

Global Change – An Introduction

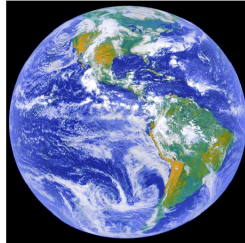
D. Gyalistras

Systems Ecology ETH Zurich &
<http://www.climate-impacts.ch/>

Young Atmospheric Scientists Workshop:
Climate Change And Impacts Upon Tourism

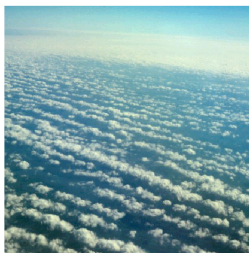
Institut Universitaire Kurt Bösch (IUKB)
Sion, Switzerland: 19 Jul. 2004

Global Change



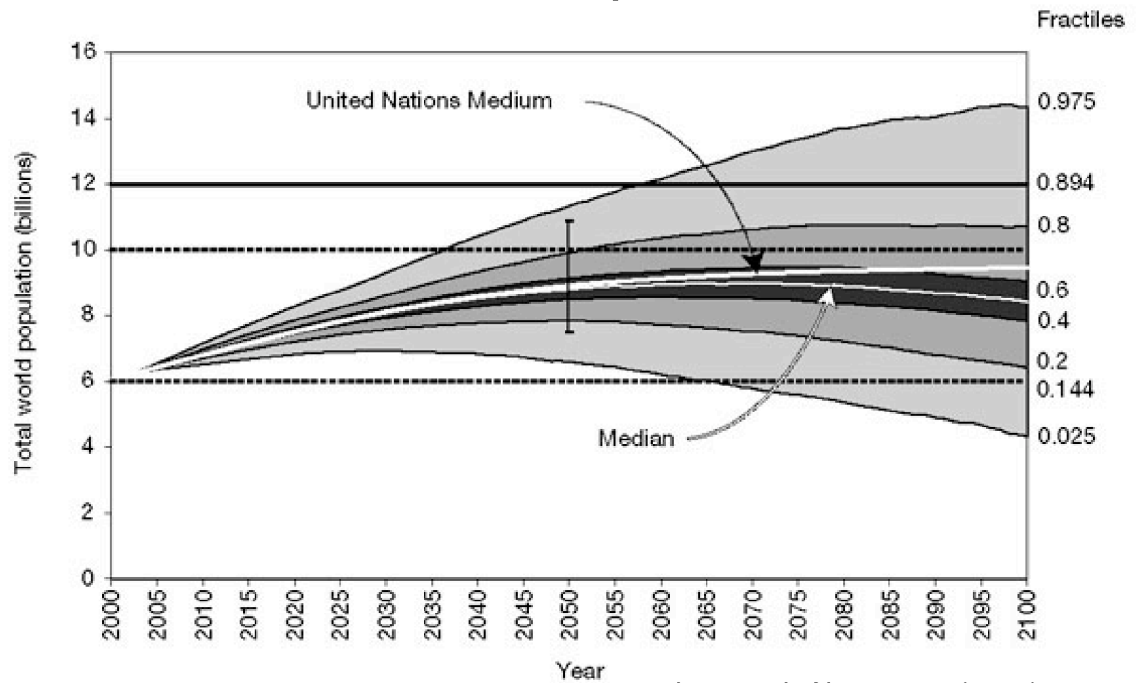
... has many facets. It involves changes in the

- **Environment**
 - Our world's physical, chemical & biological basis
 - The ecosystems supporting life on Earth
- **Economy**
 - The production, distribution, and consumption of goods and services
 - The re-distribution of wealth and debt
- **Society**
 - The ways humans organize and interact
 - The customs, traditions and identities
- **Psyche**
 - The process by which we construct "reality"
 - The emergence of thoughts, values and meaning



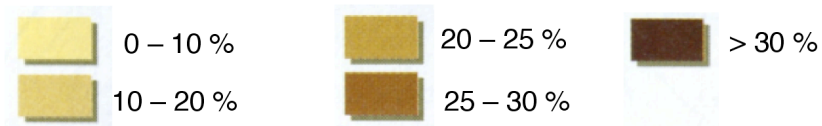
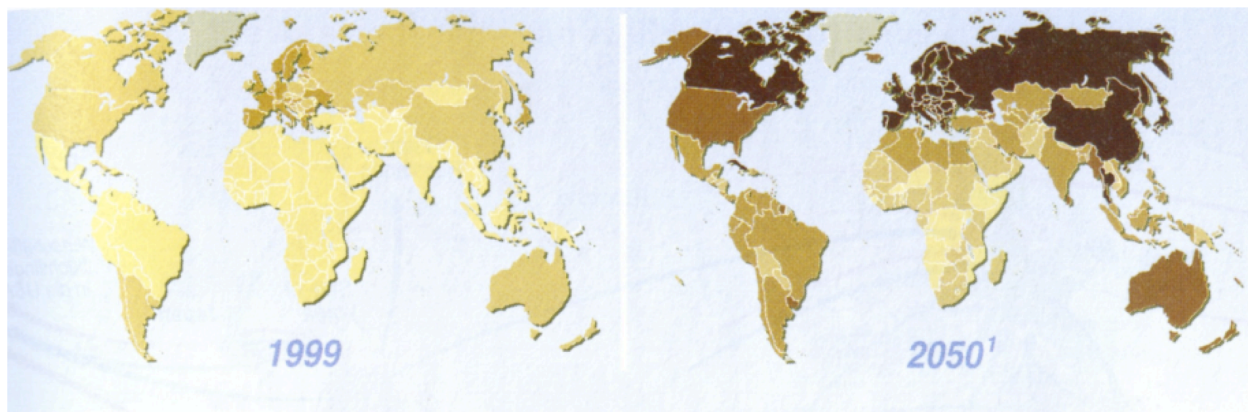
1. Population Change

Total World Population



Lutz et al., Nature 412 (2001)

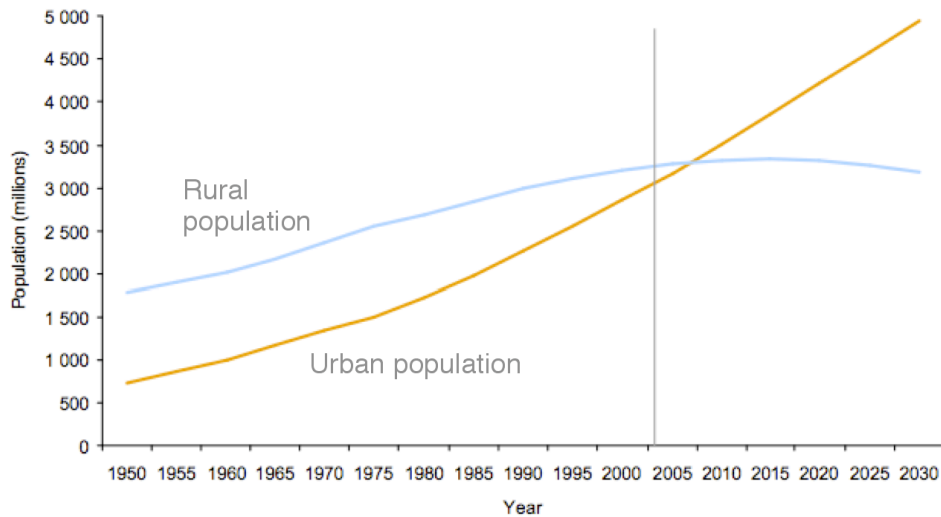
Proportion of People Older than 60 Years



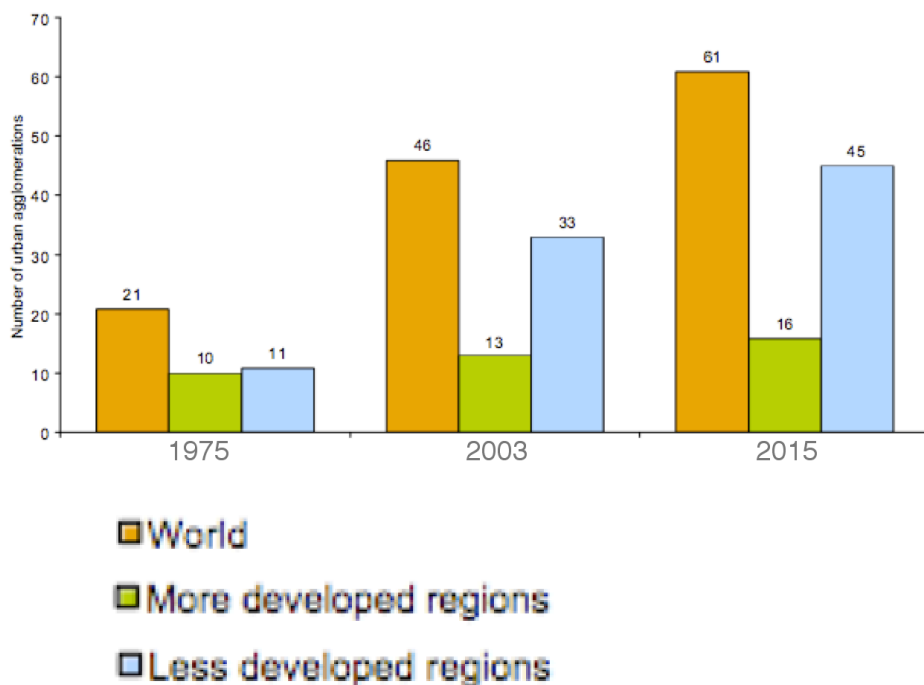
*Le Monde Diplomatique (ed.),
Atlas der Globalisierung (2003)*

2. Urbanization

Urban and Rural populations of the World



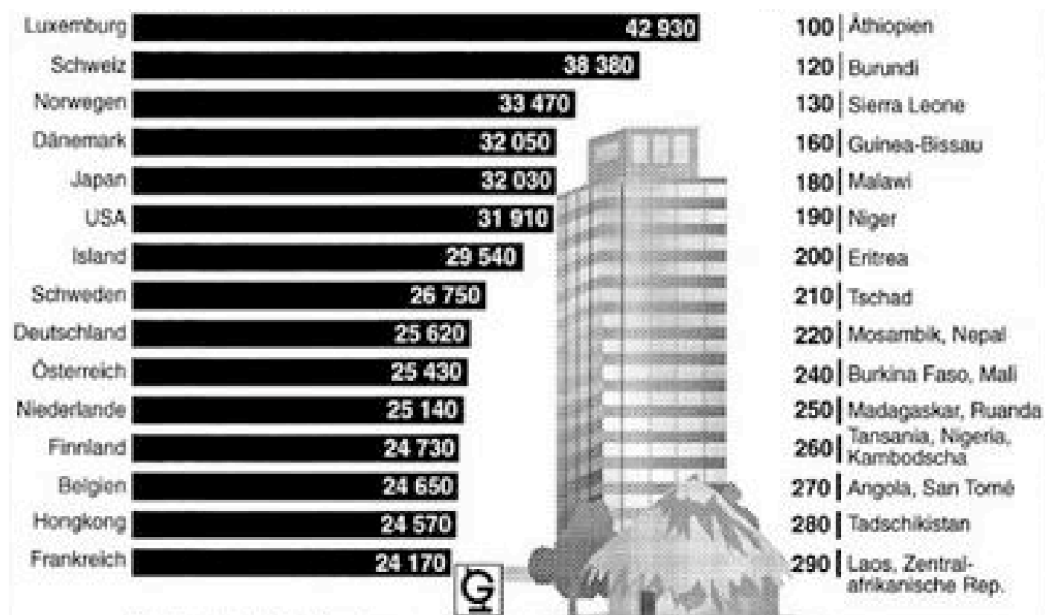
Number of Urban Agglomerations with ≥ 5 Million Inhabitants



UN Population Division,
World Urbanization Prospects
(The 2003 Revision)

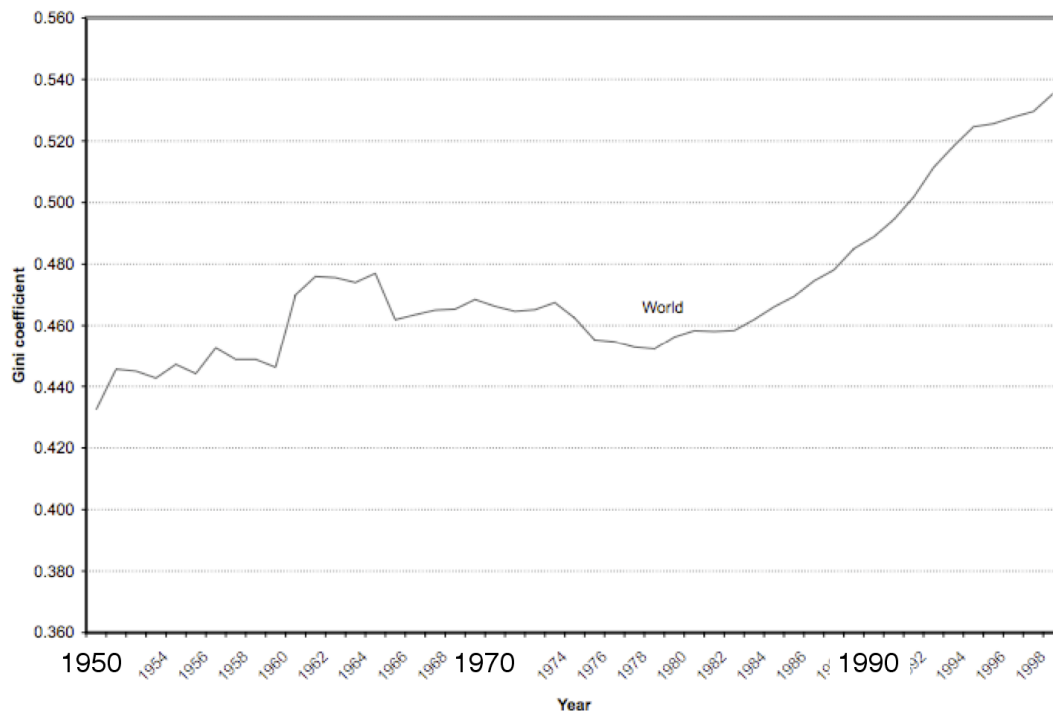
3. Inequality

Gross Domestic Product Per Capita (USD)



Messner, Informationen zur politischen Bildung 274 (2002)

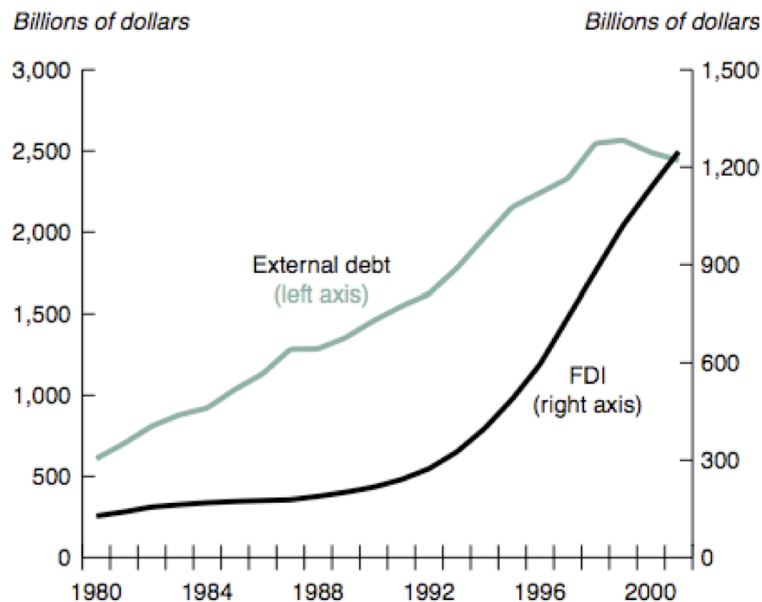
International Inequality in GDP Per Capita



Milanovic, World Development 31 (2003)

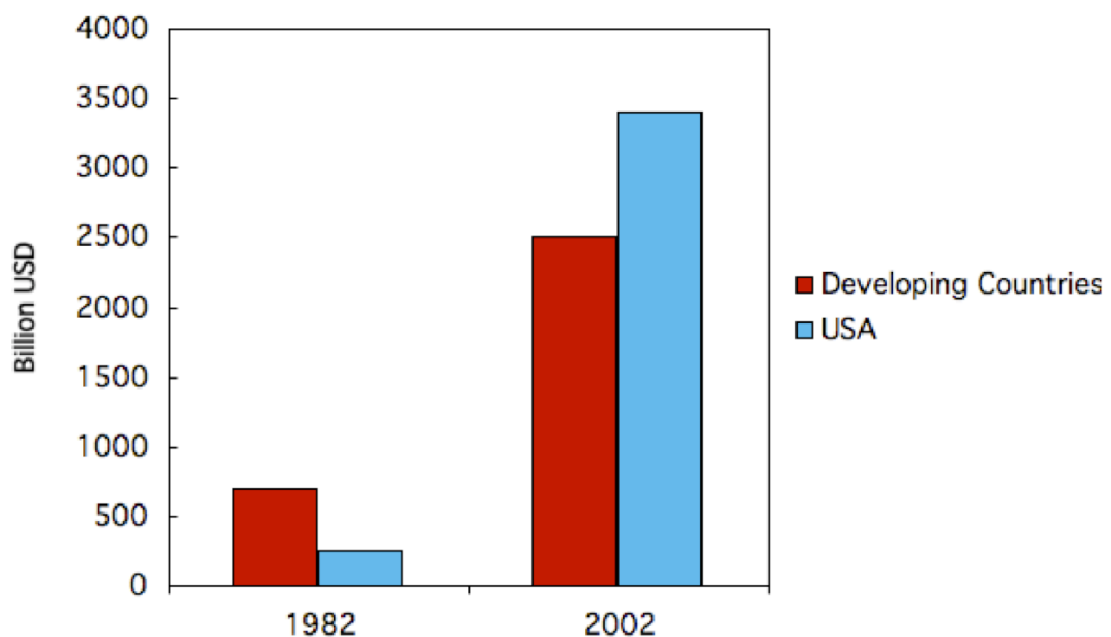
4. Debt

Developing Countries' External Debt and Foreign Direct Investment Stocks



*World Bank, Global Development Finance
(Analysis and Statistical Appendix 2003)*

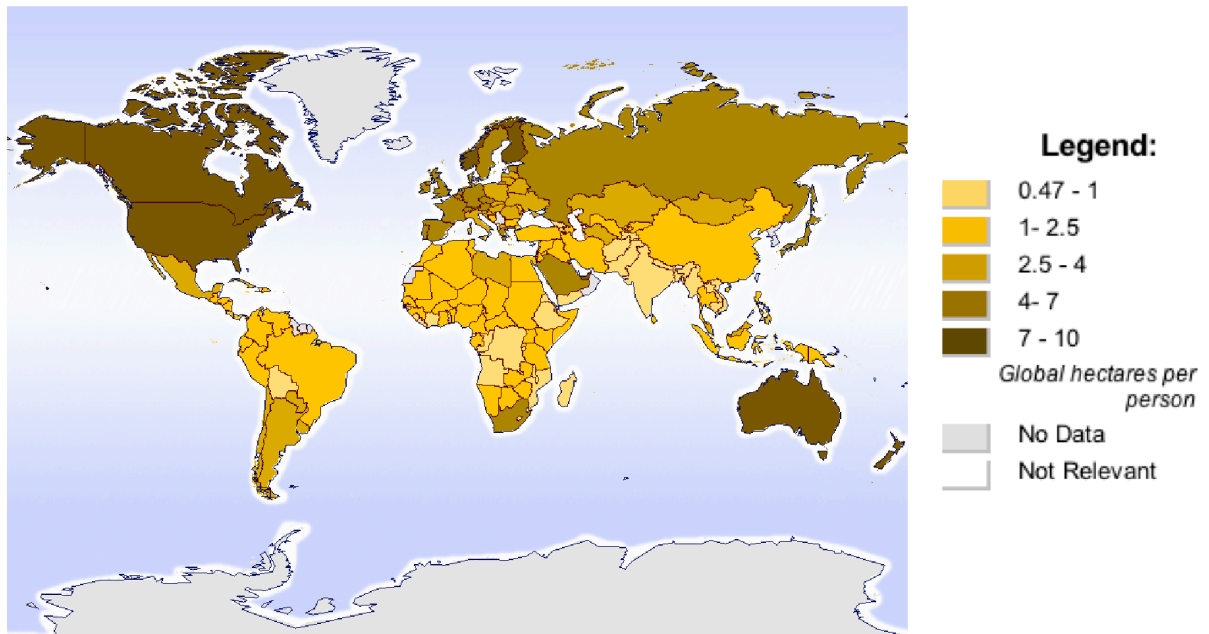
Comparison of Foreign Debts



*After: Le Monde Diplomatique (ed.),
Atlas der Globalisierung (2003)*

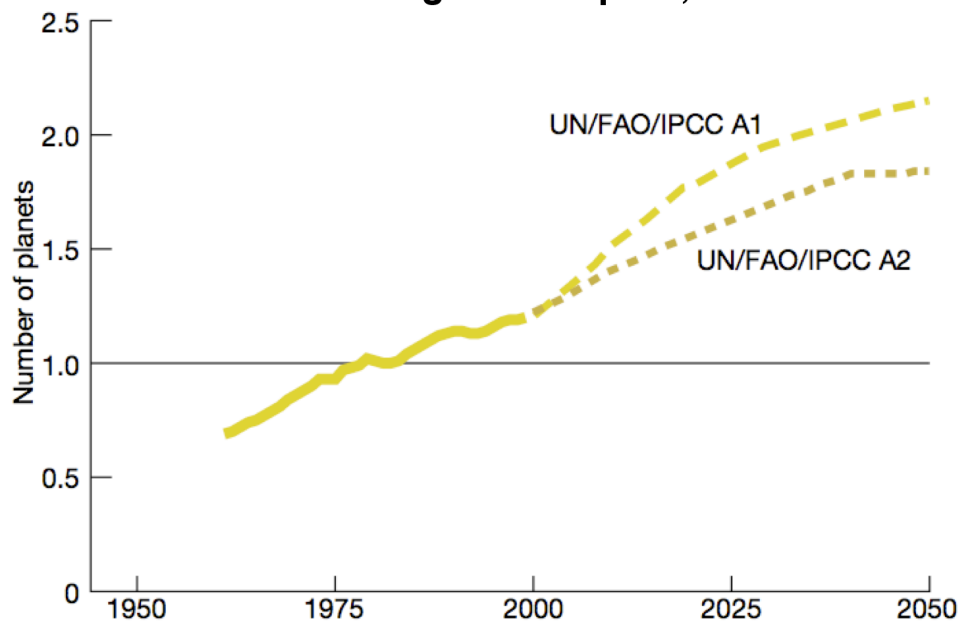
5. Overuse of Natural Resources

Ecological Footprint 1999



GLOBALIS Interactive World Map
<http://globalis.gvu.unu.edu/?840>
after WWF, Living Planet Report (2002)

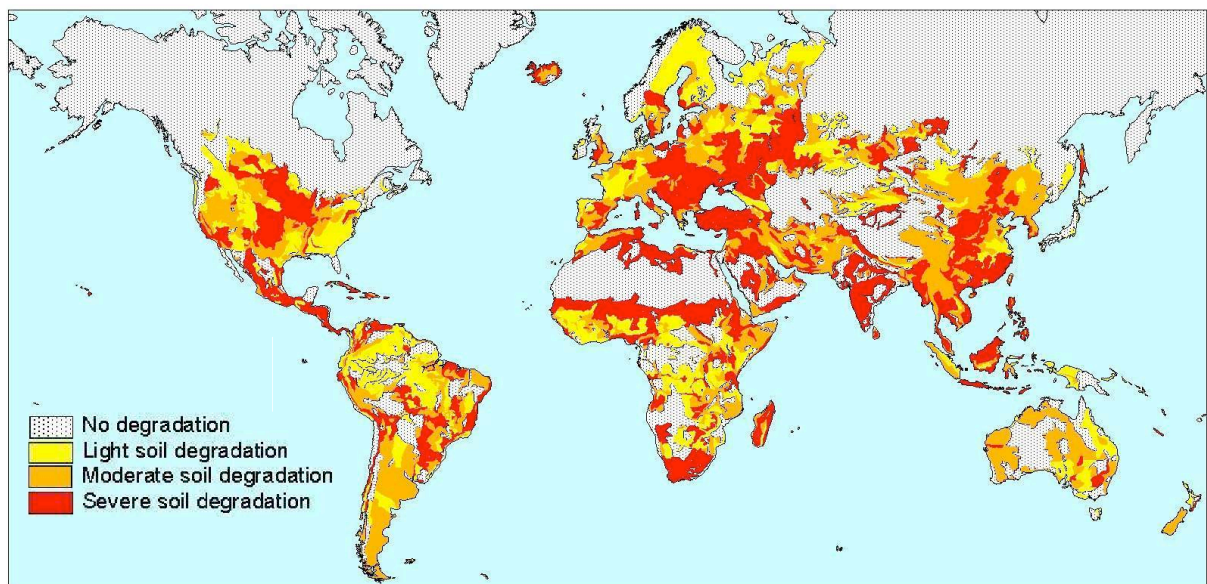
Global Ecological Footprint, 1961-2050



WWF, Living Planet Report (2002)

6. Land Degradation

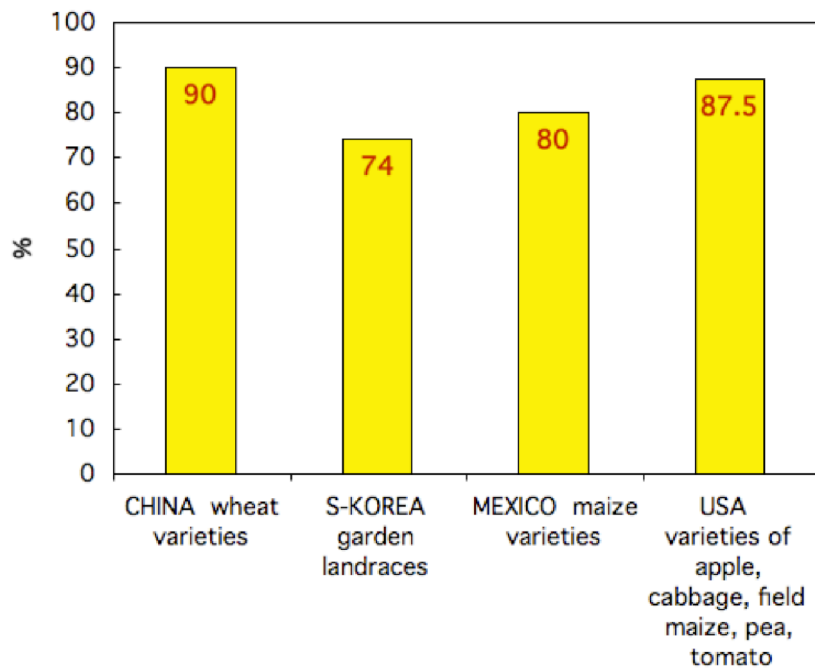
Human Induced Soil Degradation (GLASOD Data Base)



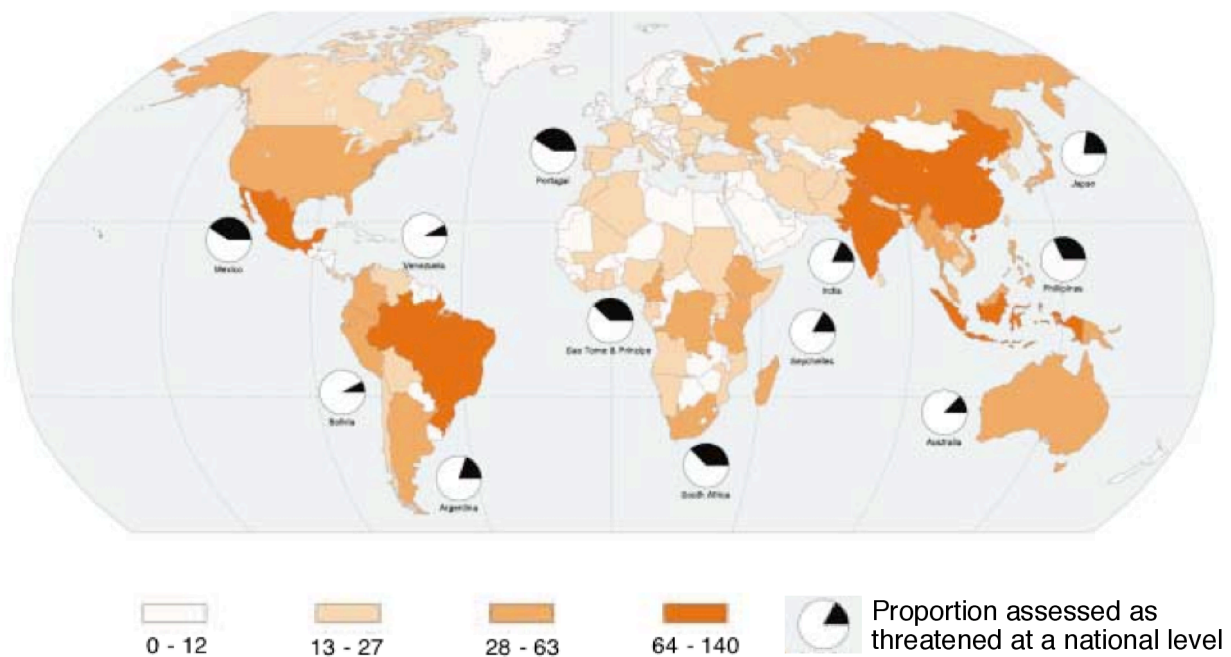
International Soil Reference and Information Centre
<http://lime.isric.nl/index.cfm?contentid=158>

7. Loss of Biodiversity

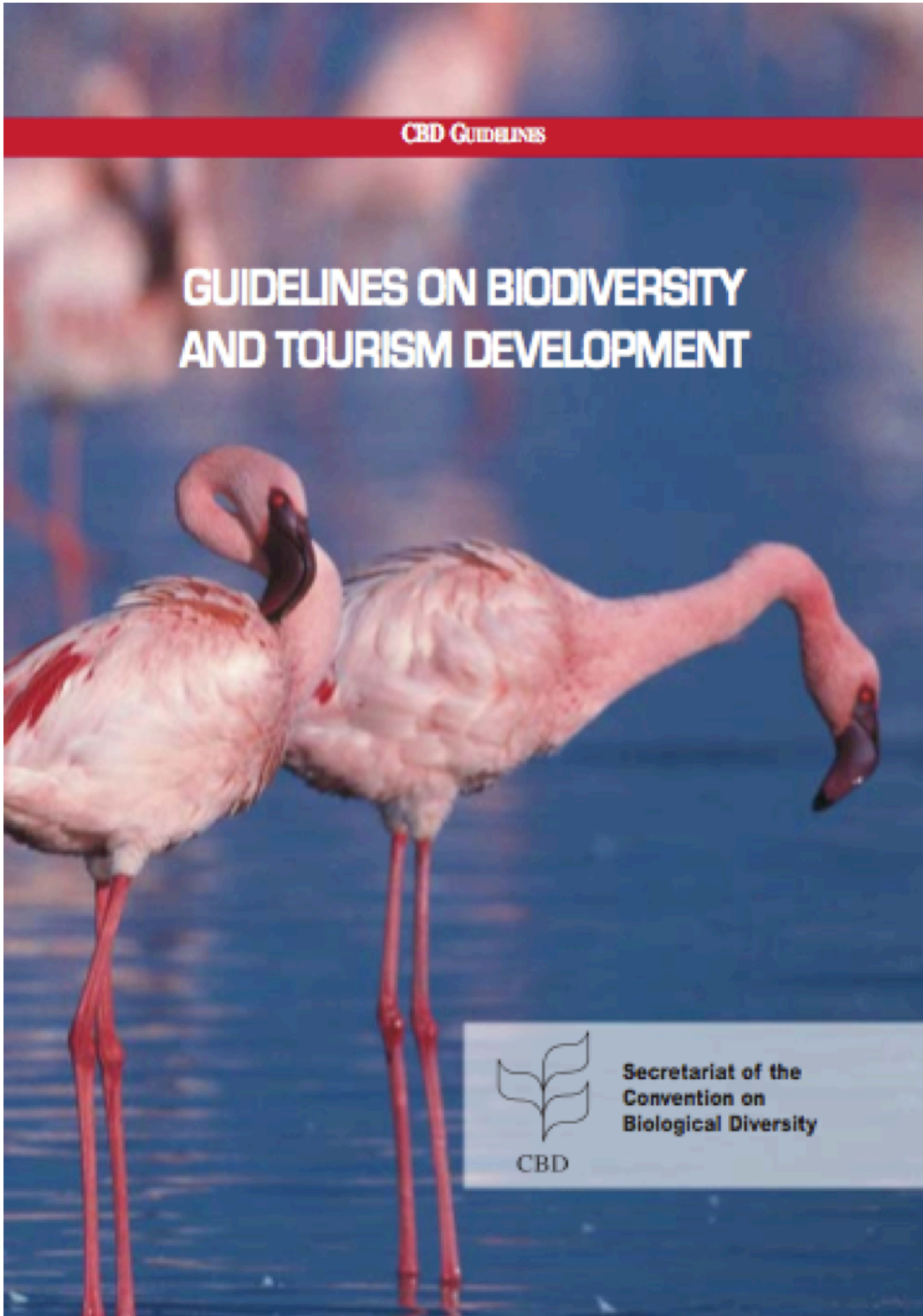
Example: Loss of
Crop Plant Genetic Resources in the Last ~ 20-100 yr



Threatened Mammals (2000)



*Secretariat of the Convention on Biological Diversity ,
Global Biodiversity Outlook (2001)*

A photograph of two pink flamingos standing in shallow blue water. The flamingo on the left is facing left, and the one on the right is facing right. They have long, thin legs and long, curved necks. The background is a soft-focus view of more flamingos in the water.

CBD GUIDELINES

GUIDELINES ON BIODIVERSITY AND TOURISM DEVELOPMENT

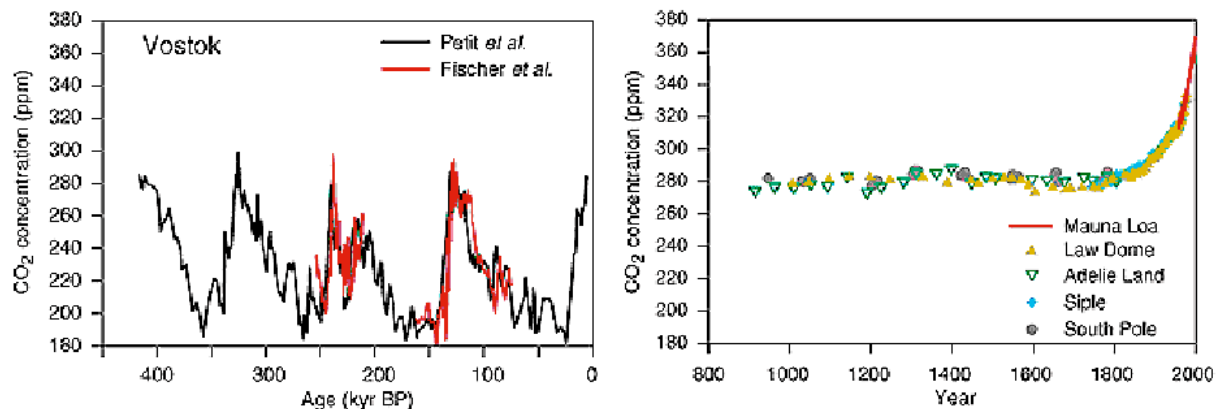


CBD

**Secretariat of the
Convention on
Biological Diversity**

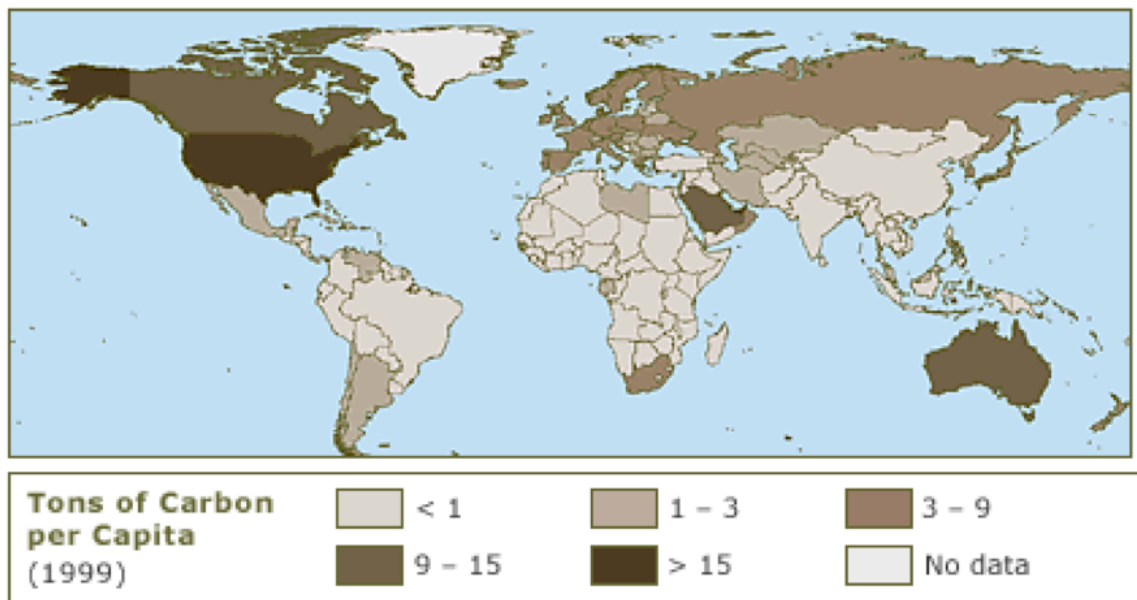
8. Changing Global Bio-Geo-Chemical Cycles

Example: Atmospheric CO₂ concentrations



Prentice et al. , IPCC WG1 Report (2001)

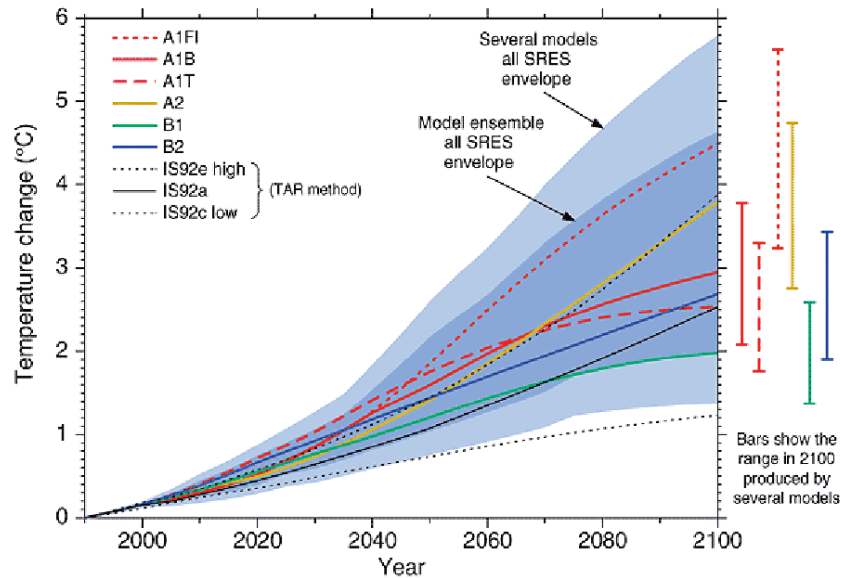
Carbon Emmissions



World Resources Institute (2001)
After: ESRI (1996) and DOI (2001)

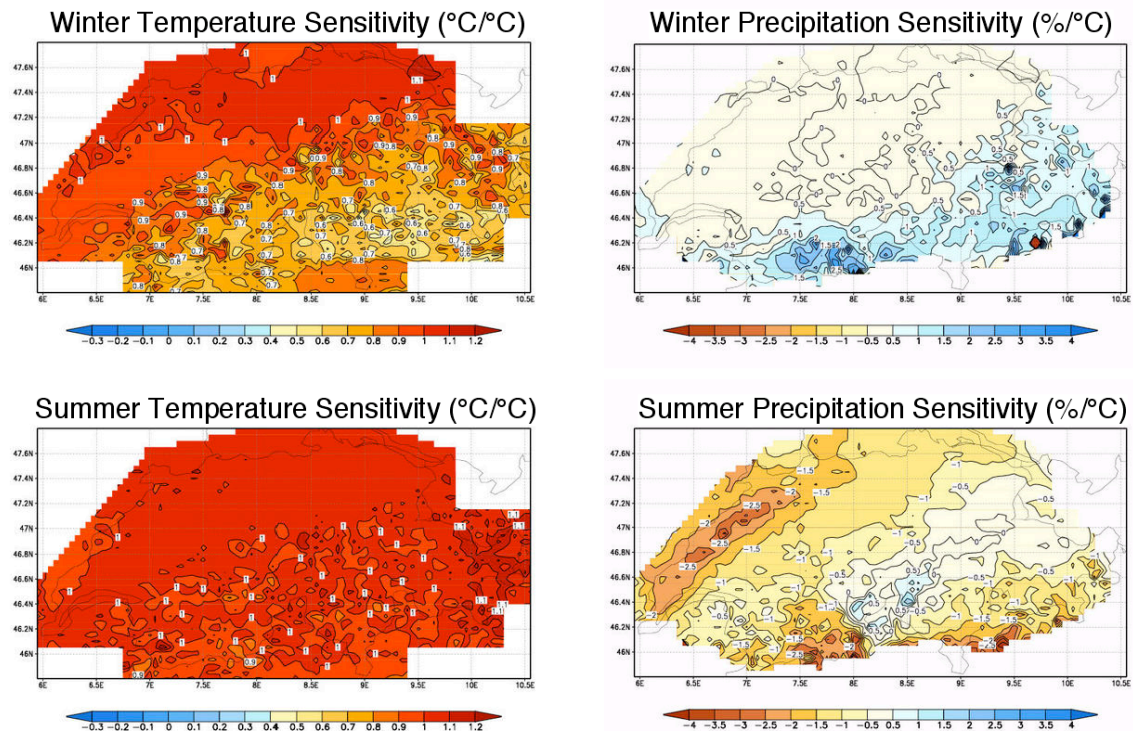
9. Climate Change

Example: Projected Changes in Global Mean Temperature



Cubasch et al. , IPCC WG1 Report (2001)

Example: Estimated Sensitivity of Swiss Climate (Forcing A2)



Gyalistras, GIUB Internal Report (2002)

Conclusion

Significant, rapid, and partially irreversible changes are already happening or lie ahead

- More people, more older people, more people in cities
- Increasing economic inequality and debt
- Over-exploitation of natural resources & land degradation
- Loss of biodiversity
- Manipulation of global BGC cycles & changing climate
- ...

Tourism is intertwined with these changes

How to cope best?