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International Council for Science

ISSC

FORUM ON
SCIENCE, TECHNOLOGY & INNOVATION
FOR SUSTAINABLE DEVELOPMENT
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RIO+20
United Nations Conference on Sustainable Development

Global Environmental Change and Transition to Sustainability

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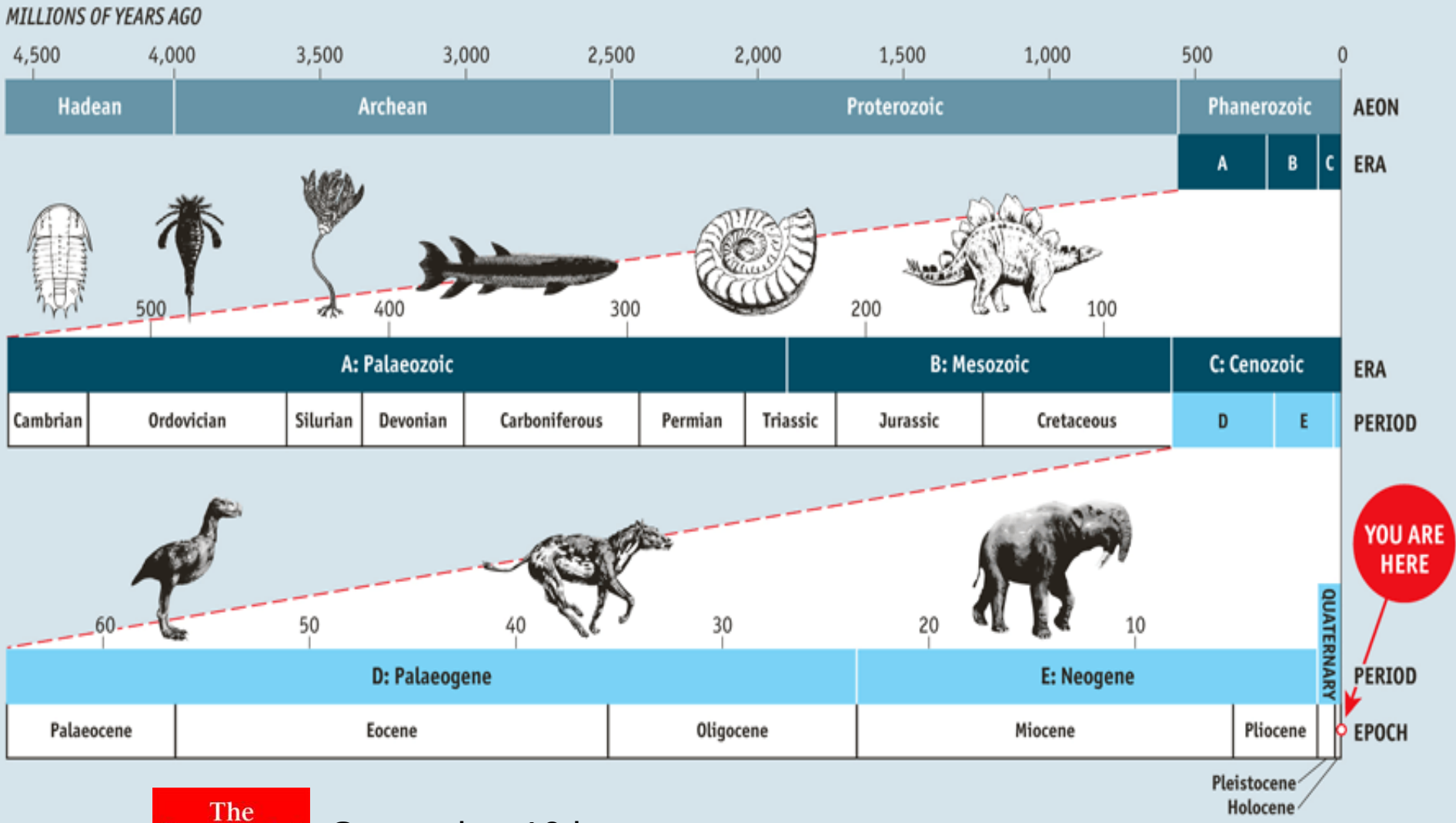
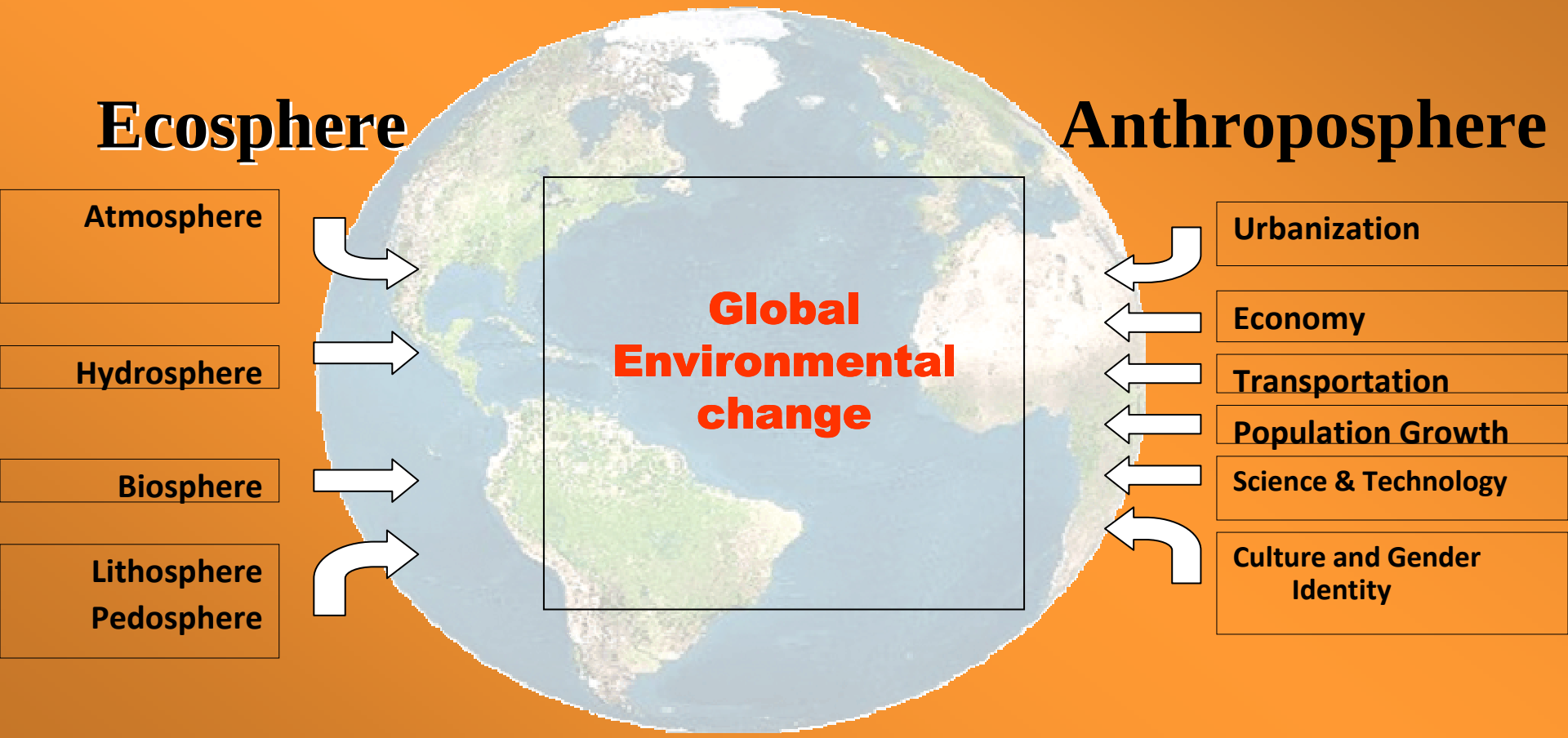
From Holocene to Anthropocene

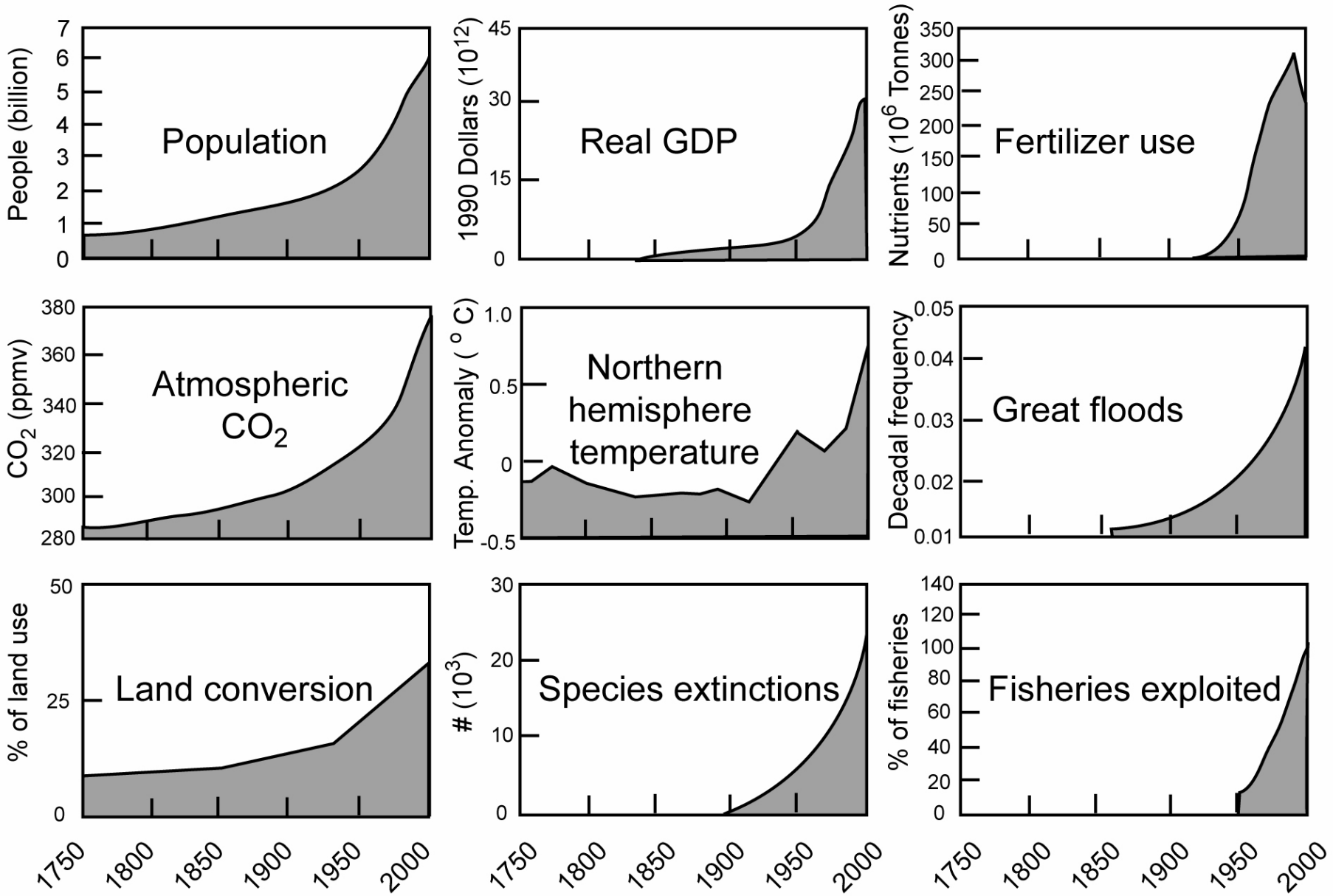


The Economist September 10th

Global Environmental Change (GEC)

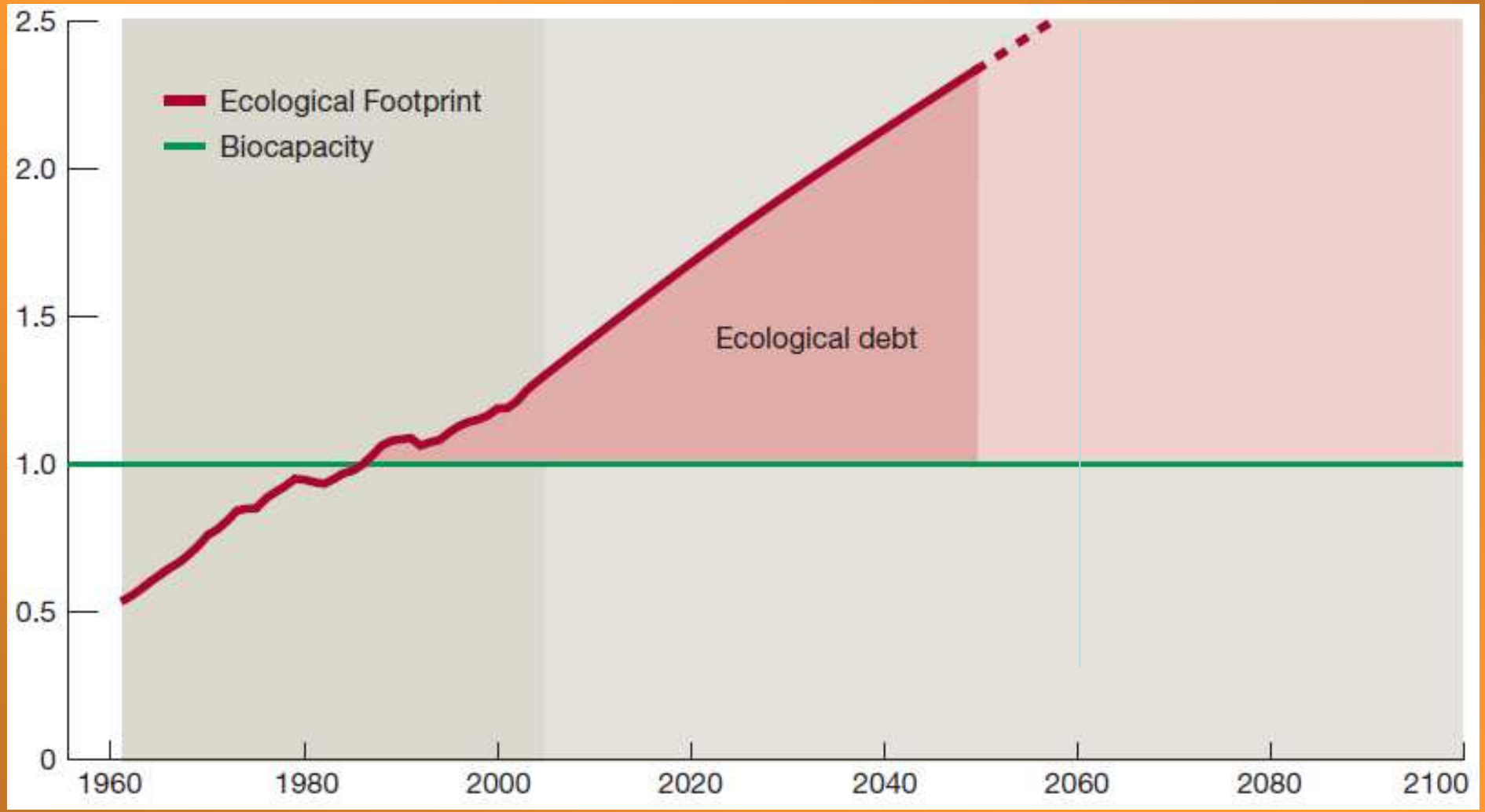


2. Effects of GEC on nature and humans



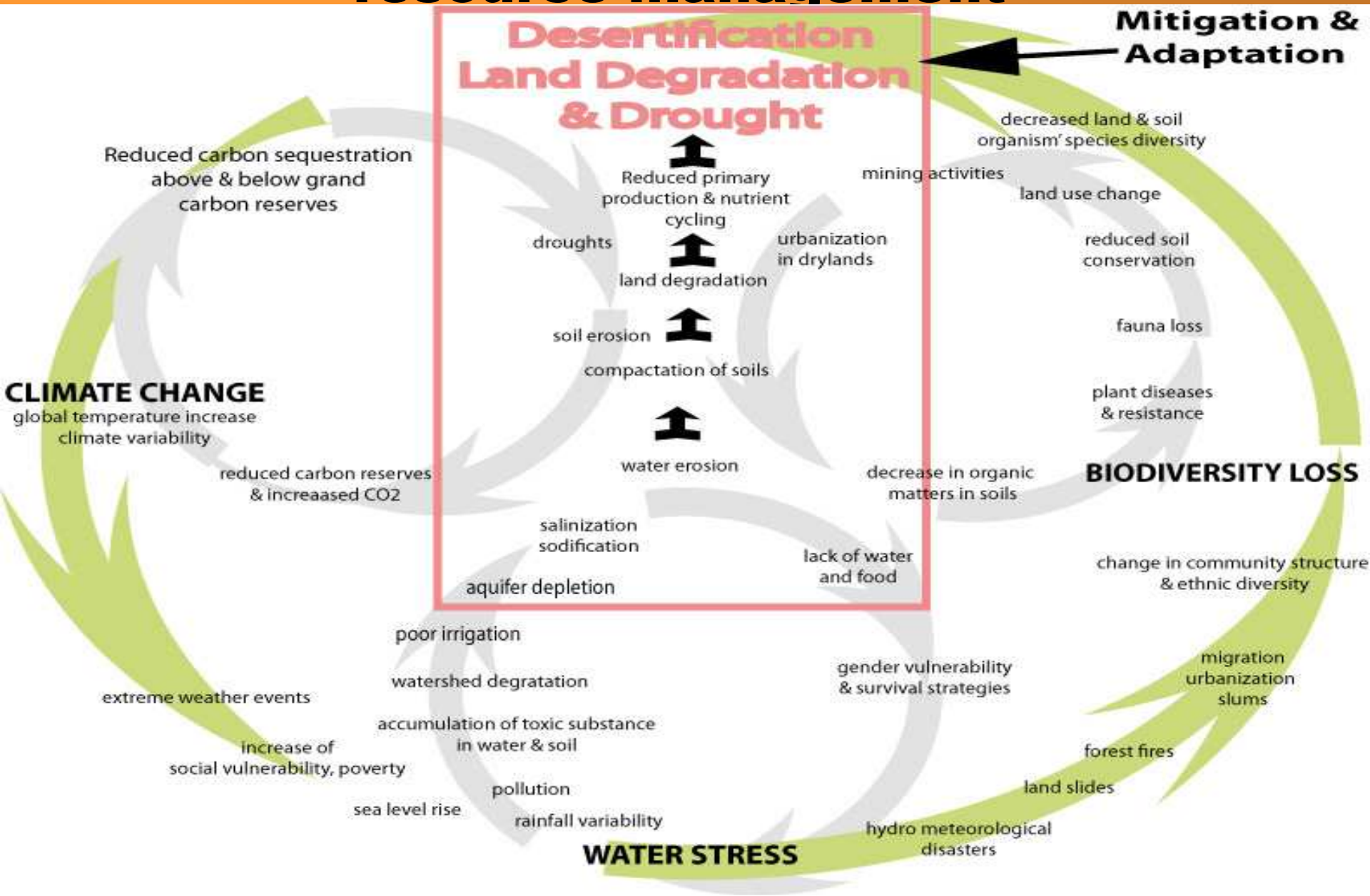
Source: MA (2005)

Ecological Footprint: with present consumerism in 2060 we require 2.5 planets



http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/

Complex interactions: integrated water resource management

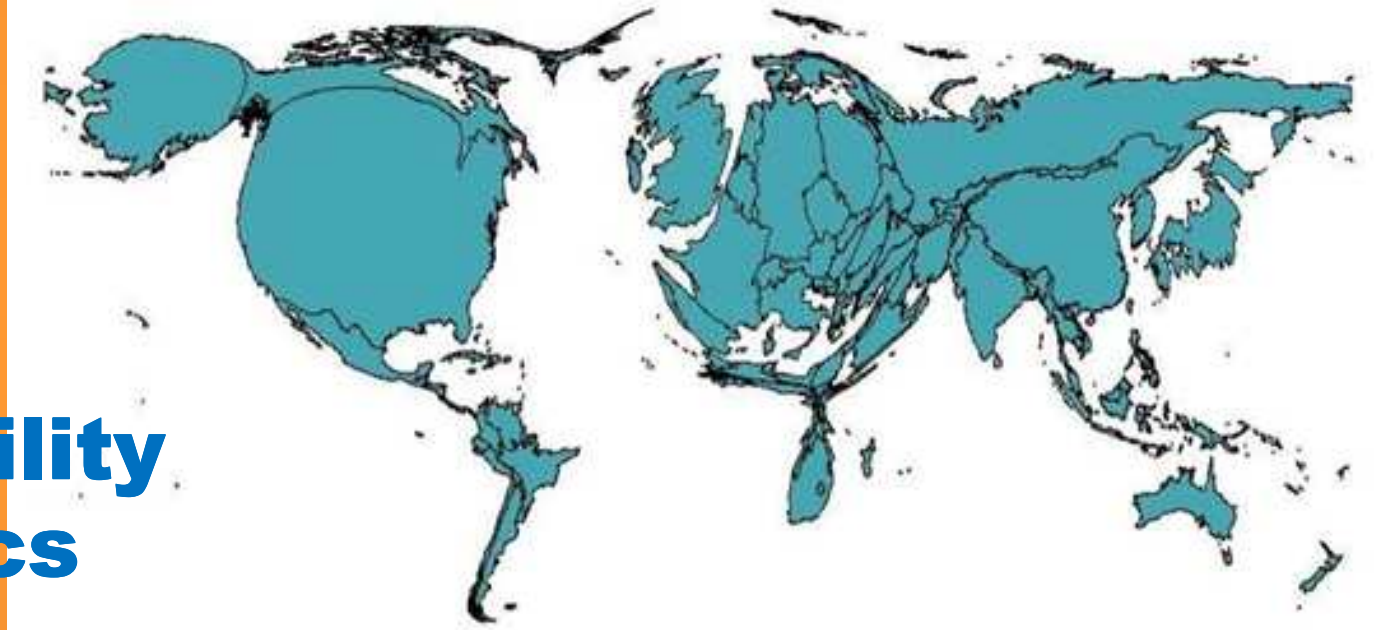


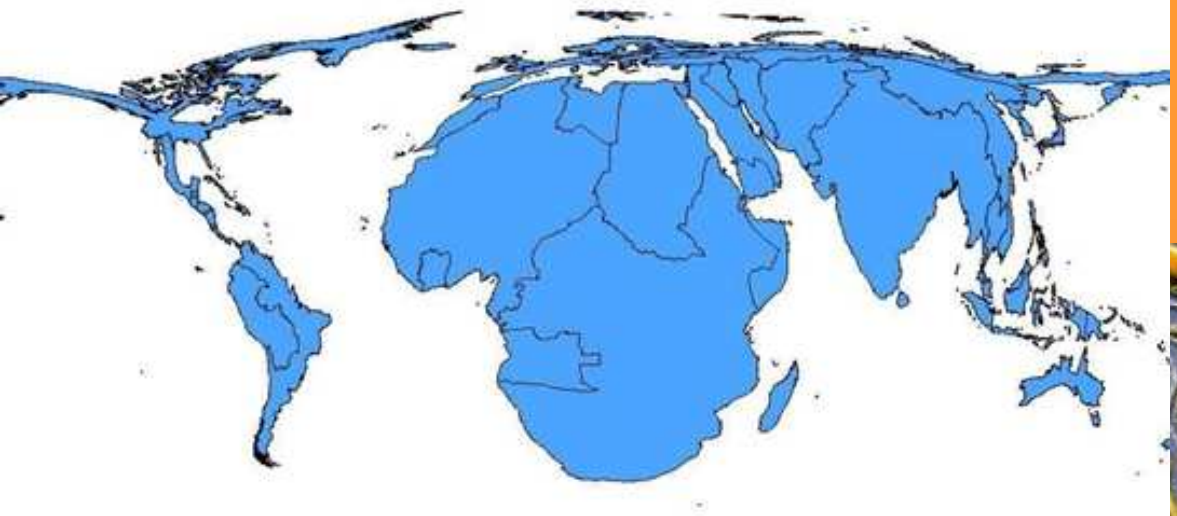
GEC paradox & implications on sustainability

1. Global environmental change and climate change are **increasing** biodiversity **loss, risks and hazards**, creating dangerous feedbacks and potential tipping points.
2. Hydrometeorological extreme events are getting stronger, affecting humans, infrastructure and ecosystems, and in some regions more frequent.
3. On the one hand we have **declaratory goals by the G-8** to reduce the impacts of GEC, especially greenhouse gases by 50% to 80% by 2050; on the other hand real emissions are rising at the highest level of established scenarios by IPCC and the implementation of the commitments of UNFCCC (1992) and the Kyoto protocol (1997) are uncertain.
4. Recent **financial and economic crises are delaying further a legally binding regime** and the dominant business-as-usual approach will not re-establish the equilibrium between nature and human beings.

Global responsability and ethics

Cumulative Greenhouse Gas Emissions, 2002



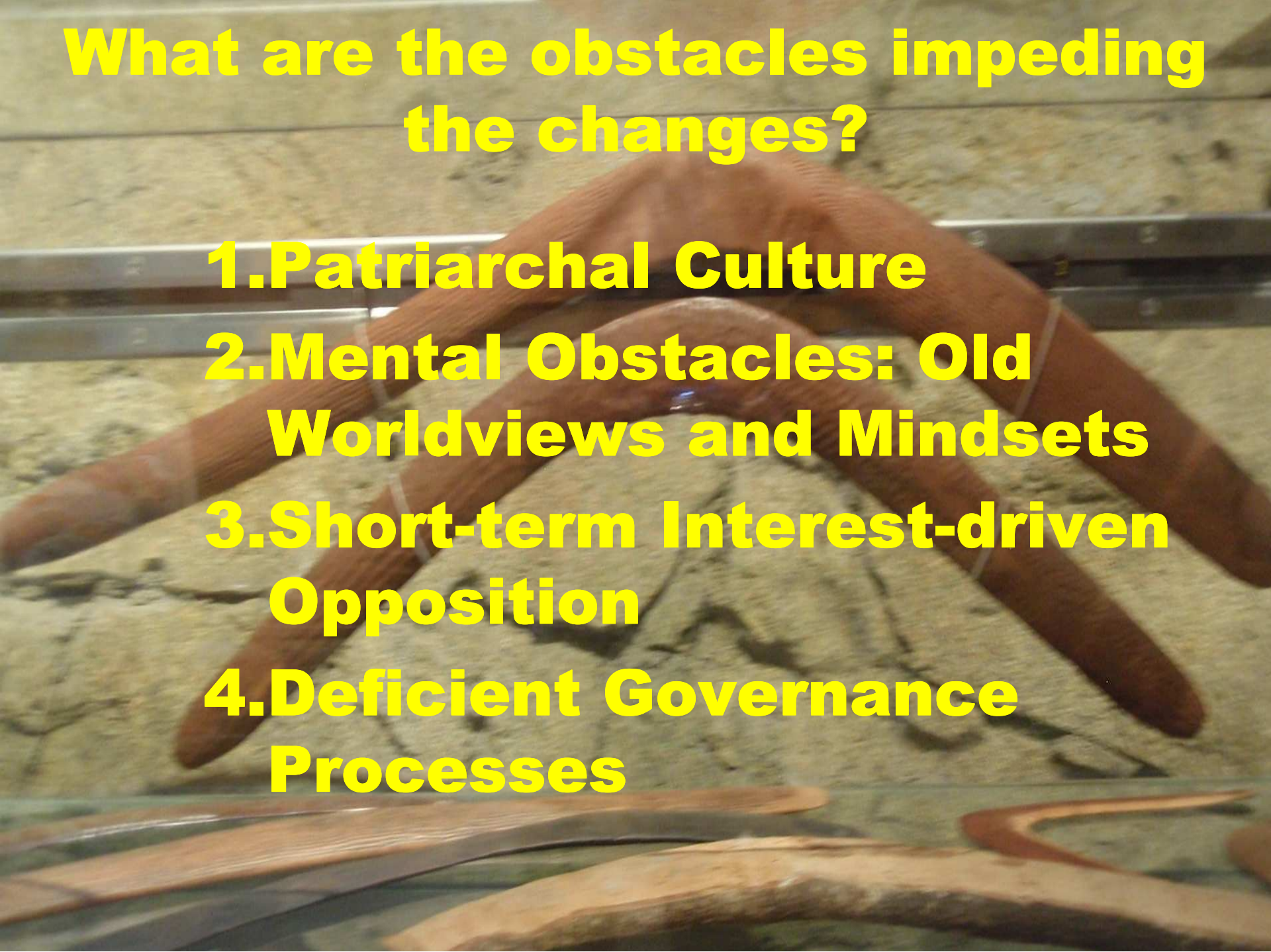


Mortality rate attributable to climate change, 2000

Patz et al., 2007

Potential Tipping points

- Now scientific attention has shifted to **chaotic processes such as a nonlinear and abrupt climate change** with complex societal outcomes such as


What are the obstacles impeding the changes?
1.Patriarchal Culture
2.Mental Obstacles: Old Worldviews and Mindsets
3.Short-term Interest-driven Opposition
4.Deficient Governance Processes


Alternative vision: what can social sciences bring to avoid dangerous tipping points?

Worldview

Worldview

***Worldview* refers to a world perception, ideas and beliefs through which people interpret and interacts with the world.**

1. an *ontology* (descriptive world model)
2. an *explanation* (how is it functioning)
3. a *futurology* (how should it be)
4. v*alues* (how will it be achieved)
5. a *praxeology* or a theory of action on how we should attain our goals (what should we do)
6. an *epistemology*, or a theory of knowledge on what is true and false (what are the underlying processes)
7. an *etiology* or a constructed worldview with an account of its own building blocks, origins and construction (Aerts, Apostel, De Moor, Hellemans, Maex, Van Belle and Van der Veken, 1994).
8. cognitive orientation of a society, its values, emotions, and ethics (Palmer, 1996: 114)

Mindset

- Includes **fixed mental attitudes**.
- **‘Cultural lenses’** that filter view of and reaction to the world (Fisher, 1997).
- **Solution:** over-coming **deeply ingrained constraints** cannot be solved by convenient technical fixes, it requires **deep and radical changes** in **own and societal aspirations** and consumption patterns.

Governance

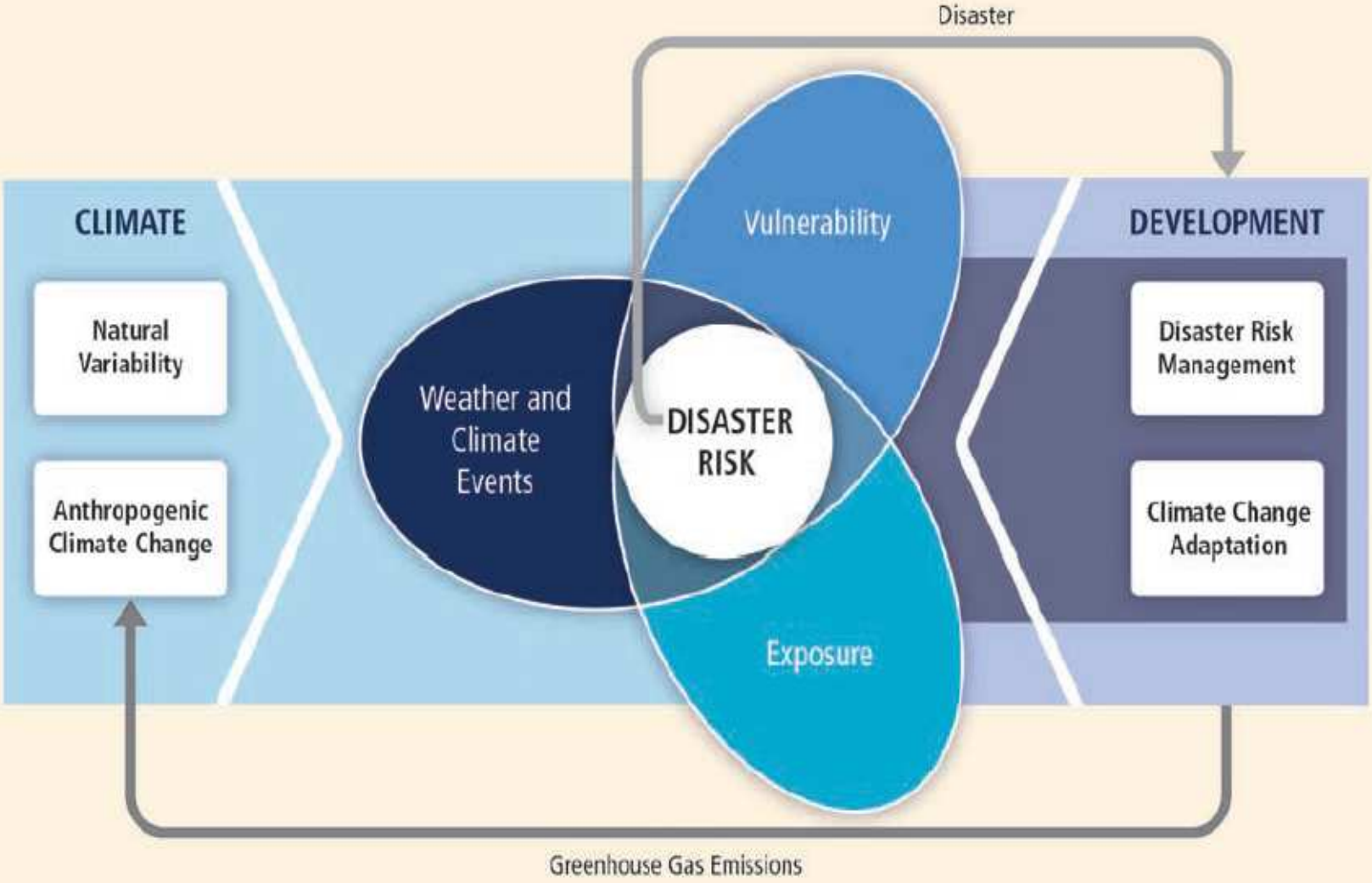
"**complex of formal** and **informal institutions**, mechanisms, relationships, and processes between and among **states, markets, citizens and organizations**, both inter- and non-governmental, through which **collective interests on the global plane are articulated**, rights and obligations are established, and **differences are mediated**".

(Weiss and Thakur, 2010)

Culture: a new cosmovision

- is a **globally organized way of life based on values,** norms, beliefs, institutions and productive processes including the development of science and technology
- is **transmitted from generation to generation** by formal and informal processes
- is a **learning process** which includes acculturation and enculturation
- not based on natural laws but socially constructed: interests maintain and reinforce structures of power and mechanisms of control
- is so **deeply internalized** and **legitimized** structures of beliefs and behavior of complex relationship, interdependence between progressive destruction of natural - human systems
- individual/ social actors, institutions, regimes, and worldviews require **fundamental change from cornucopian view to complex and sustainable biological-human system.**

How can social science knowledge lead to preventive behavior at the local, national and global level?



The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

Participative governance

- A radical change to a '**Fourth Sustainability Revolution**' require participative governance: combining processes of policy initiation and adoption (**bottom-up**) and the implementation of the required fundamental transformations (**top down**) with **peaceful negotiation** processes based on diversity and tolerance.
- Moving towards the vision of a sustainable peace with human security requires **overcoming the Hobbesian obsession of a militarization** of the climate change impacts for national security and working globally for **human, gender and environmental security: a HUGE security**.

Challenges

- A **post-carbon society**, where **solidarity, equity, and social justice** are key drivers instead of the maximization of profits and the destruction of the Earth without thinking of the **next generations** or of the collapse of **ecosystems**.

Goals of HUGE security

Goal of a global average increase of temperature of **2 ℃ by 2099** , through:

a) enhanced energy efficiency, a shift towards renewables and a gradual dematerialization and decarbonization of the economy

b) ecosystem recovery and restoration to maintain environmental services

c) integrated **water** basin management, rain harvesting, providing safe water, sewage facilities (including recycling and reuse), enhancing irrigation efficiency and substitution with less water demanding plants

d) combating **soil** erosion, degradation and desertification by integrated waste management, composting of organic **waste**; terracing, restoration of salinized and degraded soils, recovery of soil fertility by crop rotation

e) changes in our 'ways of life' and '**lifestyles**' by changing meat-intensive diets to vegetarian **food** (food culture)

f) reduction of advertisements for a **consumerist waste economy** and of individual demand for non-essential goods and enhancement of intellectual and spiritual aspirations possibly leading to a new modesty

g) political reforms of democratic governance to enhance longer-term orientations over short-termism, proactive over reactive policies.

International obligations for HUGE

International and peace community must take bold action :

1. on **climate change mitigation** to avoid an intensification of security threats to human well-being;
2. provide support to climate change **adaptation in developing countries** through investments in capacity building on water management, food security, agricultural resilience, and public health systems to deal with increased disease incidence and risk;
3. **disaster prevention**, preparedness and response, early warning systems for various climate change impacts
4. redouble its efforts for **sustainable and equitable development** through development assistance, sustainable economic growth, financial and technological support towards a low-carbon path
5. **anticipate and prepare for unprecedented challenges** beyond existing mechanisms
6. support **climate-induced displacement and migration** beyond existing legal protective regimes (‘statelessness’ of citizens of SIDS and impacts on sovereignty, claims over marine resources, and rights and relocation of their citizens);
7. **water scarcity and stress** for millions due to melting of glaciers and snow pack
8. competition over newly accessible **Arctic** natural resources and trade routes

Sustainable development with peace