Välkomna till

Naturens år

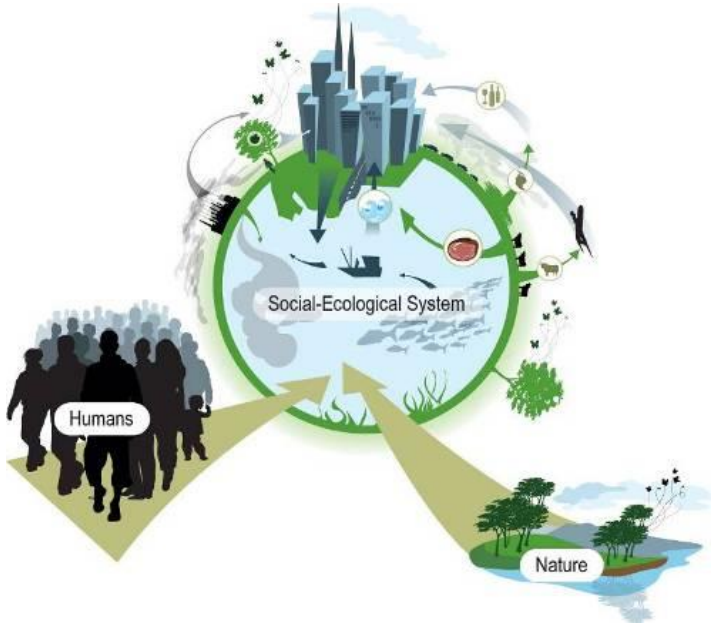
möte i samverkansnätverket

Hos Albaeco, 19 november 2018

Louise Hård af Segerstad

Fredrik Moberg

Korta fakta om Albaeco

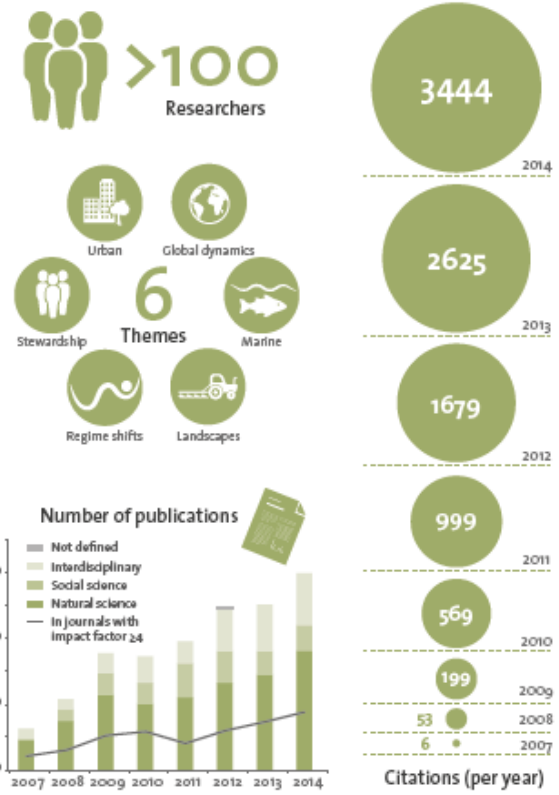


- Fristående organisation, bildad 1998
- Grundad av forskare och personer från reklam- och mediabranscherna
- Samarbetar nära Stockholm Resilience Centre vid Stockholms universitet och deras nätverk av internationella forskare
- Kommunicerar forskning om miljö och hållbar utveckling till myndigheter, näringsliv, media, skolor och allmänheten

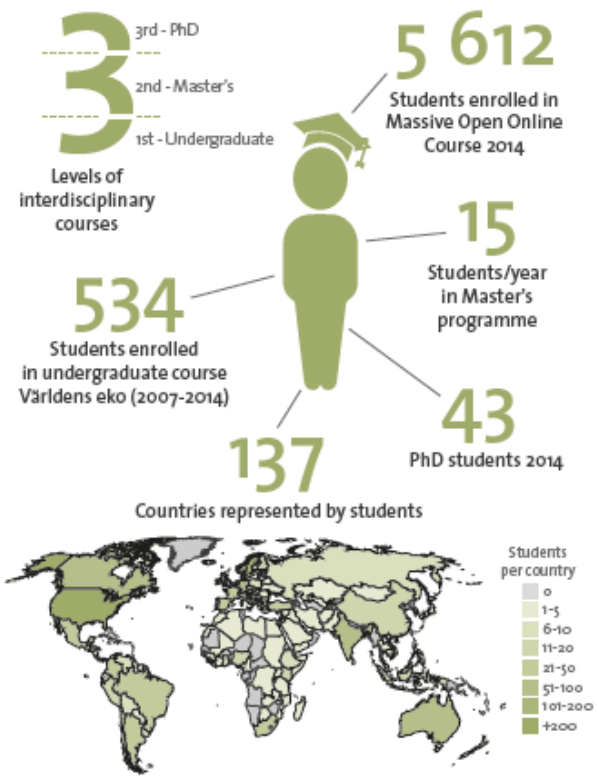
Stockholm Resilience Centre

Advancing research on the stewardship of social-ecological systems with a special emphasis on securing ecosystem services for human wellbeing and resilience for long-term sustainability.

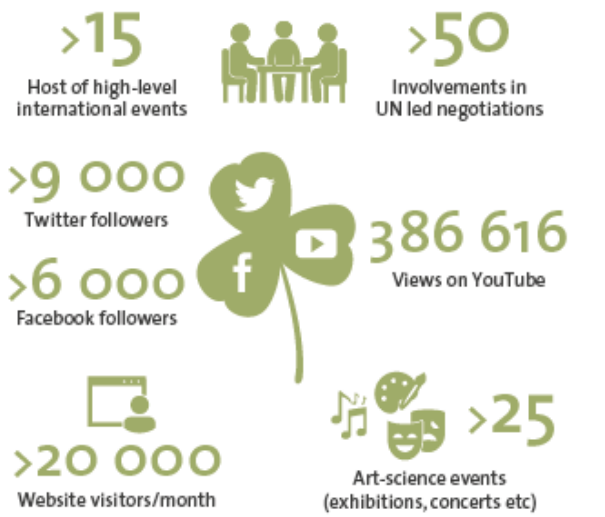
RESEARCH



EDUCATION



POLICY & OUTREACH



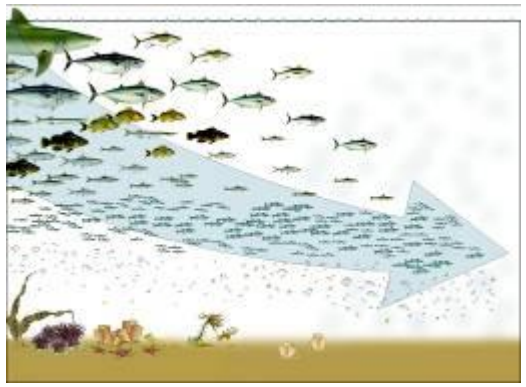
FINANCE

*The Swedish Foundation for Strategic Environmental Research

MISTRA

Rationale:

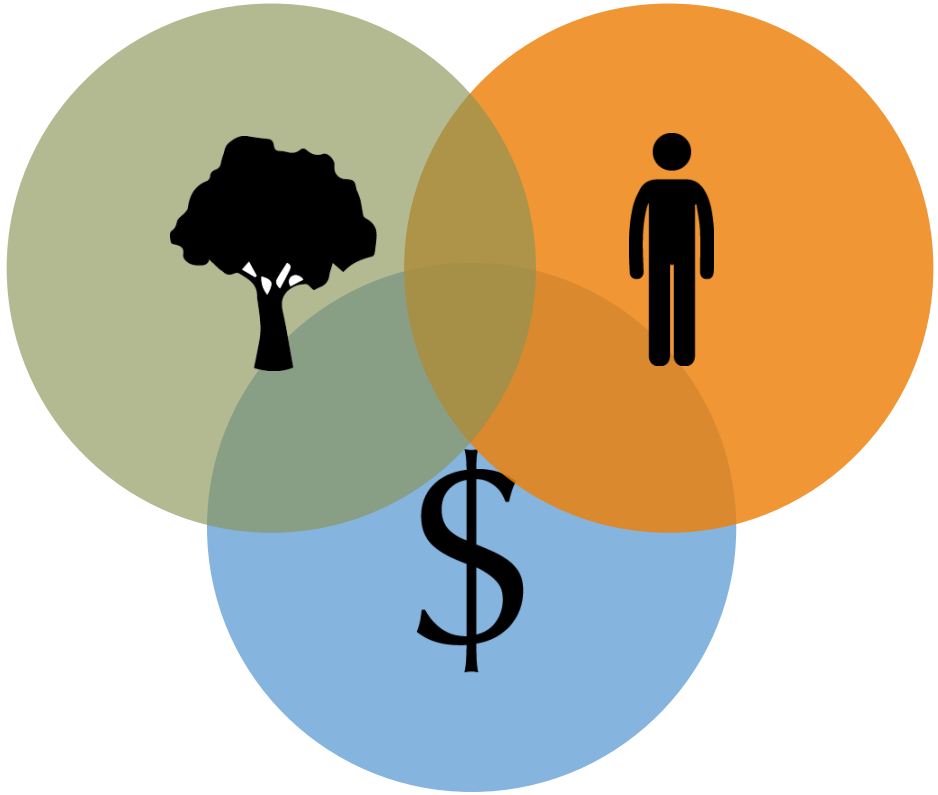
“The institutional capacities to manage the earth’s ecosystems are evolving more slowly than man’s overuse of the same systems”

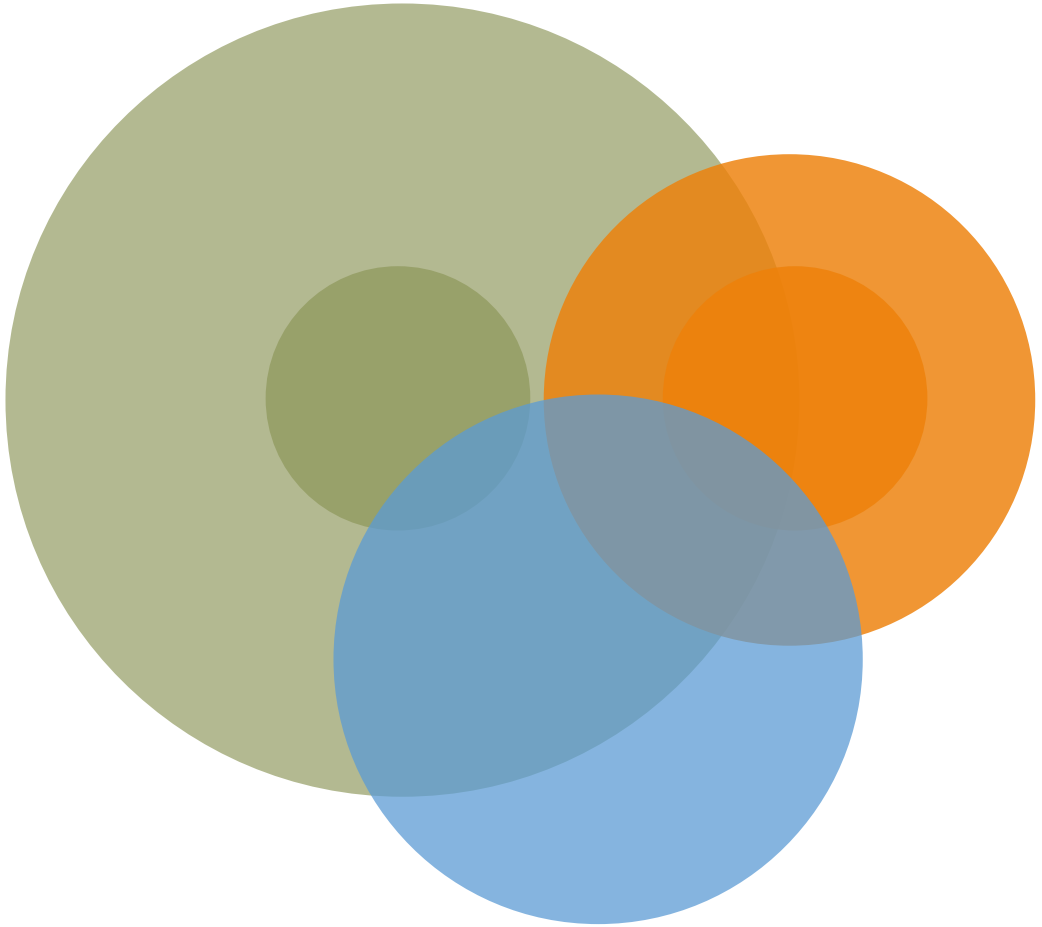


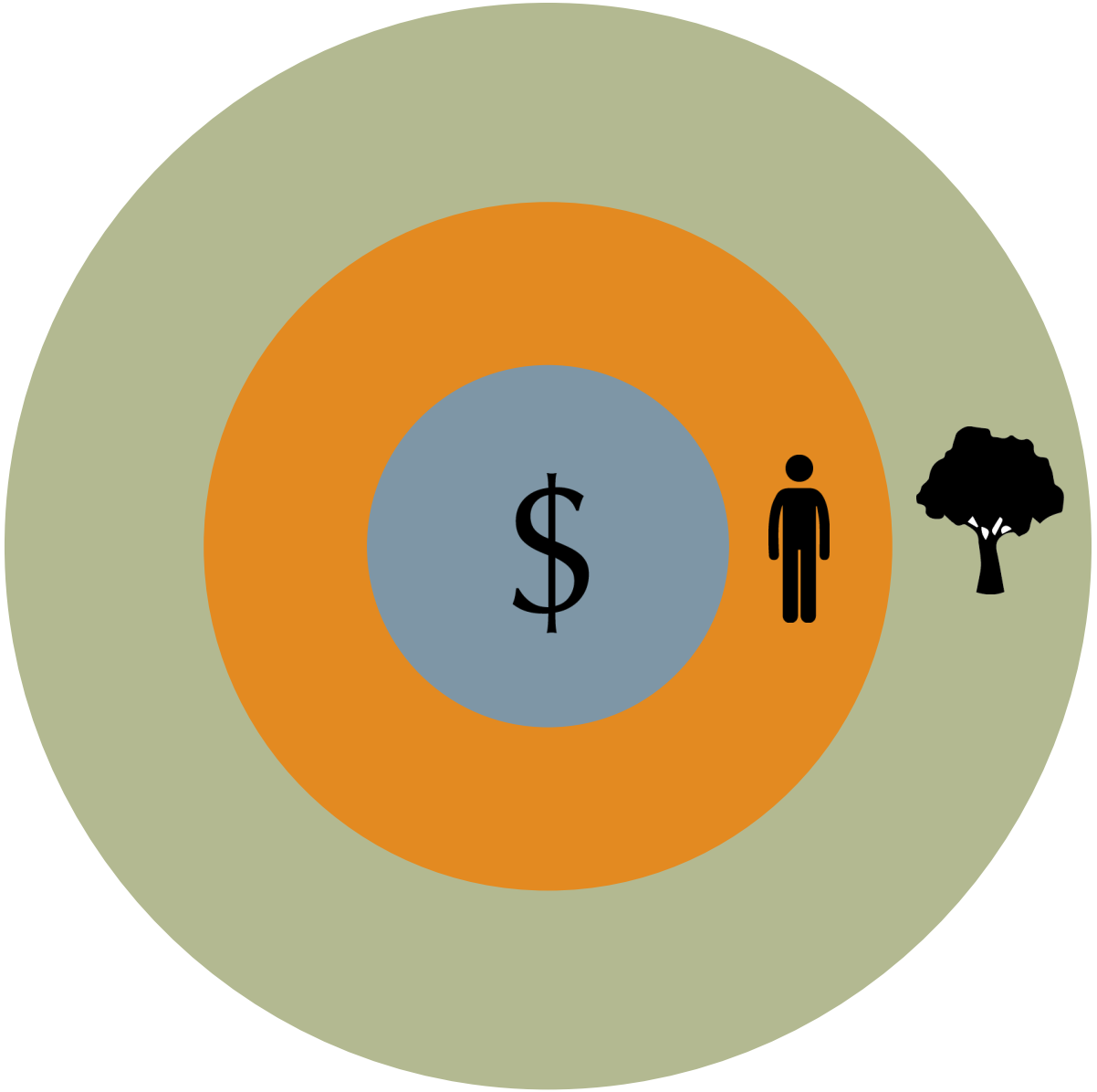
Mänskligheten är en del av biosfären och formar den, från lokal till global skala, historiskt och i framtiden.

På samma gång är mänskligheten fullständigt beroende av biosfärens förmåga att upprätthålla mänsklig välfärd och utveckling.

Hållbar utveckling?

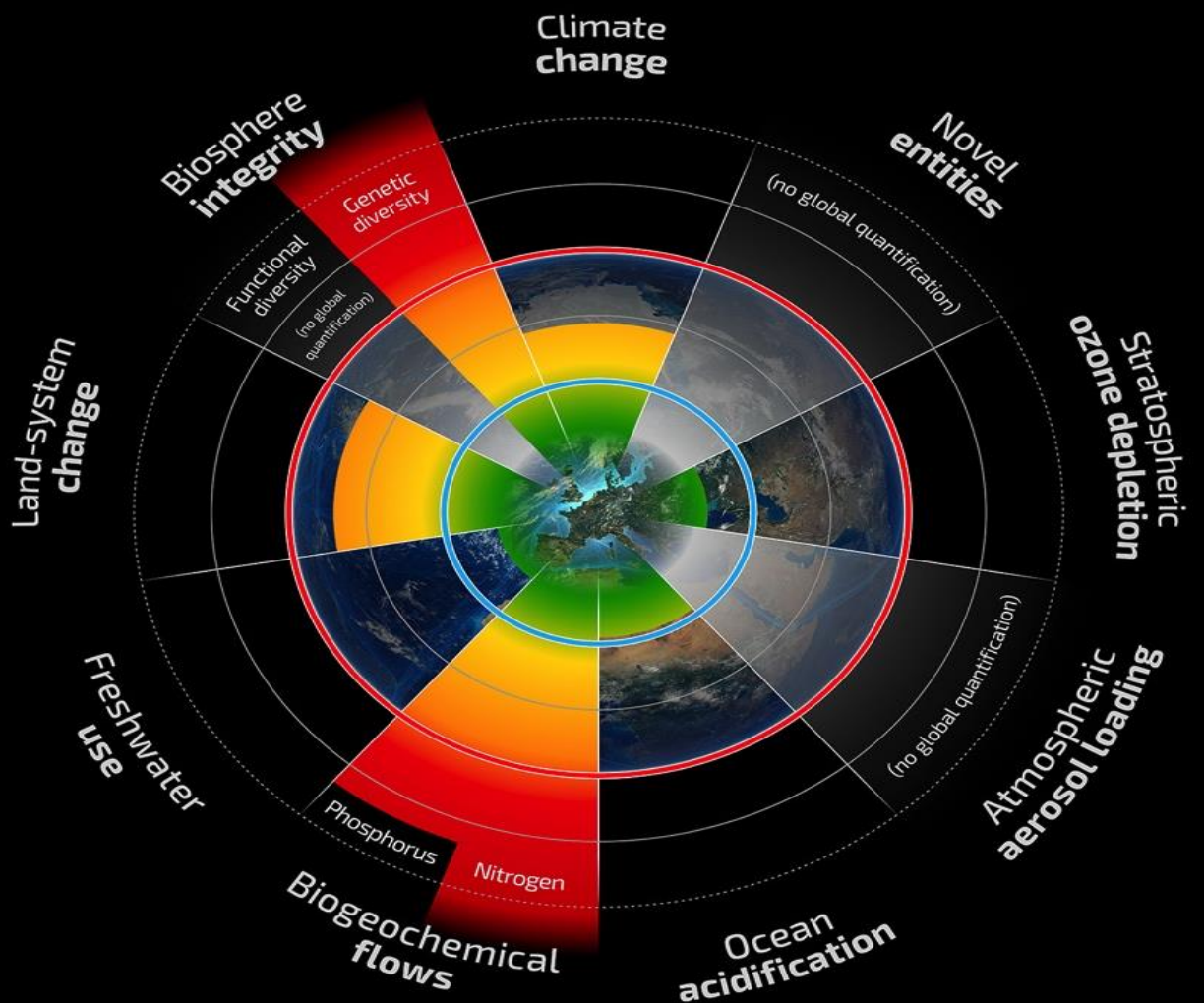







ECONOMY
SOCIETY
BIOSPHERE

Planetens gränser

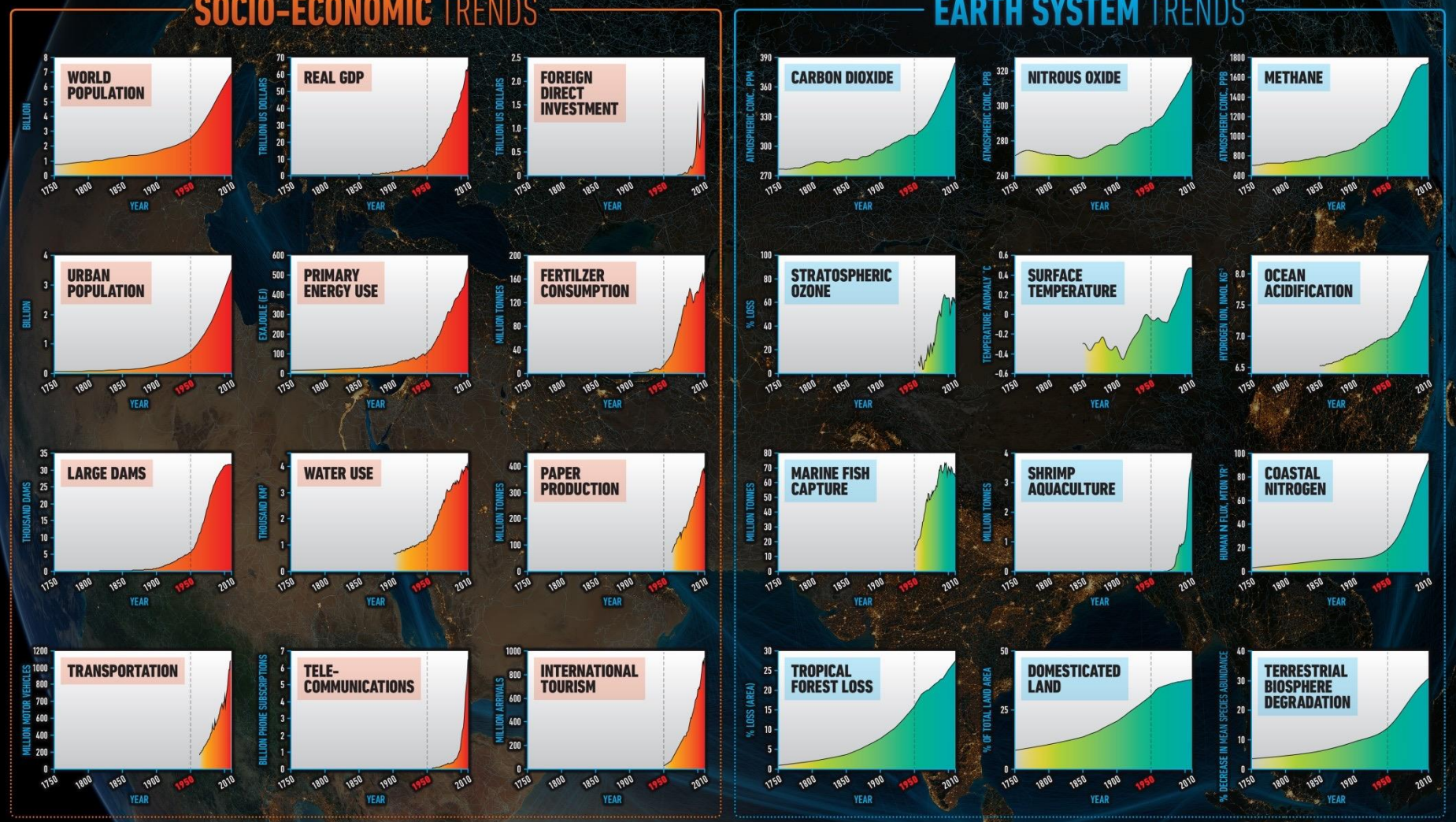


Säkerhetszonen
(Safe Operating Space)
Inom vilket vi har fritt spelutrymme

Osäkerhetszonen
Ökande risker för tröskeleffekter

Planetens gränser
Stora risker att destabilisera biosfären

THE GREAT ACCELERATION



REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig (2015), The Trajectory of the Anthropocene: the Great Acceleration, Submitted to *The Anthropocene Review*.

MAP & DESIGN: Félix Pharand-Deschênes / Globaïa

“Planetary Boundaries”

Ett nytt sätt att mäta vår påverkan på planeten.

Källa: J. Rockström med flera. 2009. *Nature*.

nature Vol 461|24 September 2009

FEATURE

A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.

ROAD TO COPENHAGEN

SUMMARY

- New approach proposed for defining preconditions for human development
- Crossing certain biophysical thresholds could have disastrous consequences for humanity
- Three of nine interlinked planetary boundaries have already been overstepped

Although Earth has undergone many periods of significant environmental change, the planet's environment has been unusually stable for the past 10,000 years[1–3]. This period of stability — known to geologists as the Holocene — has seen human civilizations arise, develop and thrive. Such stability may now be under threat. Since the Industrial Revolution, a new era has arisen, the Anthropocene[4], in which human actions have become the main driver of global environmental change[5]. This could see human activities push the Earth system outside the stable environmental state of the Holocene, with consequences that are detrimental or even catastrophic for large parts of the world.

During the Holocene, environmental change occurred naturally and Earth's regulatory capacity maintained the conditions that enabled human development. Regular temperatures, freshwater availability and biogeochemical flows all stayed within a relatively narrow range. Now, largely because of a rapidly growing reliance on fossil fuels and industrialized forms of agriculture, human activities have reached a level that could damage the systems that keep Earth in the desirable Holocene state. The result could be irreversible and, in some cases, abrupt environmental change, leading to a state less conducive to human development[6]. Without pressure from humans, the Holocene is expected to continue for at least several thousands of years[7].

Planetary boundaries

To meet the challenge of maintaining the Holocene state, we propose a framework based on 'planetary boundaries'. These boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes. Although Earth's complex systems sometimes respond smoothly to changing pressures, it seems that this will prove to be the exception rather than the rule. Many subsystems of Earth react in a nonlinear, often abrupt, way, and are particularly sensitive around threshold levels of certain key variables. If these thresholds are crossed, then important subsystems, such as a monsoon system, could shift into a new state, often with deleterious or potentially even disastrous consequences for humans[8,9].

Most of these thresholds can be defined by a critical value for one or more control variables, such as carbon dioxide concentration. Not all processes or subsystems on Earth have well-defined thresholds, although human actions that undermine the resilience of such processes or subsystems — for example, land and water degradation — can increase the risk that thresholds will also be crossed in other processes, such as the climate system.

We have tried to identify the Earth-system processes and associated thresholds which, if crossed, could generate unacceptable environmental change. We have found nine such processes for which we believe it is necessary to define planetary boundaries: climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use; change in land use; chemical pollution; and atmospheric aerosol loading (see Fig. 1 and Table).

In general, planetary boundaries are values for control variables that are either at a 'safe' distance from thresholds — for processes with evidence of threshold behaviour — or at dangerous levels — for processes without

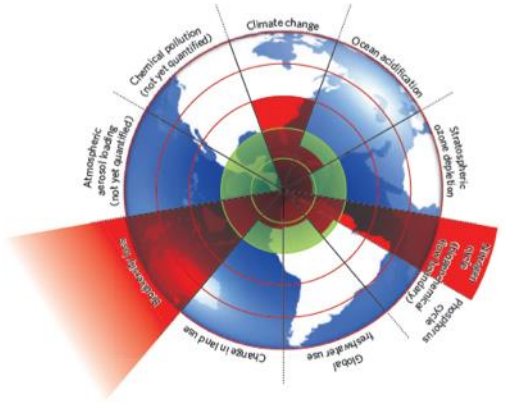


Figure 1 | Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

Vi befinner oss nu i Holocen: 10 000 år av stabilitet för mänskligheten

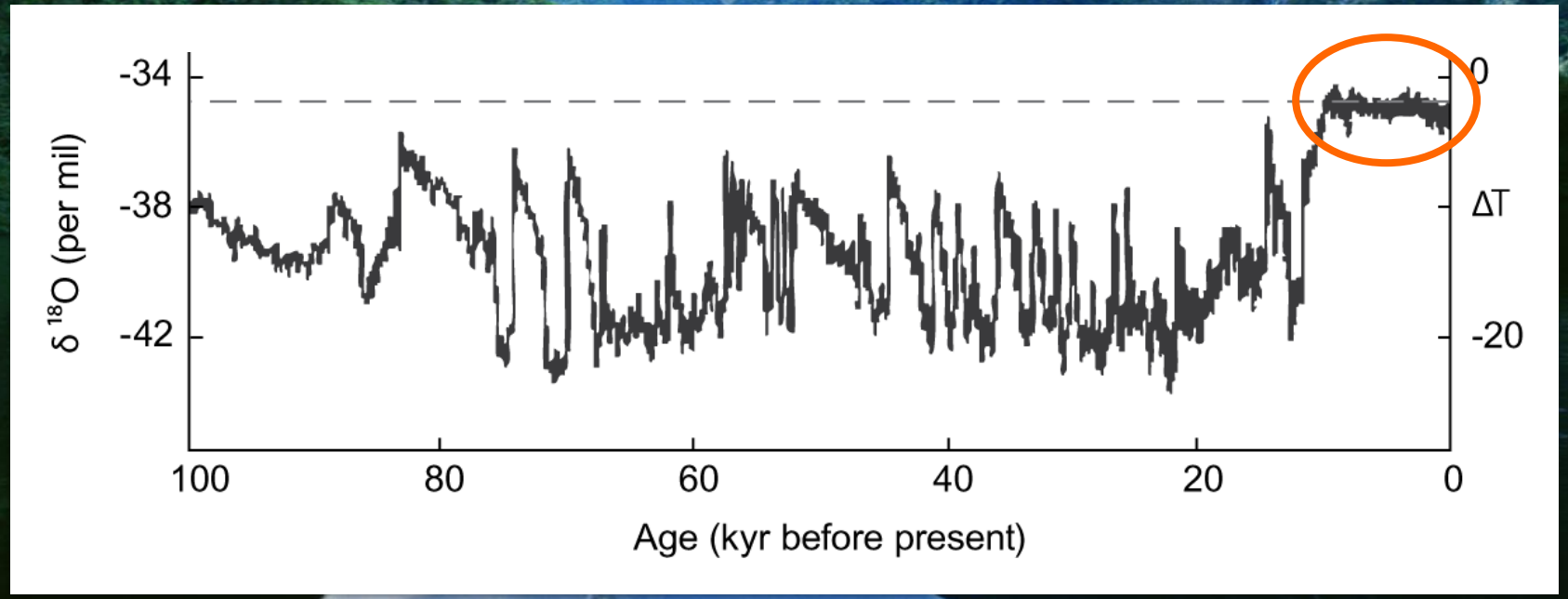
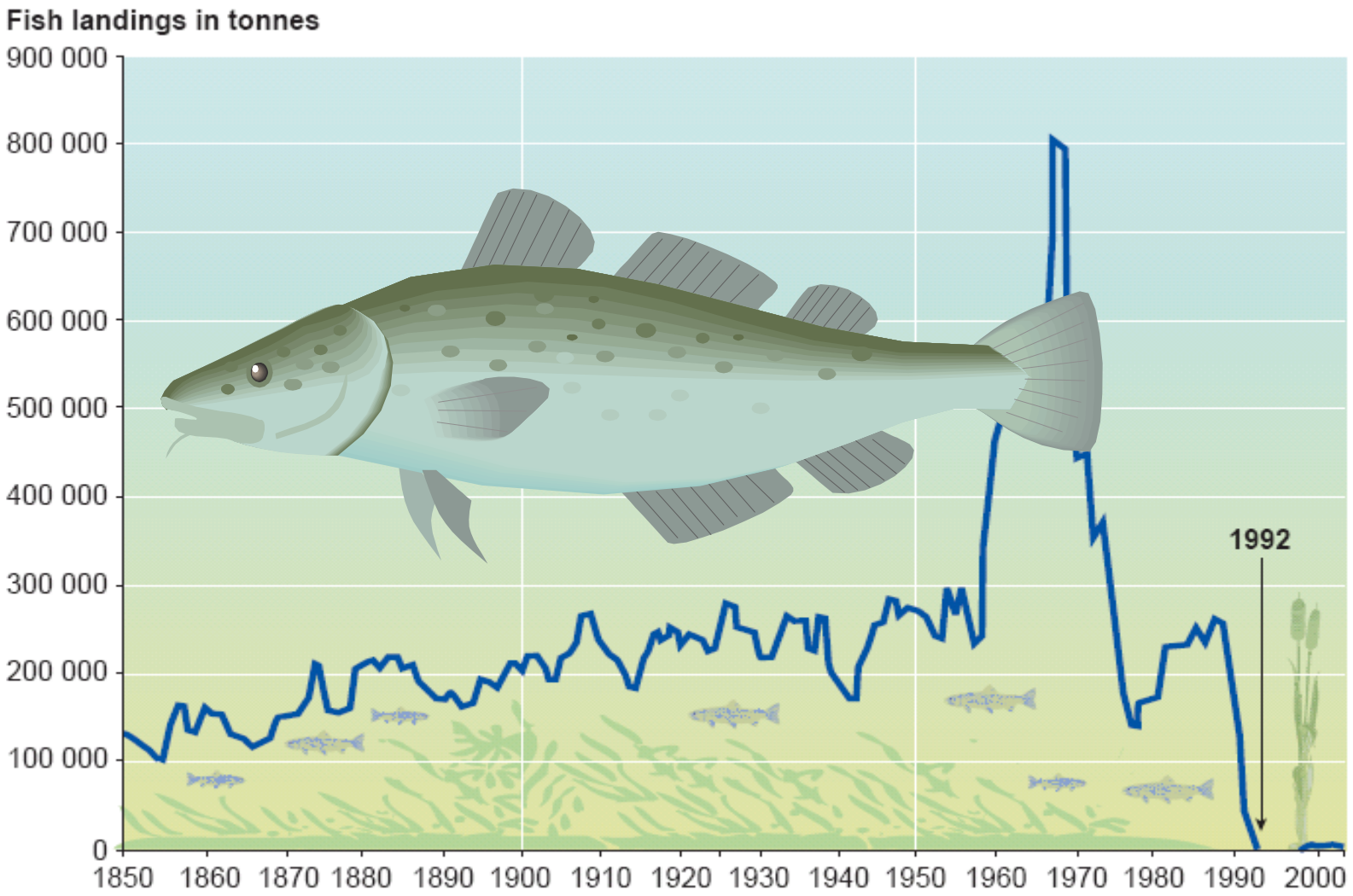
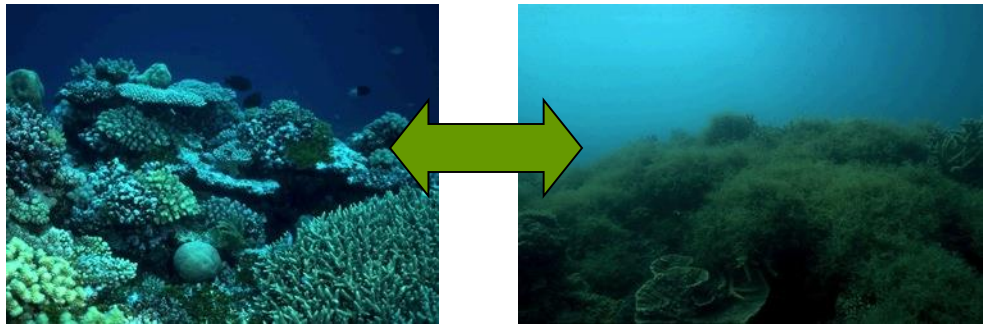


Photo: Michael A. Stecker

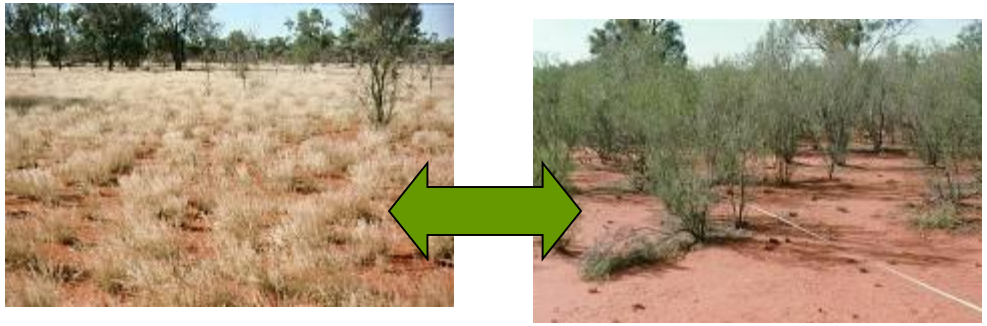
Tröskeleffekter



Ekosystemskiften

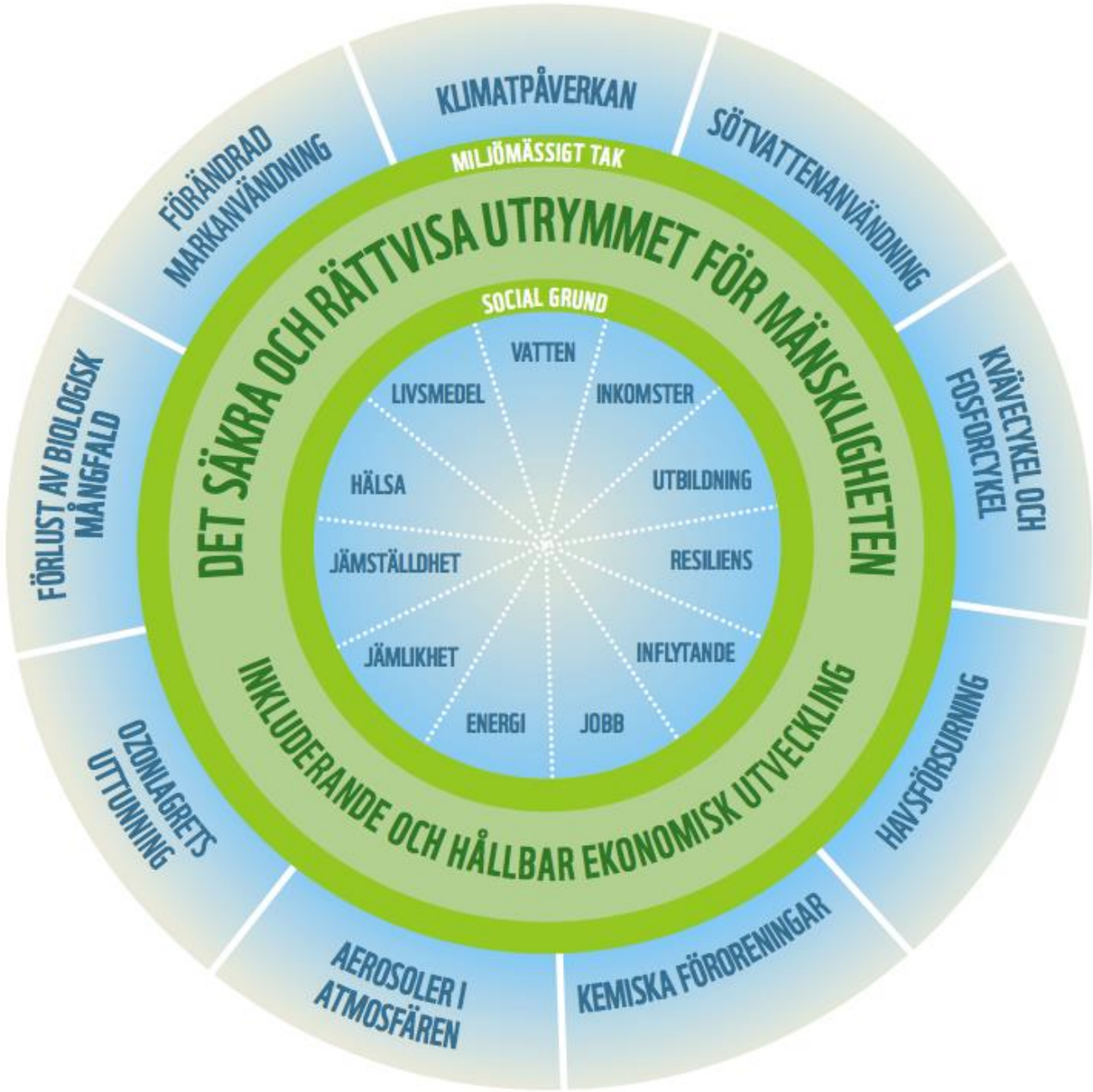


Korallrev

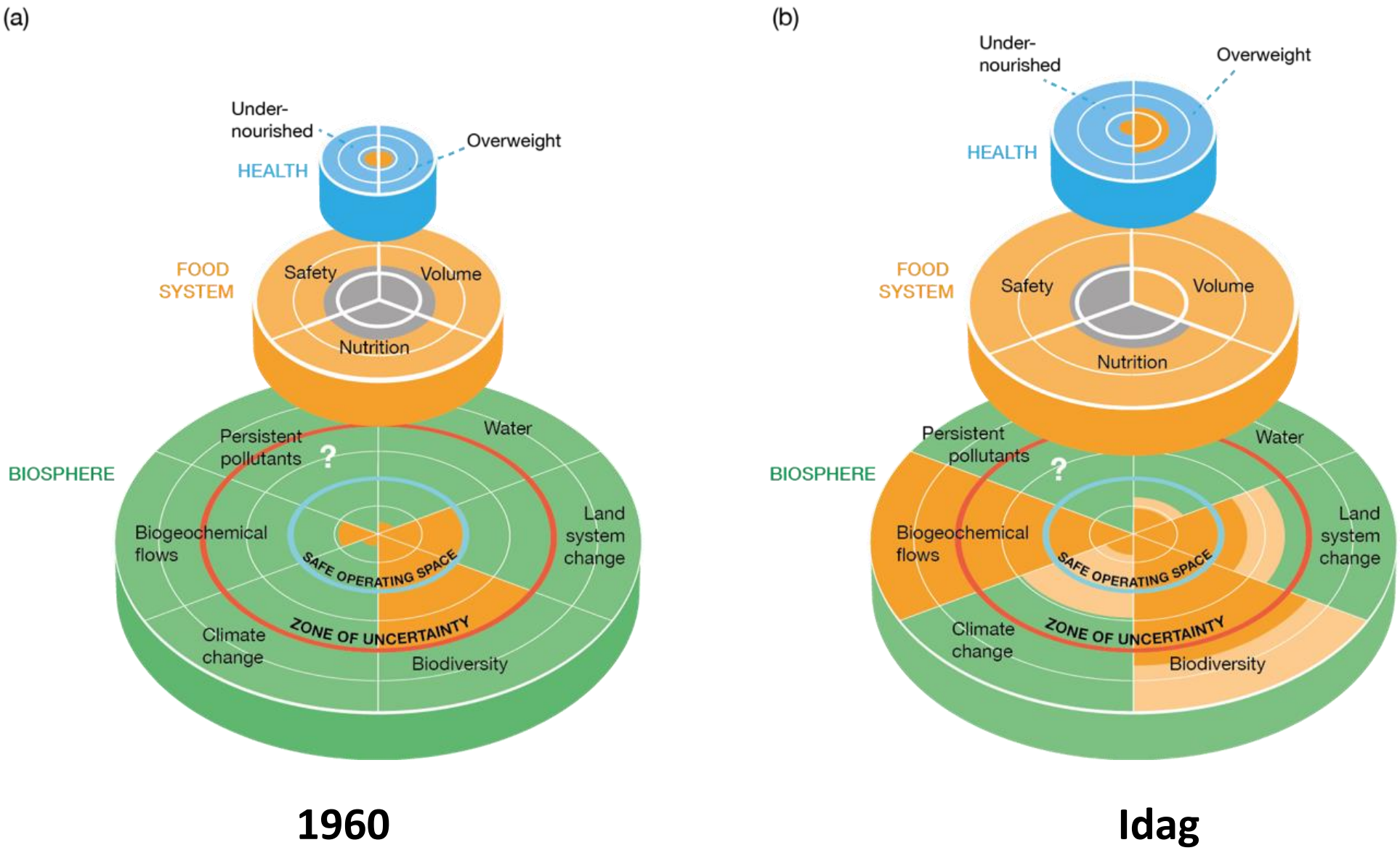


Betesmarker (gräs)

Tropiska skogar


KLIMATPÅVERKAN
SÖTVATTENANVÄNDNING
KVÄVECYKEL OCH FOSFORCYKEL
HAVSFÖRSURNING
KEMISKA FÖRORENINGAR
AEROSOLER I ATMOSFÄREN
OZONLAGRETS UTTUNNING
FÖRLUST AV BIOLOGISK MÅNGFALD
FÖRÄNDRAD MARKANVÄNDNING
MILJÖMÄSSIGT TAK
DET SÄKRA OCH RÄTTVISA UTRYMMET FÖR MÄNSKLIGHETEN
SOCIAL GRUND
INKLUDERANDE OCH HÅLLBAR EKONOMISK UTVECKLING
VATTEN
INKOMSTER
UTBILDNING
RESILIENS
INFLYTANDE
JOBB
ENERGI
JÄMLIKHET
JÄMSTÄLLDHET
HÄLSA
LIVSMEDEL

1960 jämfört med idag



1960 **Idag**

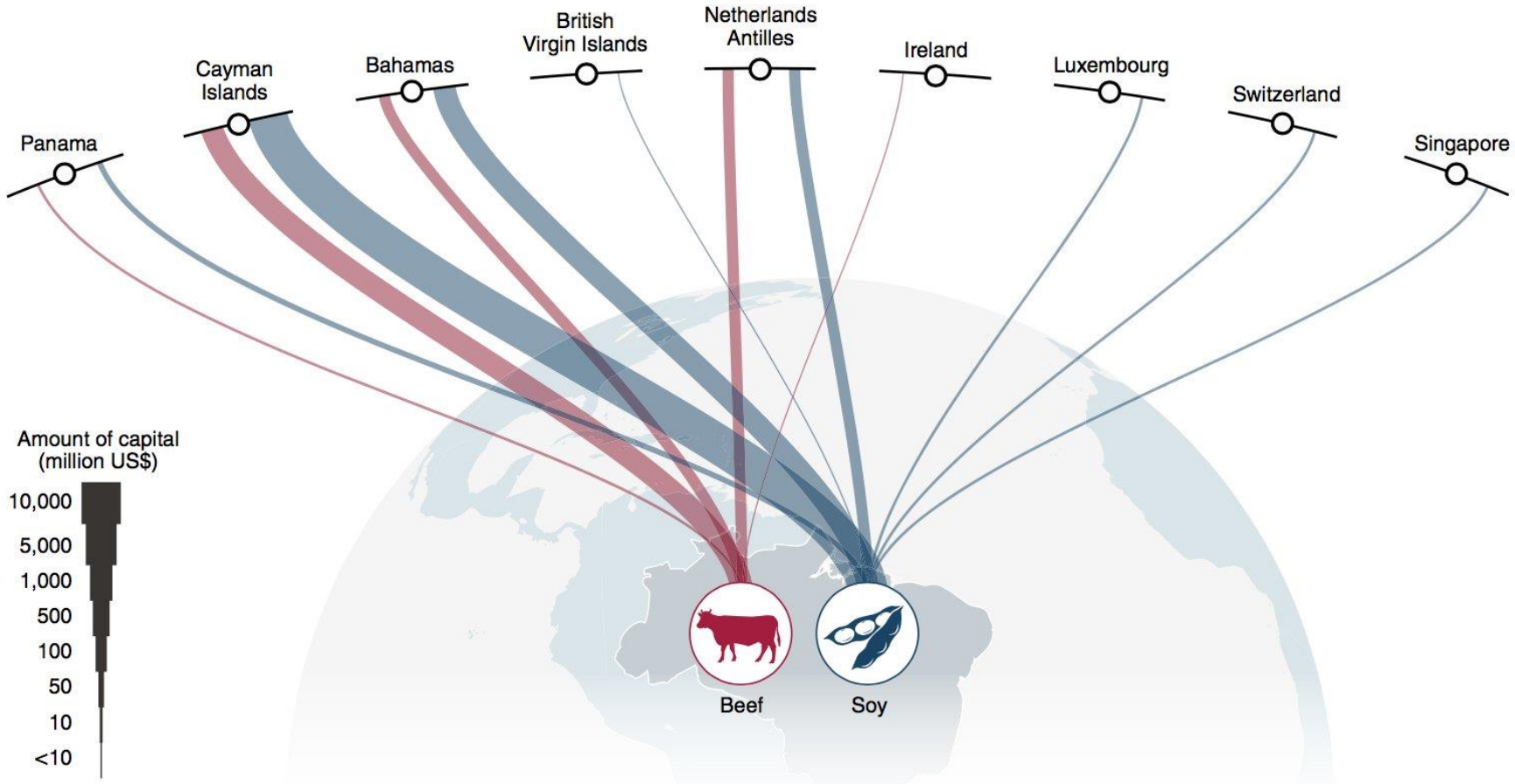


Fig. 2 | Foreign capital and tax havens in the Amazon. Foreign capital (that is, loans, cash in advance, financed import and leasing/rental) transferred from tax havens between October 2000 and August 2011 to key economic sectors associated with land-use change in the Brazilian Amazon.

Crossing planetary boundaries for antibiotic and pesticide resistance

How we got here...

In a study published in the journal Ambio, researchers take a closer look at the Smart Growth concept and whether it delivers what it promises. They found that conclusive proof of its ability to deliver environmental benefits is lacking. Photo: N. Ryrholm/Azote

URBAN DESIGN

Not so smart after all…?

Popular concept for building sustainable cities stands on fragile scientific grounds

Story highlights

- **Conclusive proof of Smart Growth's ability to deliver environmental benefits is lacking**

Perhaps it was too good to be true. The Smart Growth concept has been hailed as a way to turn our increasingly urbanized planet into a compact, walkable and bicycle friendly one, where urban sprawl is halted because old land is used for new constructions. It certainly sounds smart and the concept is frequently endorsed by national and local policy makers. However, conclusive proof of its ability to deliver environmental benefits is lacking.

Related info

Gren, Å., Colding, J., Berghauser-Pont, M., Marcus, L. 2018. How smart is smart growth? Examining the environmental validation behind city compaction. Ambio DOI 10.1007/s13280-018-1087-y

Resiliens principer

- Princip ett: Bevara mångfald
- Princip två: Hantera konnektivitet
- Princip tre: Glöm inte långsamma variabler och ”feedbacks”
- Princip fyra: Omfamna komplexitet och system tänkande
- Princip fem: Uppmuntra lärande
- Princip sex: Bredda deltagandet
- Princip sju: Polycentrisk styrning

Biggs et al. 2012 *Ann. Rev. Env. Res.* 37: 421-448