THE AUSTRALIAN NATIONAL UNIVERSITY

Green Growth and Global Change: International Institutional Challenges

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The Rationale for Green Growth

- The environment has risen in prominence as a political issue in many countries. It is no longer a marginal issue and is now challenging “traditional thinking” on development pathways
- The scale of environmental problems has now become global, transcending national boundaries.
- “Green growth” or “green economies” are rapidly gaining acceptance in mainstream socio-economic thinking, but so far most of the emphasis is on new technologies.
- The move towards green economies demands not only new technologies, but presents major challenges for institutions and legal systems.

”The Quadruple Squeeze”

Human growth
20/80 dilemma

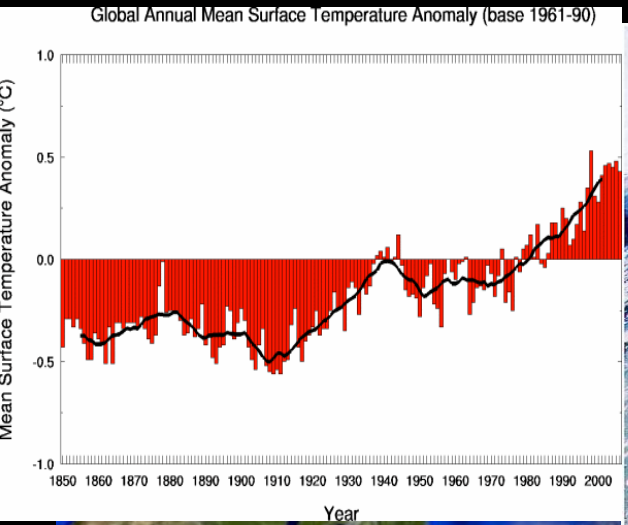
Climate
550/450/350
dilemma

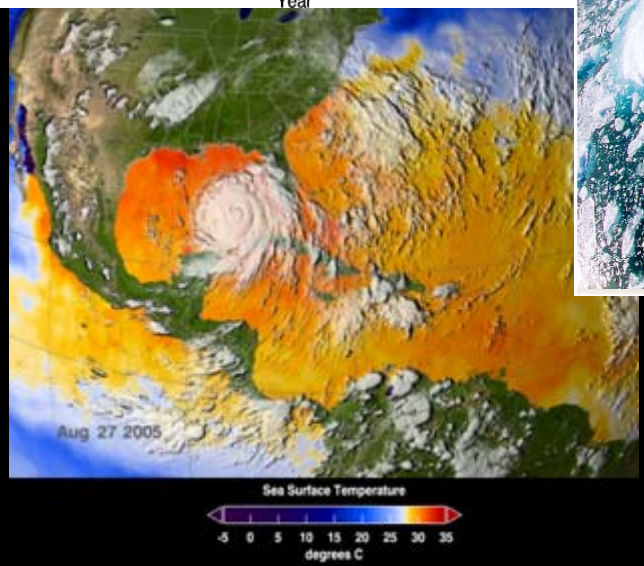
Ecosystems
60 % loss dilemma

Surprise
99/1 dilemma

Source: J. Rockström

Climate Change:
Driving the emergence of green economies around the world





Dealing with Climate Change:

Some inherent challenges

- Equity issues - climate change is inherently unequal; industrialised countries are primarily responsible for the problem but developing countries bear most of the impacts. Is “contract and converge” appropriate and how can it be implemented?

- Long lag times - tough policies enacted now won’t yield their full benefits until decades into the future

- Defining dangerous climate change - this is a value judgment which can differ across different societies. Yet there is only one global climate system.

- Nonlinearities in the climate system - there are tipping points in the climate system where a small, incremental increase in greenhouse gases can trigger a large, abrupt shift that could affect a billion people. What are the implications of tipping points for institutional frameworks and legal systems?

Young and Steffen 2009

Global Governance:

The nature of the problem and the challenges for institutions and legal systems

- Uncertainties abound - a daunting challenge!
- Rates of change in the climate system are now often faster than rates of response in governance and legal systems
- Multi-level governance required - a severe challenge for national legal systems
- Early warning systems - monitoring of changes in the climate system
- Capacity to assimilate new information and modify institutions and laws

Young and Steffen 2009

Global Governance:

Some suggestions for building robust institutions

- Emphasize social learning as well as adaptive management - the knowledge base on environmental problems is changing rapidly. institutions must continually learn and adapt to ensure that there is an appropriate “fit” between institutions and natural systems.

- Prepare for crises as periods of opportunity - the global financial crisis provides an excellent opportunity to renew infrastructure with new green technologies.

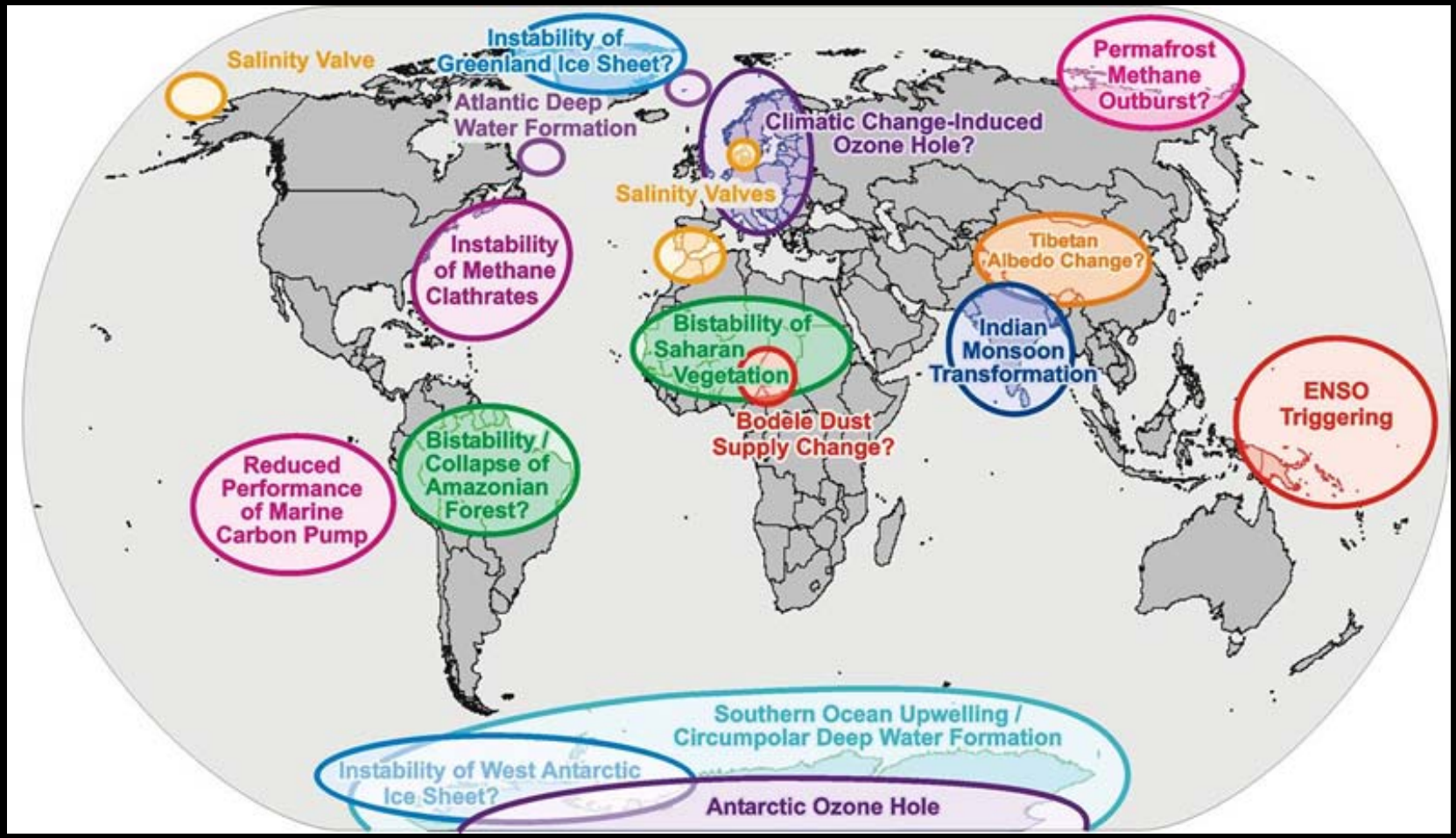
- Worst-case scenario analyses - do not ignore low probability but very high impact events.

- Pay attention to long-term consequences; development of safeguards to prevent triggering “runaway processes” and crossing “tipping points”.

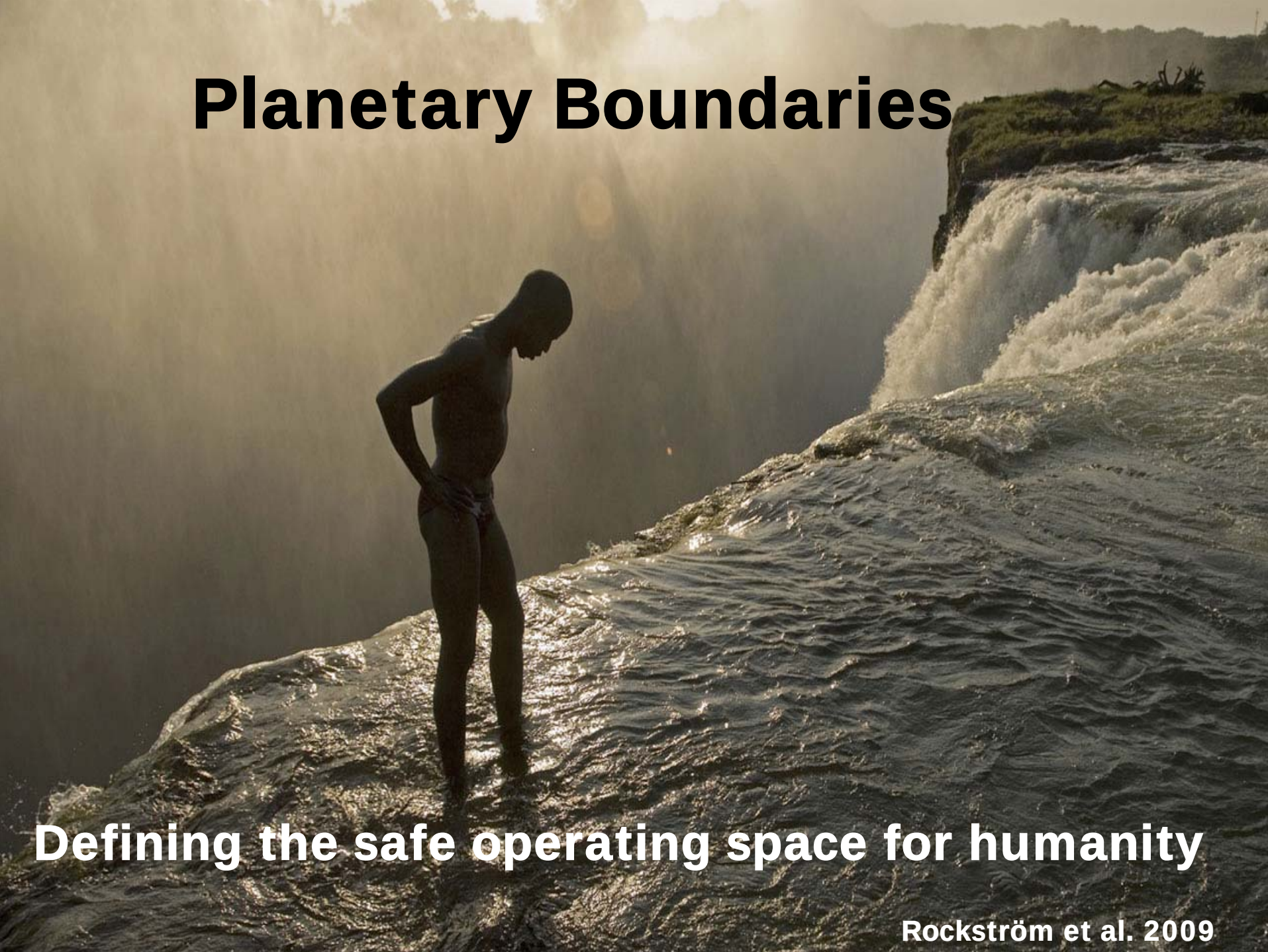
Young and Steffen 2009

The Risk of Catastrophic Tipping Points:

”Hard-wired” features of the climate system that could have devastating consequences for humanity if triggered



After Lenton et al. 2008



Planetary Boundaries

Defining the safe operating space for humanity

Rockström et al. 2009

The Concept of Planetary Boundaries

An attempt to define the “planetary playing field” on which humanity can operate safely.

Assumes that the Holocene epoch defines a desirable global environment for the further development of humanity.

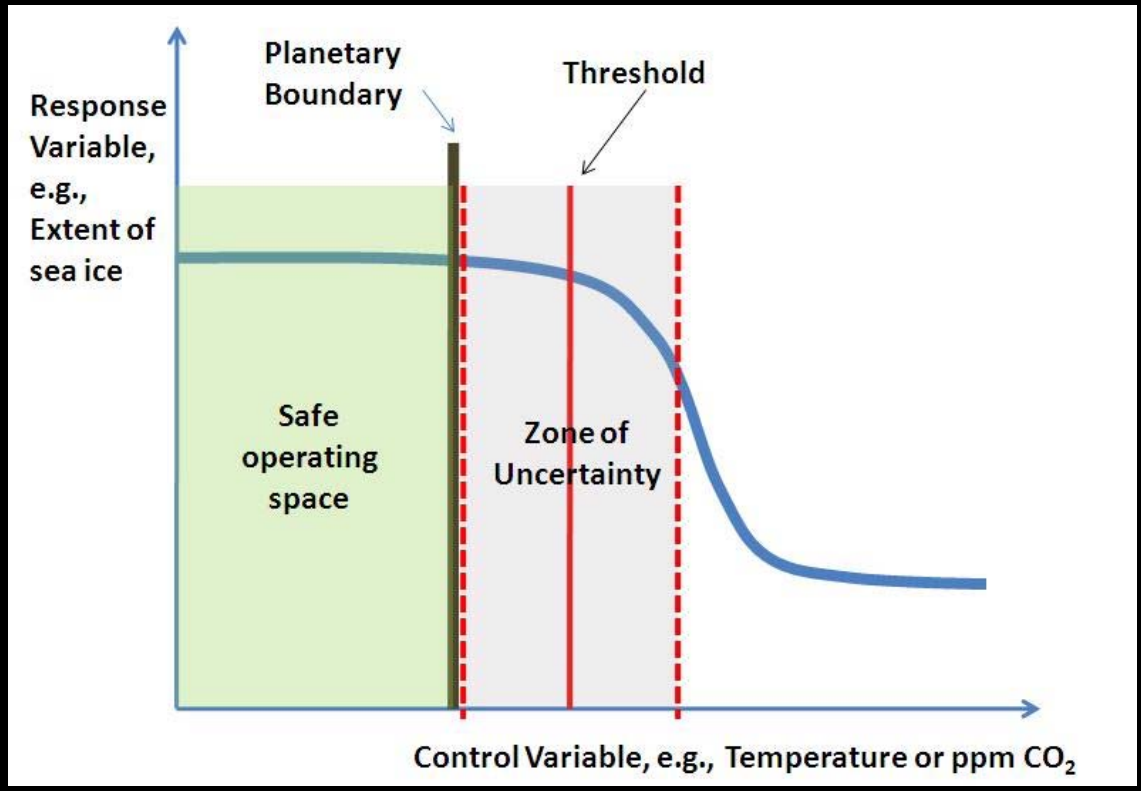
Based on critical processes in the global environment - chemical cycles; climate; ocean, atmosphere and land condition; biological diversity...

Designed to avoid the crossing of dangerous thresholds (e.g., change in Asian monsoon to a drier state) or the undermining of resilience.

Placement of a planetary boundary is a value judgment based on amount of risk humanity is willing to take.

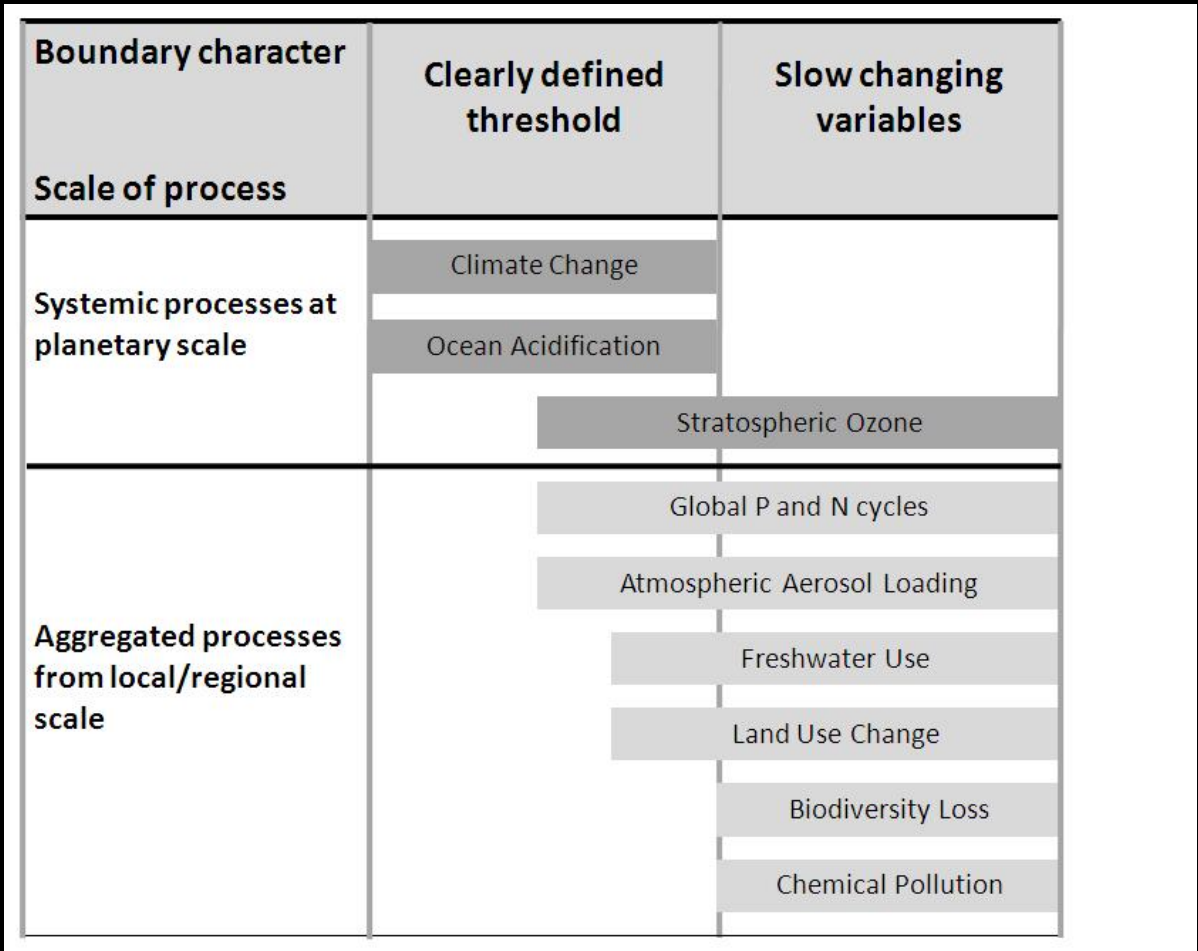
Planetary boundaries do NOT say anything about resource depletion, population size, consumption patterns etc. They are based firmly on the “ground rules” of planet Earth - independent of human desires or wishes.

What is a planetary boundary?



Conceptual definition of a planetary boundary. The boundary is designed to avoid the crossing of a critical threshold in an Earth System process. Insufficient knowledge and the dynamic nature of the threshold generate a zone of uncertainty about its precise position, which informs the determination of where to place the boundary.

Categories of planetary boundaries



These 9 planetary boundaries, and the processes on which they are based, are all different in character. What are the implications for governance and institutions?

E.S. Process	Control Variable	Boundary	State of Knowledge
Climate change	CO2 conc energy change	350 ppm +1 W m2	Good, but debate on boundary position
Ocean acidif.	arag. sat ratio	20% reduction	Process understood
Stratospheric O3 loss	O3 conc, DU	5% reduction from pre-indust	Boundary agreed and respected
Atmos aerosols	part. conc.	TBD	Thresholds unknown
P & N cycles	N: amt fixed P: inflow to ocean	35 Tg N/yr 10 x pre-indust	Boundaries are educated guesses
Freshwater use	Blue water use	4000 km3/yr	Global aggregate
Land system change	Fraction of land cultivated	15% ice-free land surface	Regional distribution is critical
Biodiversity	Extinction rate	<10 E/MSY	Diversity-functioning??
Chem. Pollution	Amt emitted	TBD	Aggregate effects??

Implementing the Land Boundary

How do we limit cropland to 15% of Earth's land surface and yet feed a growing population?

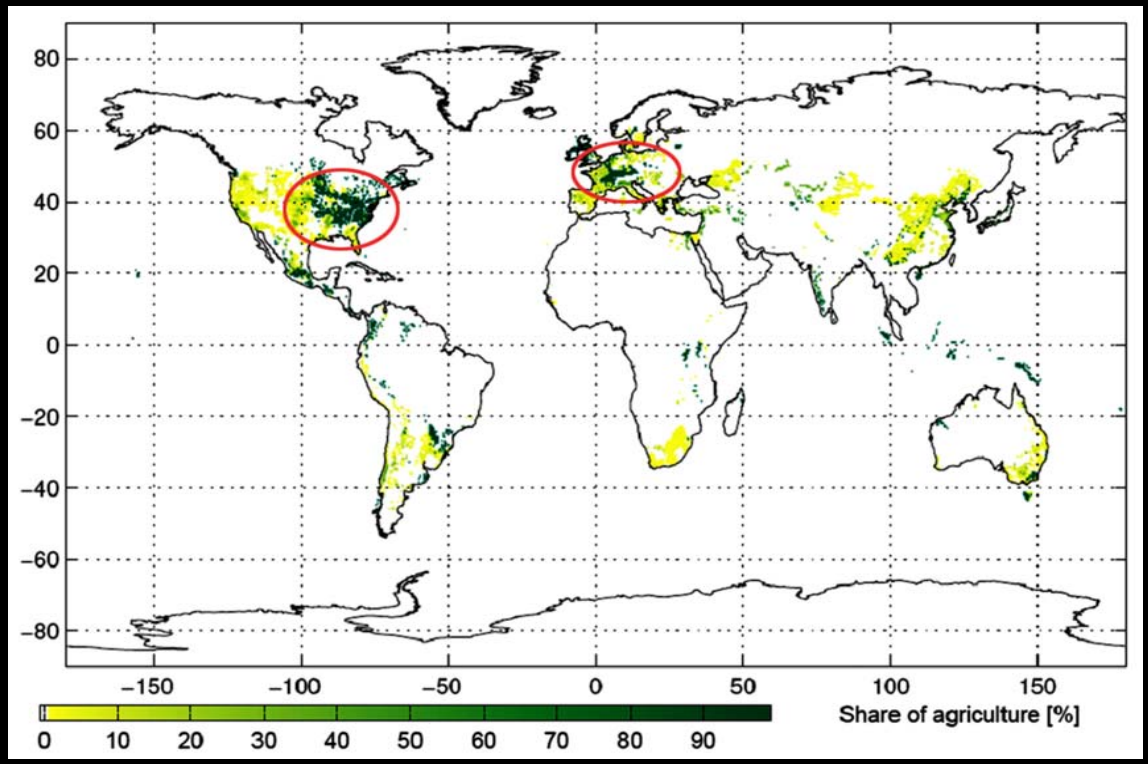
What is the role of national governments in enforcing such a boundary?

Should we rely on a much greater amount of food trade to meet this boundary?

What are the cultural, ethical, ecological and strategic/security considerations associated with this boundary?

Land use is normally a local decision. How do we relate local decisions to a global-scale boundary?

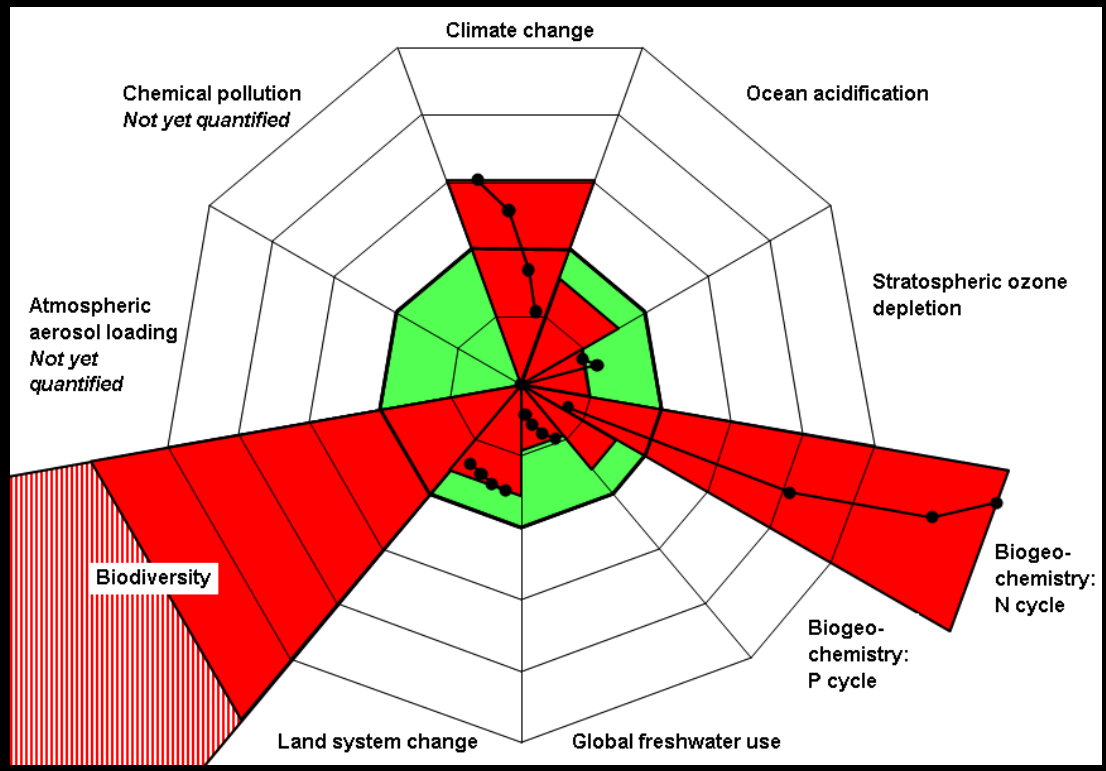
A proposed approach for the land boudary: Towards “global agricultural commons”?



Ranking world-wide areas according to suitability for food production. Should we grow nearly all of the food for 10-12 billion in central Europe and eastern North America only? What are the implications of such an approach?

Schellnhuber 2009

Planetary boundaries: how are we tracking?



Estimate of quantitative evolution of control variables for seven planetary boundaries from pre-industrial levels to the present . The inner (green) shaded nonagon represents the safe operating space with proposed boundary levels at its outer contour. The extent of the wedges for each boundary shows the estimate of current position of the control variable. Points show the estimated time trajectory of each control variable from pre-industrial to the present.

⟊Planetary Boundaries:
Implications for Governance and Institutions

1. What current institutions (e.g., UNEP, WTO) might be relevant and useful for planetary boundaries, and how might they contribute to more sustainable outcomes?

2. What changes to current institutions and governance arrangements, or new institutions, might be needed to deal with the implementation of planetary boundaries?

3. What are the important interactions (biophysical, social, economic, political) among the boundaries, and what are the implications of these interactions for governance and institutions?

4. What are the implications of planetary-scale environmental boundaries for national governance and institutions - and indeed for national sovereignty?

There is only one Planet Earth...

...and it has its own ground rules.