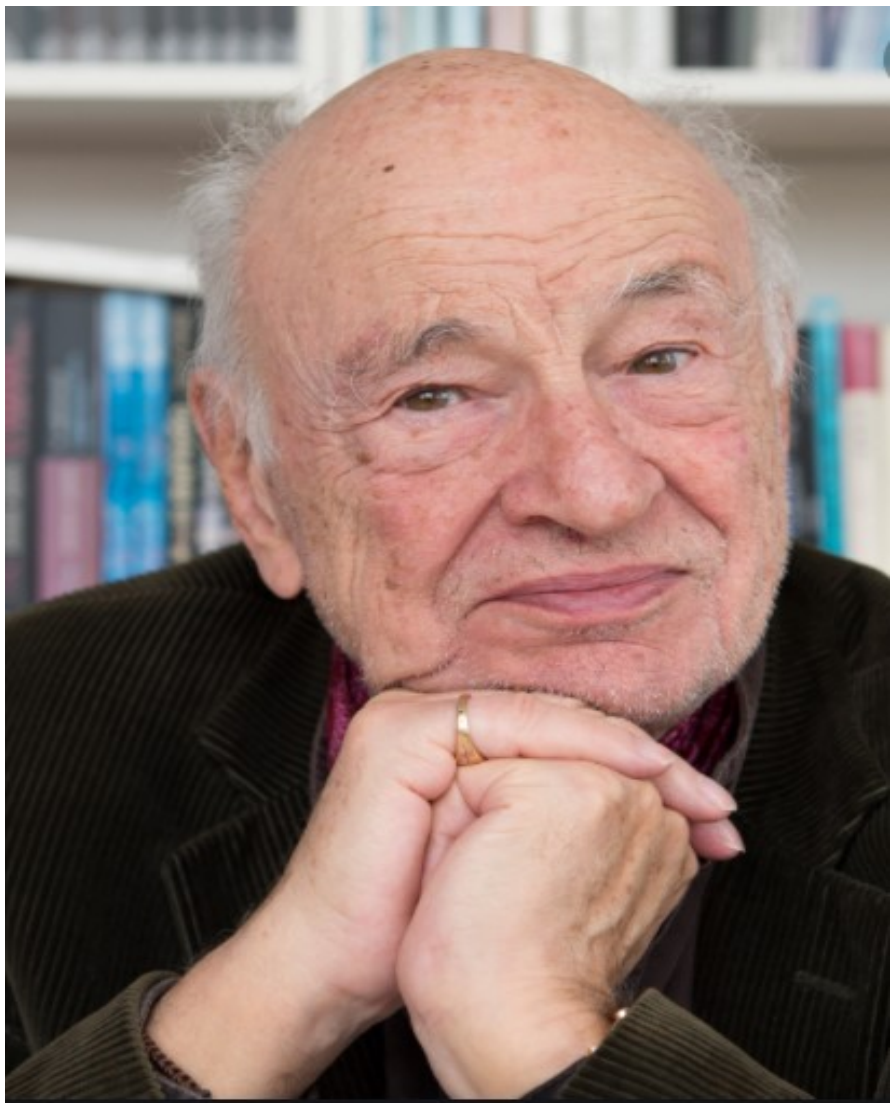


COMMON HOME OF HUMANITY

UNIDENTIFIED ECONOMIC OBJECT / *UNIDENTIFIED LEGAL OBJECT*



La sostenibilità è complessità

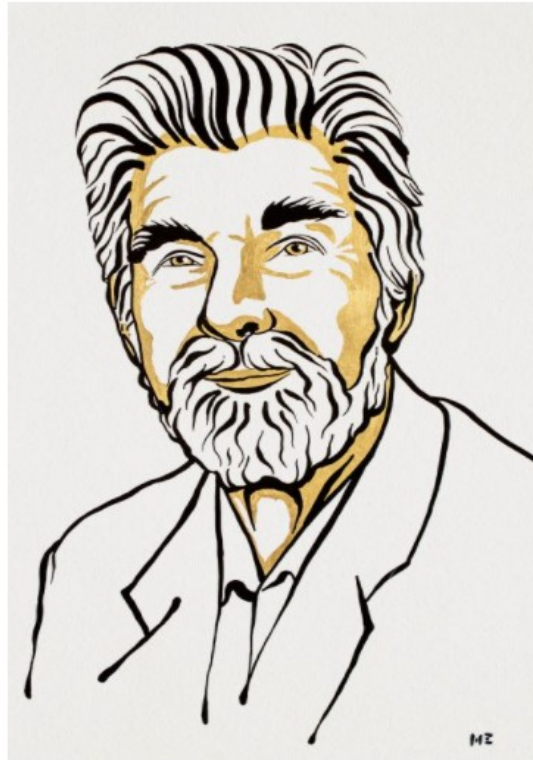


- **«La riforma del pensiero reclama un pensiero della «relianza», che possa collegare le conoscenze fra loro, collegare le parti al tutto, il tutto alle parti e che possa concepire la relazione del globale con il locale, e quella del locale con il globale.»**
- **Edgar Morin, 2012, *La via. Per l'avvenire dell'umanità*, Raffaello Cortina edizioni.**

The Nobel Prize in Physics 2021



Syukuro Manabe

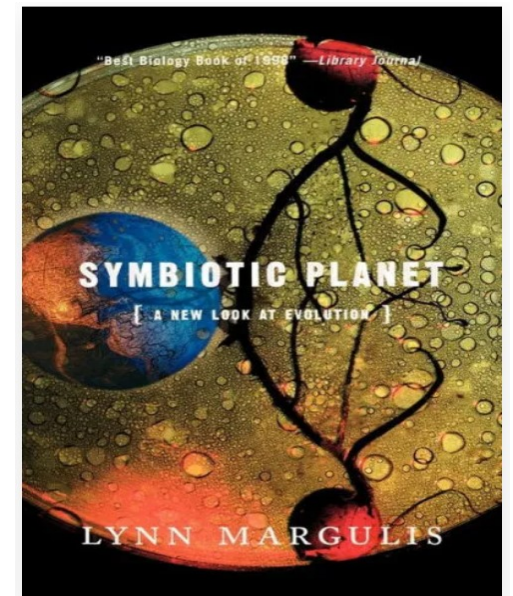
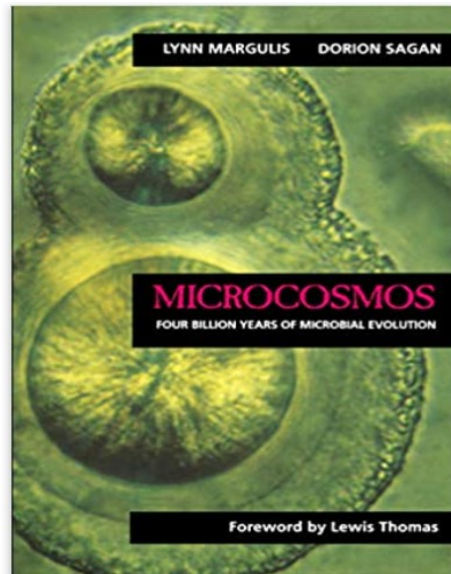
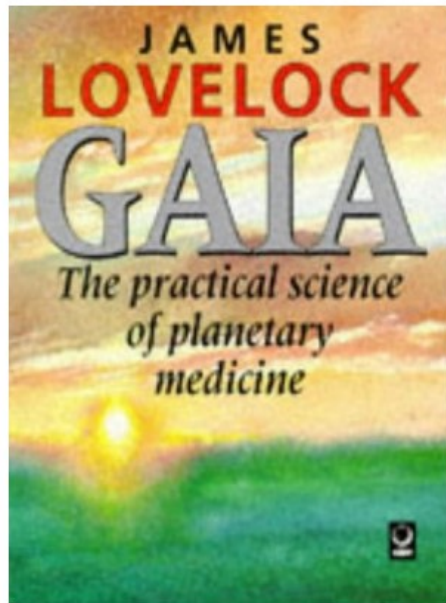
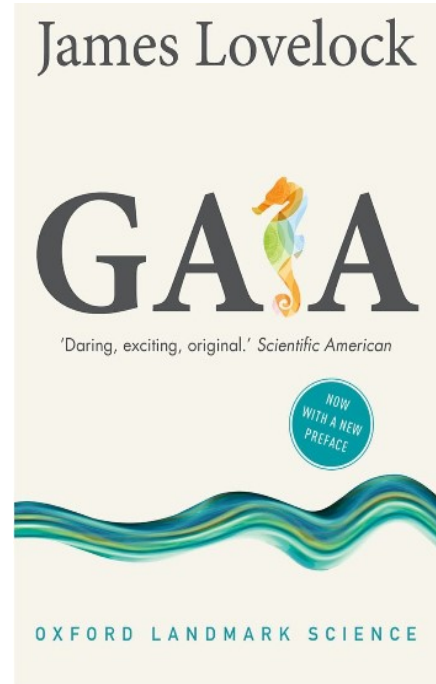
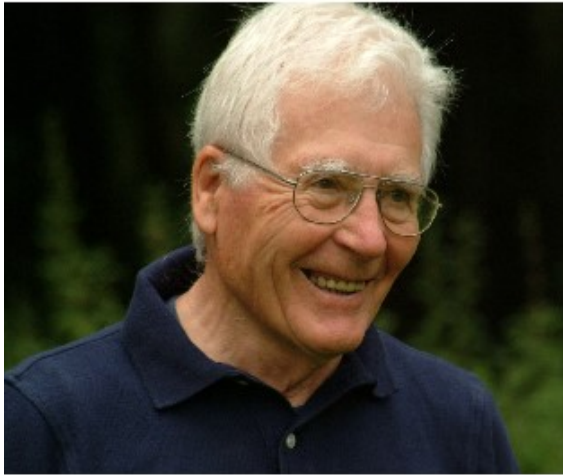


Klaus Hasselmann

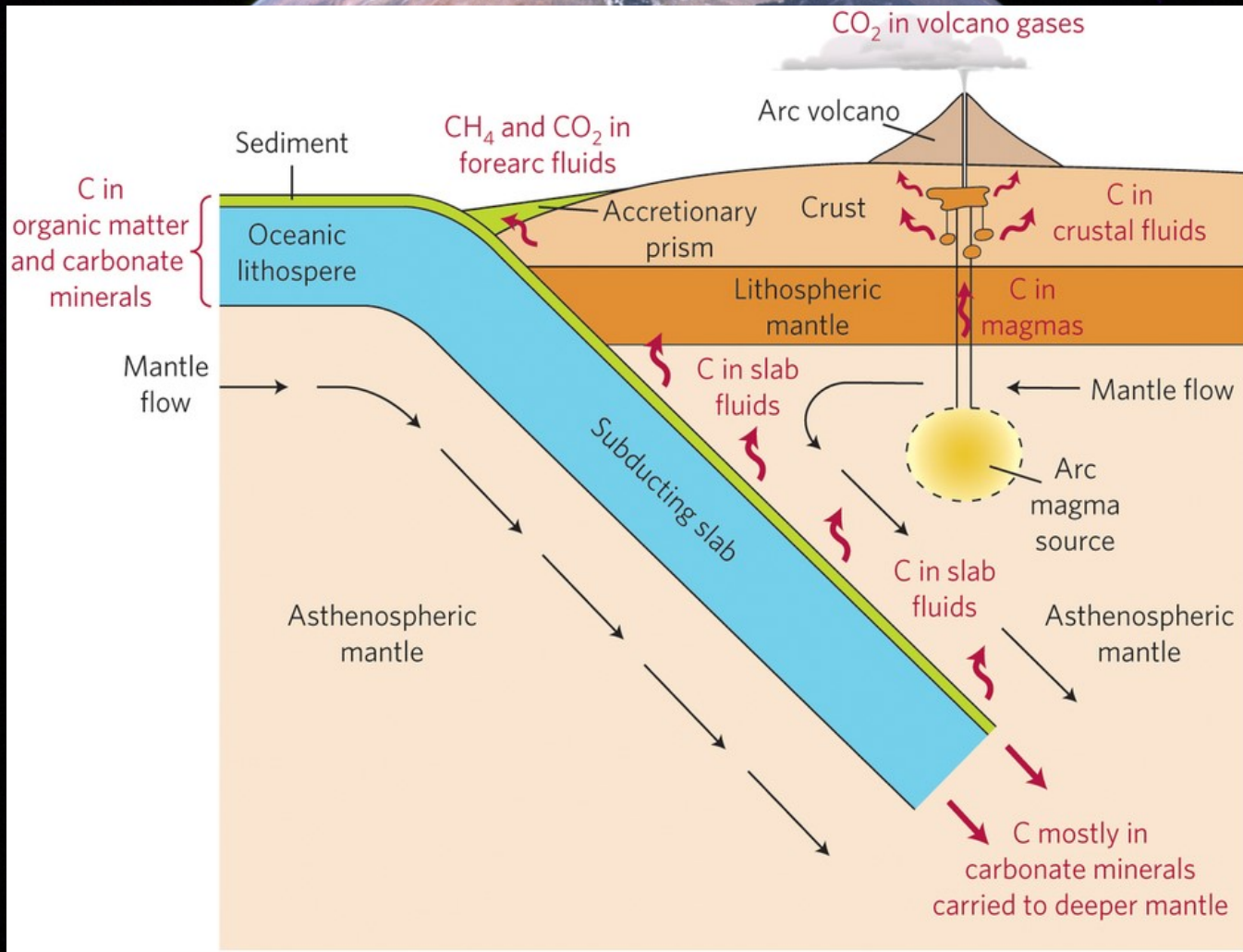


Giorgio Parisi

The Nobel Prize in Physics 2021 was awarded "for groundbreaking contributions to our understanding of complex systems" with one half jointly to Syukuro Manabe and Klaus Hasselmann "for the physical modelling of Earth's climate, quantifying variability and reliably predicting global warming" and the other half to Giorgio Parisi "for the discovery of the interplay of disorder and fluctuations in physical systems from atomic to planetary scales."



Earth System Science



La consapevolezza della Terra come «Sistema»: NON somma di componenti MA rete di interazioni e retroazioni

Come funziona il clima di un pianeta roccioso?

Come funziona l'interno di un pianeta roccioso?

Quale ruolo giocano gli organismi viventi nella dinamica planetaria?

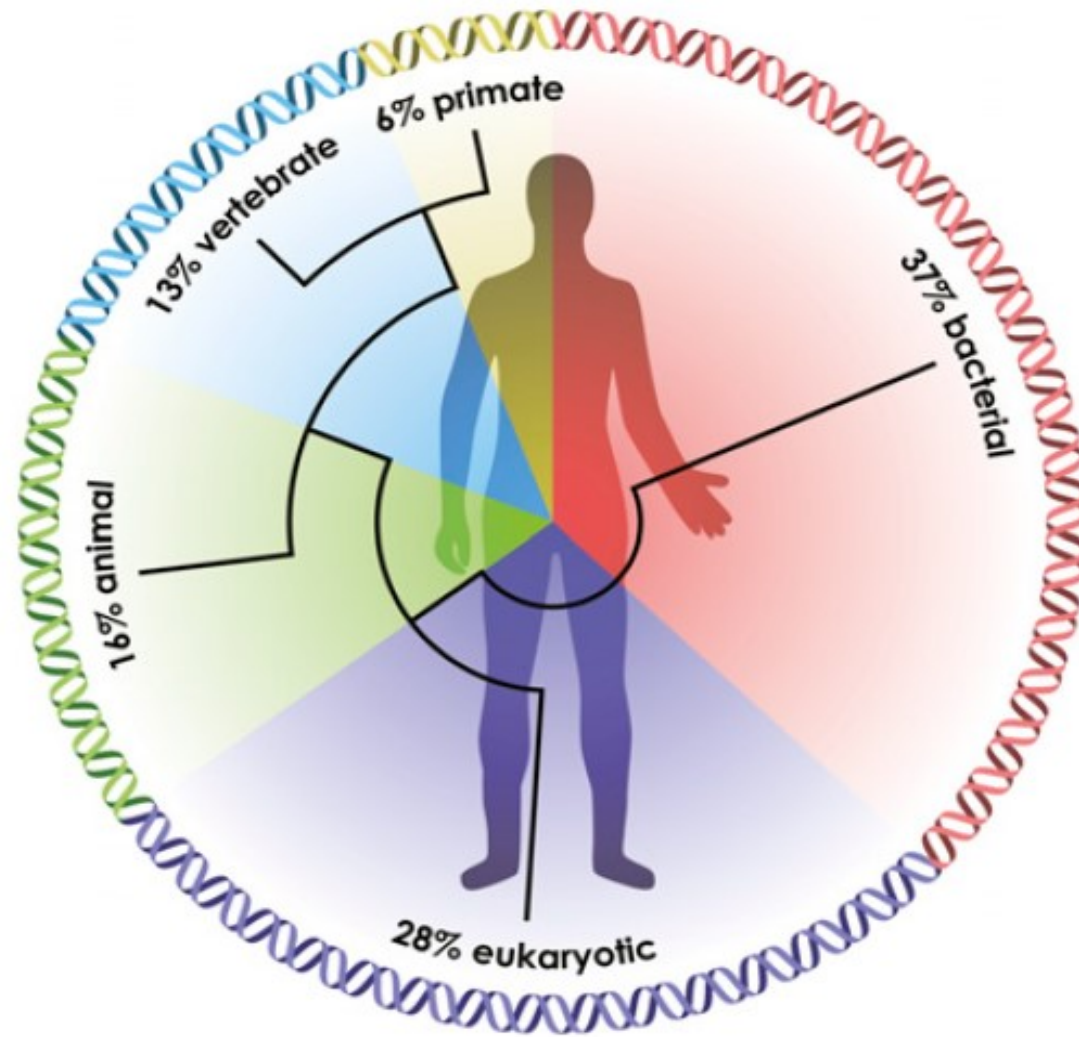


Fig. 2. The ancestry of humans reflected in the genomic signature. A phylogenetic analysis of the human genes reveals the relative percentage of the genome that arose at a series of stages in biological evolution (20).

ESSAY

Revised Estimates for the Number of Human and Bacteria Cells in the Body

Ron Sender¹, Shai Fuchs^{2*}, Ron Milo^{1*}

¹ Department of Plant and Environmental Sciences, Weizmann Institute of Science, Rehovot, Israel,

² Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel

* Current address: Division of Endocrinology, The Hospital for Sick Children and Department of Pediatrics, The University of Toronto, Toronto, Canada

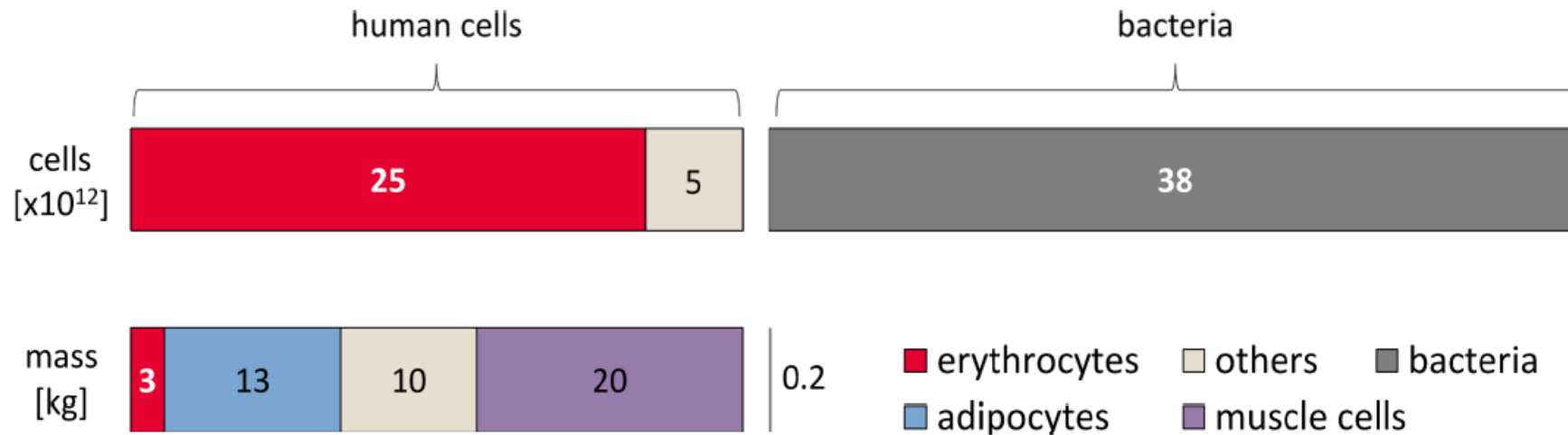


Fig 3. Distribution of cell number and mass for different cell types in the human body (for a 70 kg adult man). The upper bar displays the number of cells, while the lower bar displays the contribution from each of the main cell types comprising the overall cellular body mass (not including extracellular mass that adds another ≈ 24 kg). For comparison, the contribution of bacteria is shown on the right, amounting to only 0.2 kg, which is about 0.3% of the body weight.



International
Science Council
The global voice for science

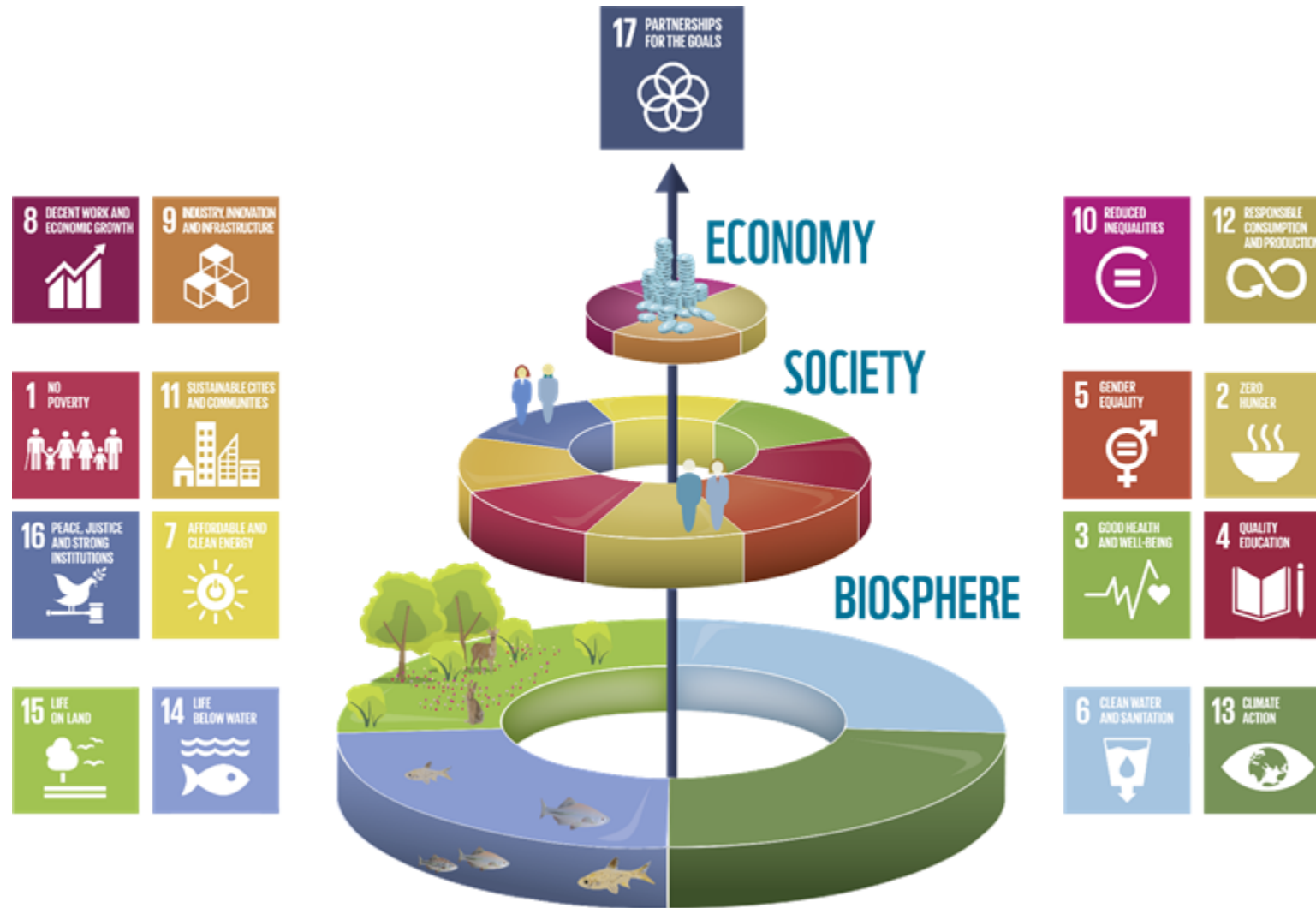
UNLEASHING SCIENCE

Delivering Missions
for Sustainability

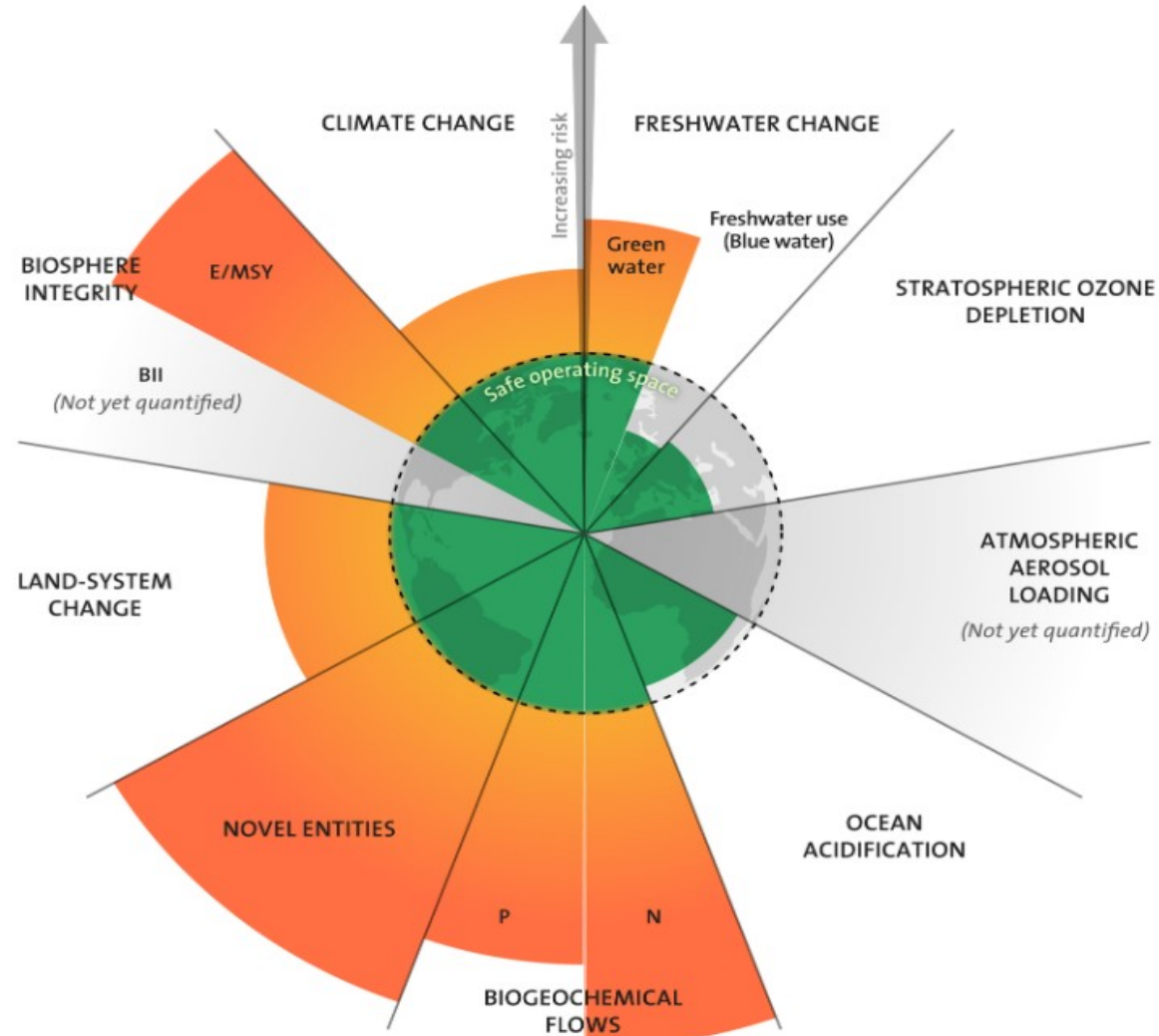
The International Science Council (ISC) is the world's premier representative scientific organization. It works at the global level to catalyse and convene scientific expertise, advice and influence on issues of major concern to both science and society. Its role is growing in need and importance in a world of growing complexity and pressing global challenges.

The ISC was launched in 2018 following a merger of the International Council for Science, which was created in 1931, and the International Social Science Council, created in 1952. The Council's growing membership includes more than 140 national and regional academies, research councils and other scientific organizations, and 40 international scientific unions and associations. Through its members and associates, its partnerships with other international scientific organizations, UN agencies and inter-governmental bodies, and its wider networks of expertise, the Council is unique in its capacity to bring together scientific excellence and science policy expertise from all fields of science and all regions of the world.

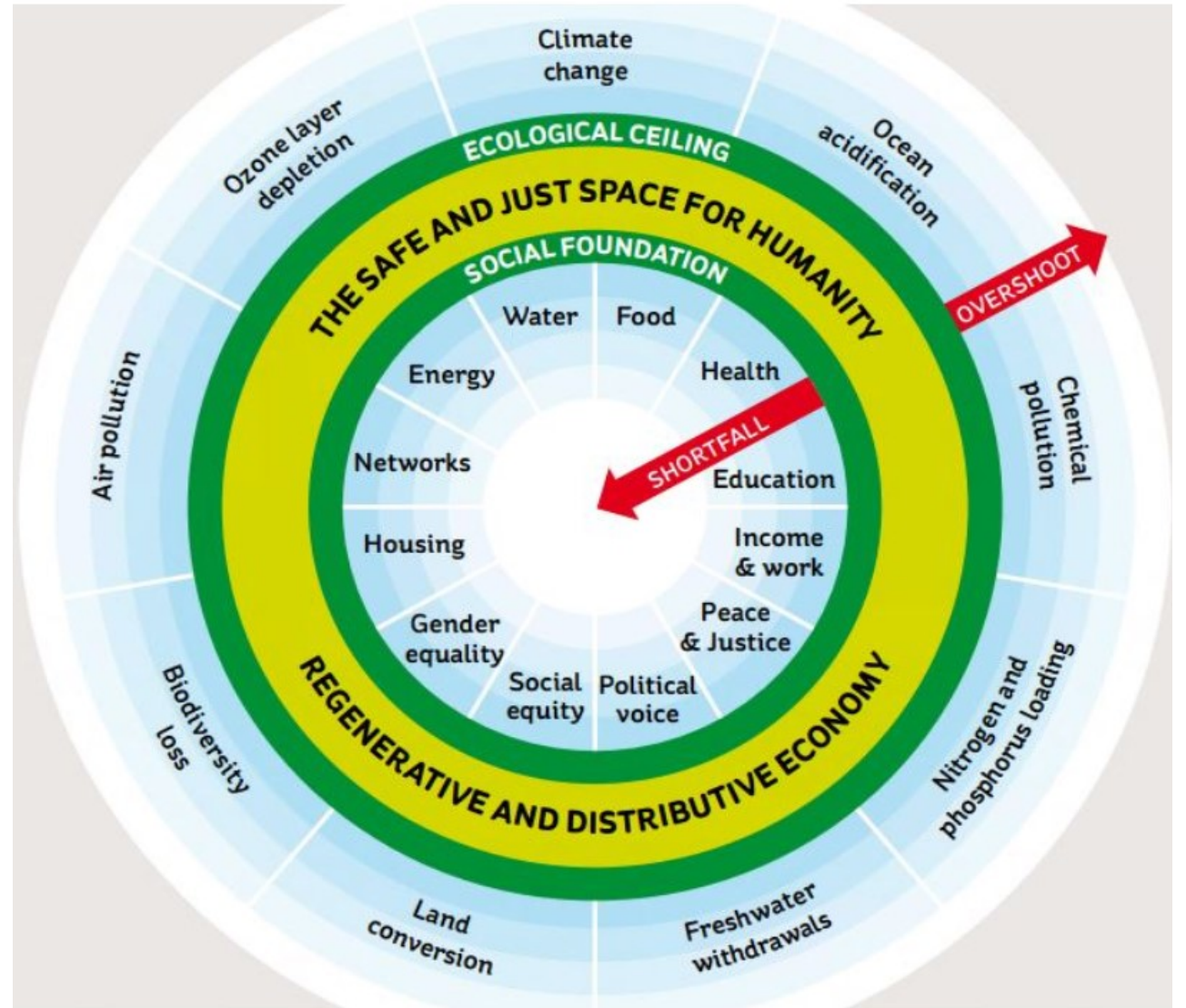
We cannot have a healthy, prosperous future on a degraded planet



Safe Operating Space (S.O.S.)



S.O.S : Safe Operating Space



THE EARTH COMMISSION: A COMPASS FOR HUMANITY



The Earth Commission is a group of leading scientists convened by Future Earth. Their mission is to assess the latest science to underpin the development of science-based targets for systems like land, water, and biodiversity. By setting such targets, companies and cities will be able to contribute to re-stabilizing Earth's natural systems and work towards ensuring a planet where humans can thrive.

Hosted by

futureearth
Research. Innovation. Sustainability.



Wellbeing Economy Policy Design Guide

How to design economic policies
that put the wellbeing of people
and the planet first



SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

[REGISTER YOUR INTEREST](#)

[What are SBTs?](#)

[Why set SBTs?](#)

[How to set SBTs](#)

[Cities](#)

[Companies](#)

[Register now](#)

[Earth systems](#) ▾

[News and events](#) ▾

[Resources](#)



**We enable companies and cities to operate
within the limits of our Earth's systems – nature
and climate – by setting science-based targets**

The Choice is Ours

