Economic Conditions Political Decisions Environmental Losses

Presentation by Harvey Mead

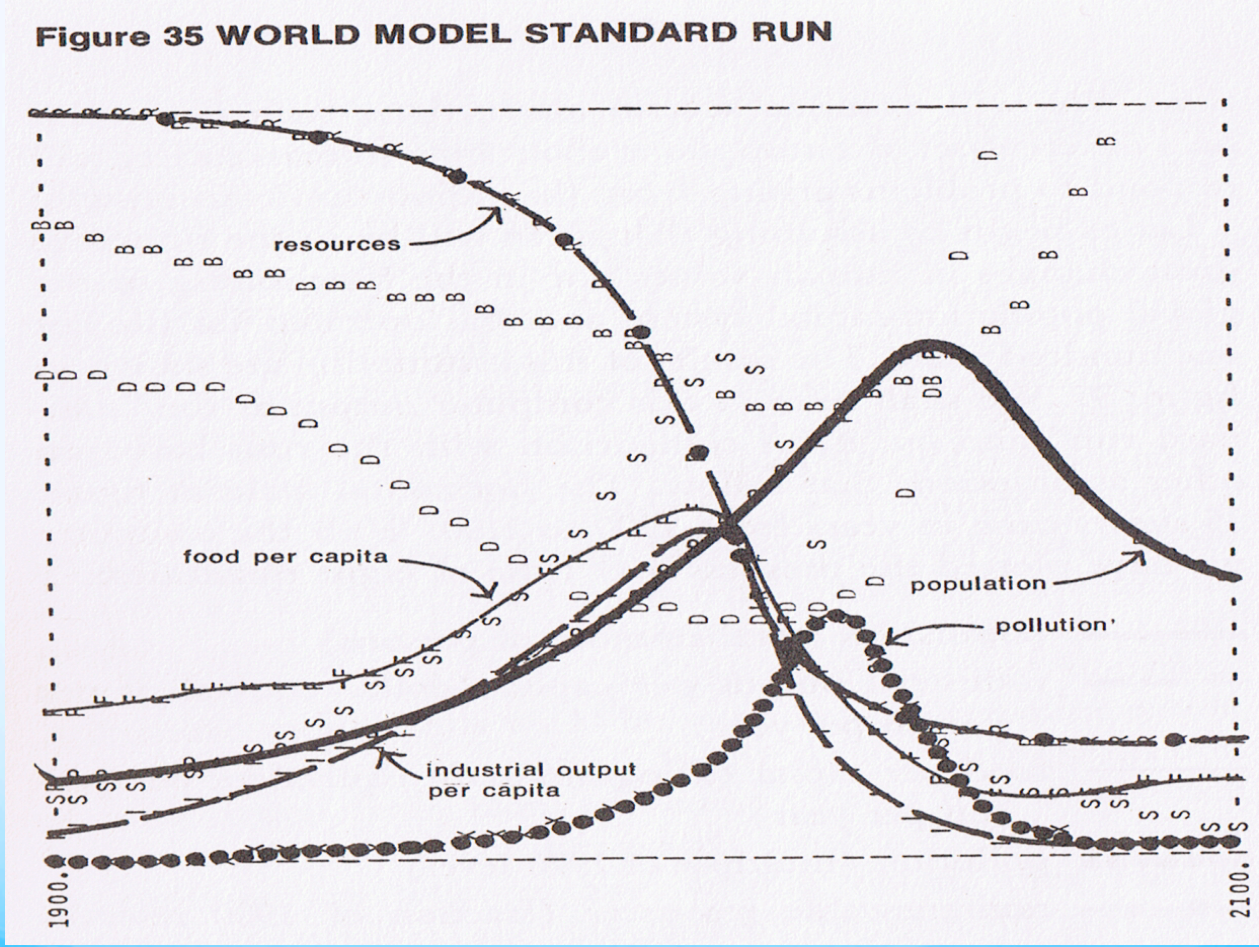
OECD Workshop on Best Practices for Assessing Sustainability of Biobased Products

Montreal

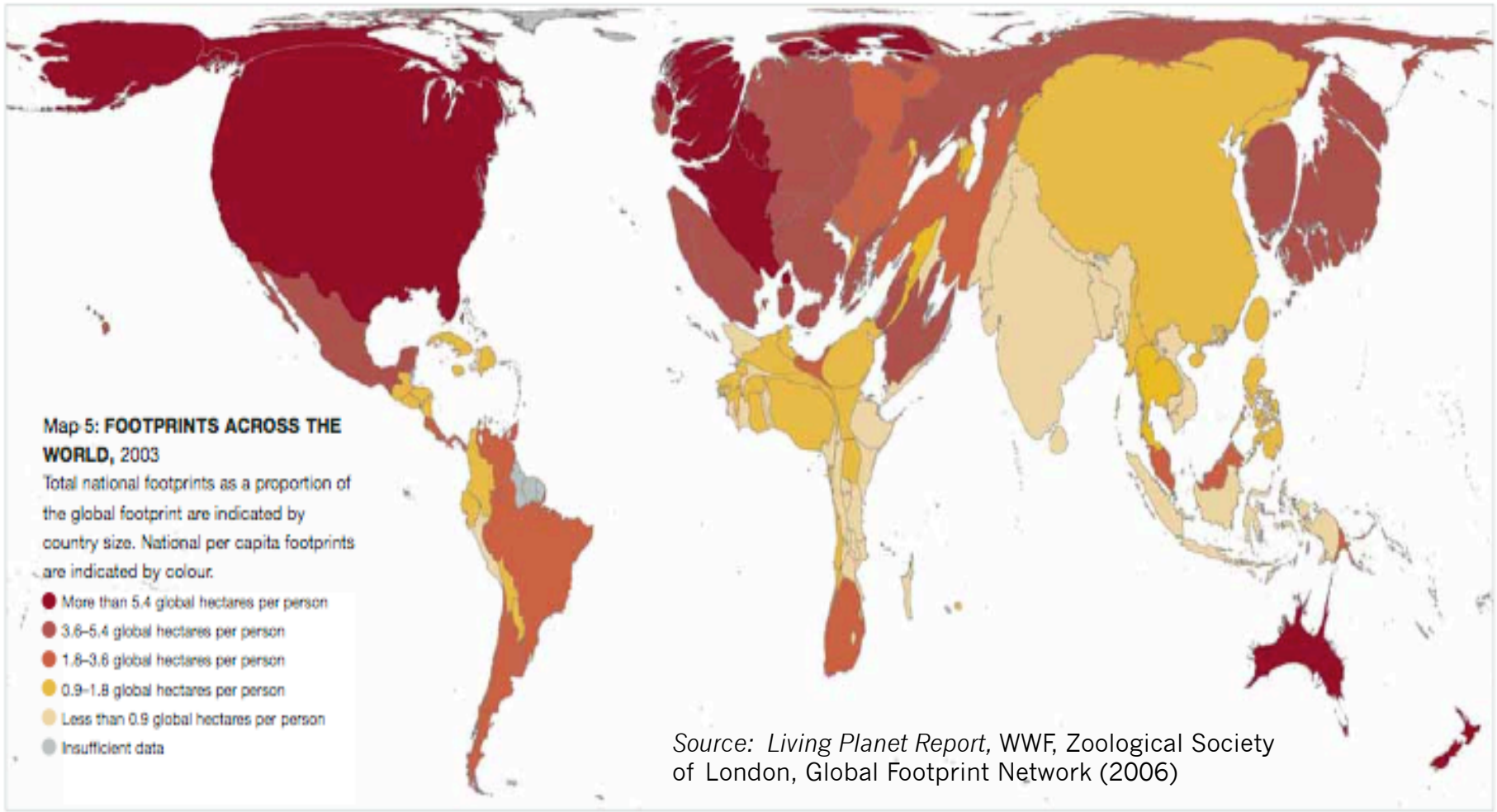
July 23-24, 2009

Delta Centre-ville

Bioproducts and the Club of Rome

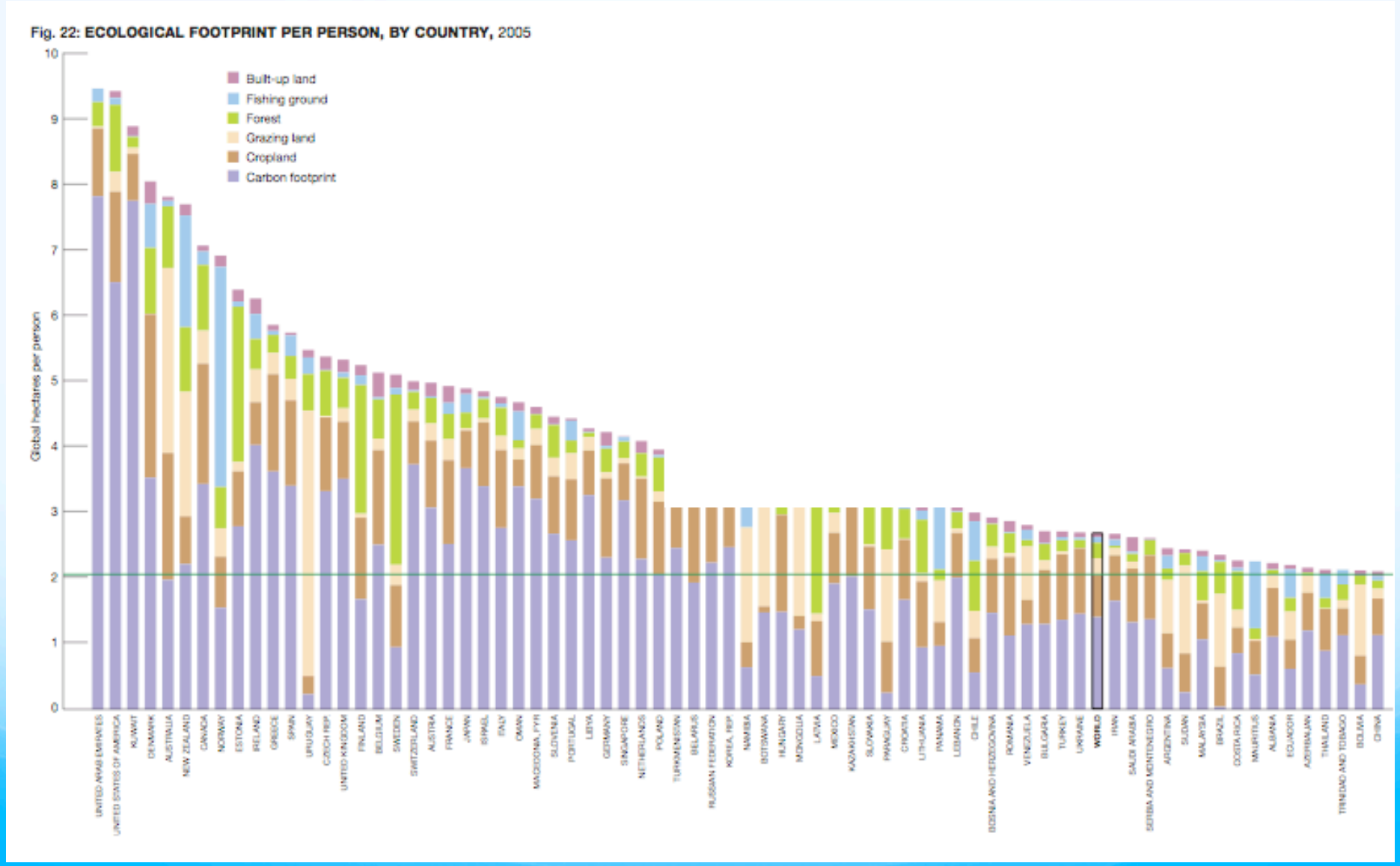


The Fat Planet 2009:
Our Footprint = 1.3 Planets

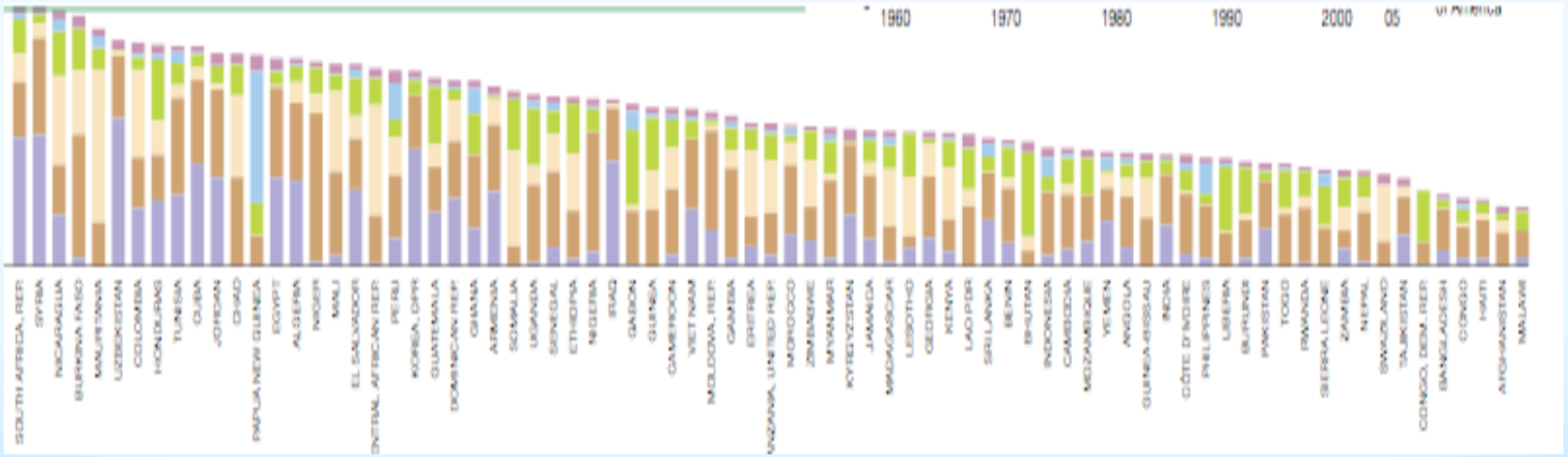


Source: Living Planet Report, WWF, Zoological Society of London, Global Footprint Network (2006)

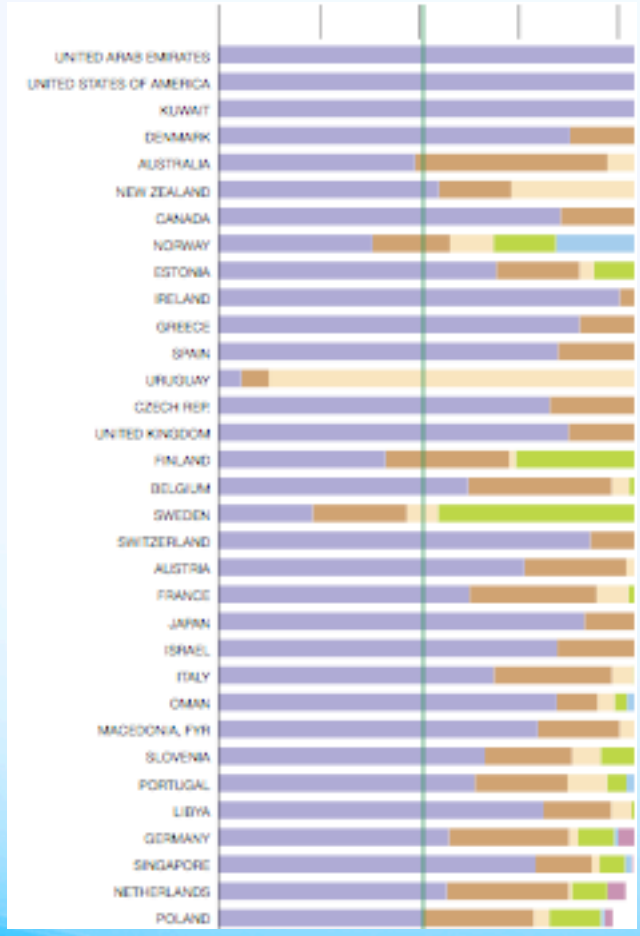
The *per capita* Ecological Footprint

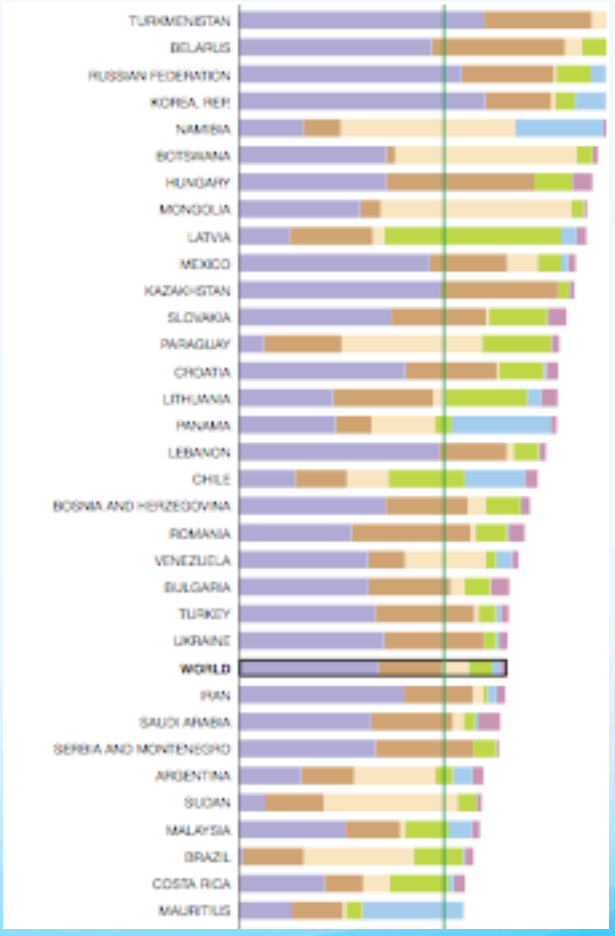


Including that of most of humanity



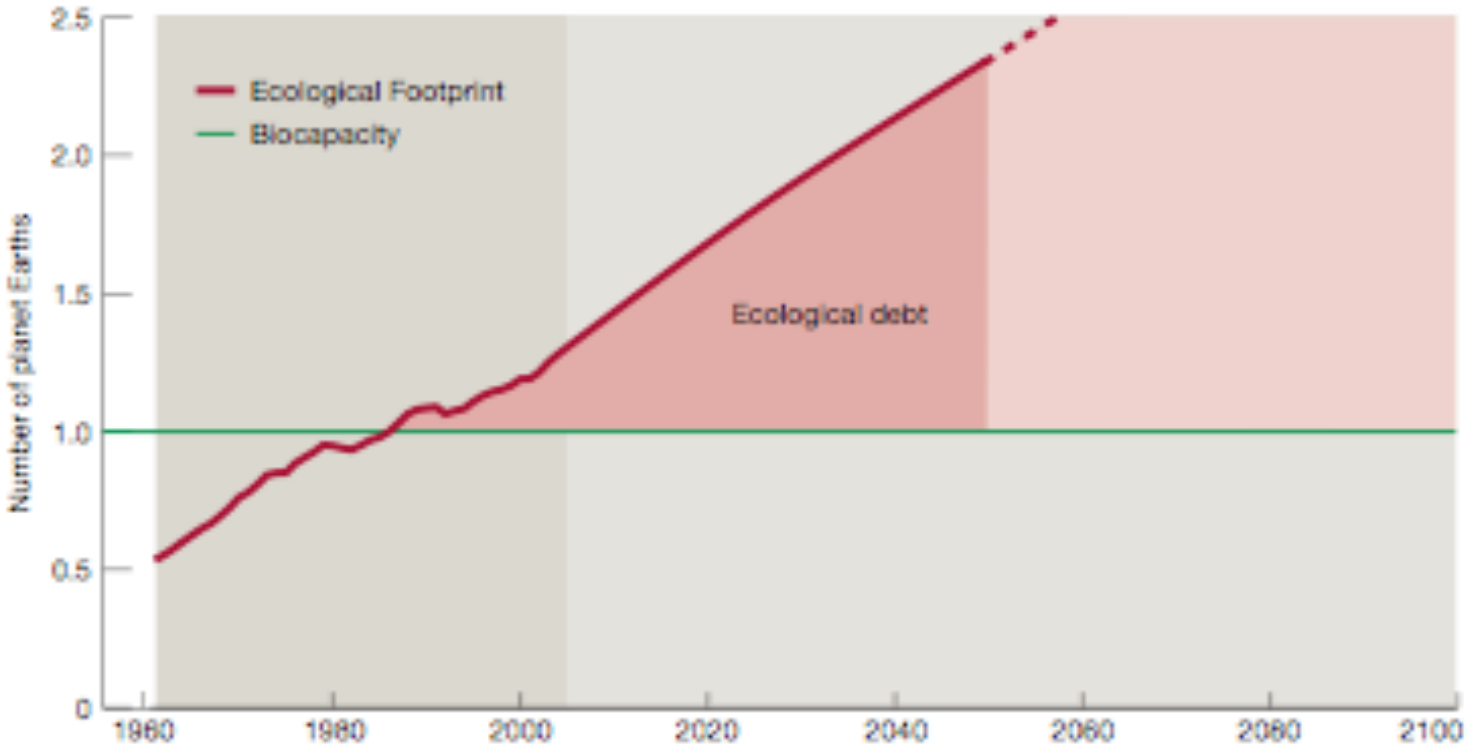
Footprints of OECD Countries



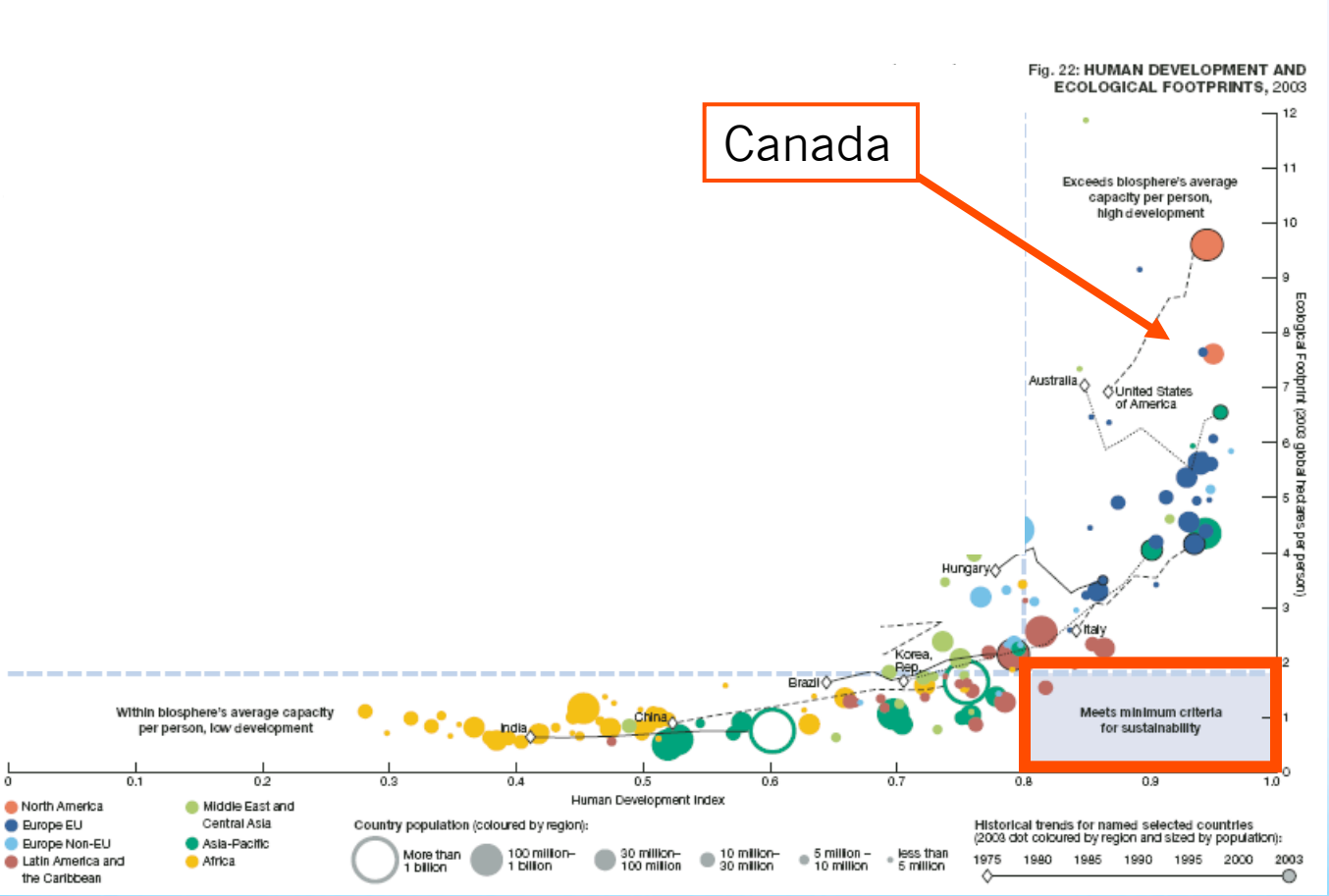


Footprint With BAU Scenario: 2040 = 2x Earth's Biocapacity

Fig. 31: **BUSINESS-AS-USUAL SCENARIO AND ECOLOGICAL DEBT**



The ecological footprint and the Index of Human Development



Mainstream Environmentalism: Incapable of coping…

- It is no accident that environmental crisis is gathering as social injustice is deepening and growing inequality is impairing democratic institutions. Each is the result of a system of political economy--today's capitalism--that is profoundly committed to profits and growth and profoundly indifferent to nature and society.... While environmentalists have been winning many battles, we are losing the planet.... The escalating processes of climate disruption, biotic impoverishment and toxification--which continue despite decades of warnings and earnest effort--are a severe indictment of capitalism.... **An ever growing world economy ... is undermining the ability of the planet to sustain life.**

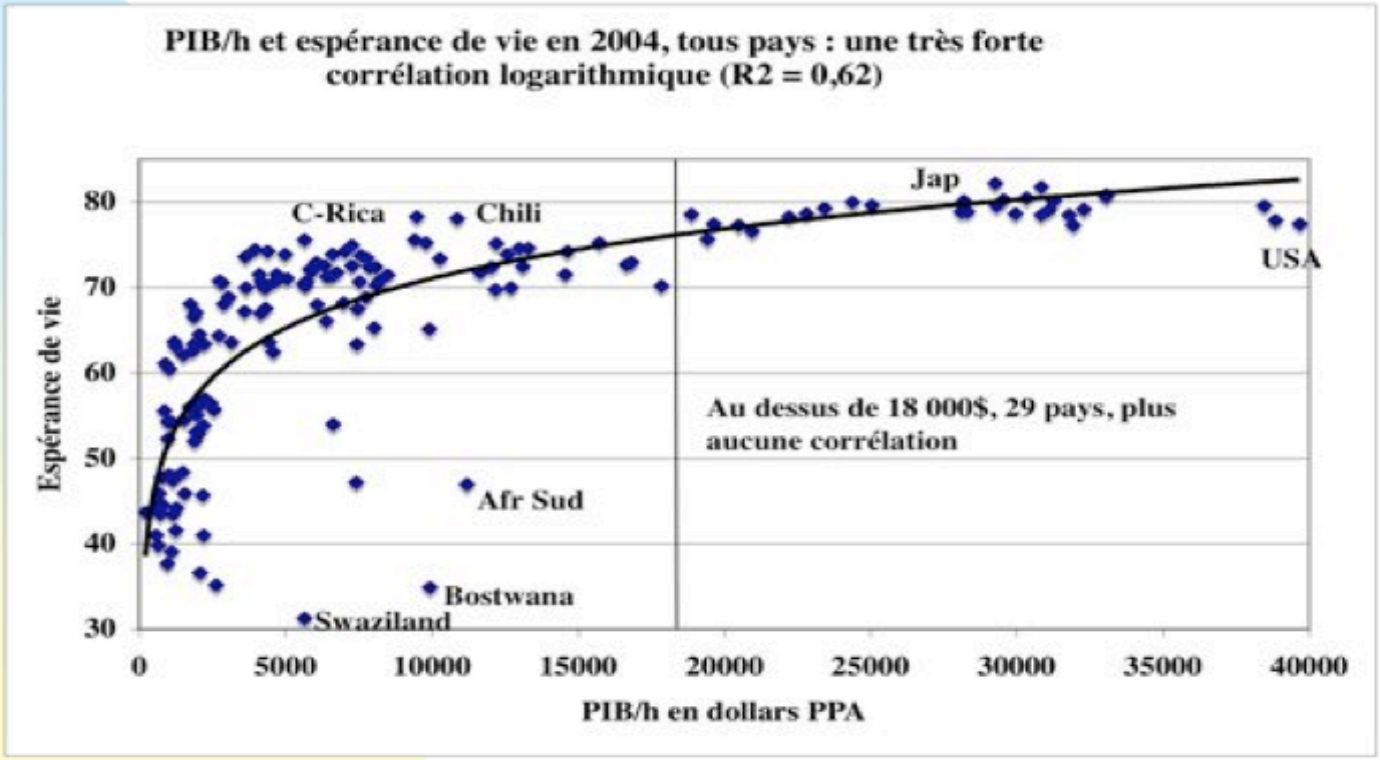
James Gustave Speth, "Global Warming and Modern Capitalism", in *The Nation, October 6, 2008*

… and your economic criteria fail to look at the global context

- Recognizing that advances in **biotechnology and genetics offer much promise for sustainable growth and development**…
  - first premise of draft recommendation
- The development of **a bioeconomy [is] necessary if OECD countries are to achieve long-term economic growth** (that also addresses environmental and social needs)… - first sentence of the workshop plan
- This
  - in spite of **60 years of failed development** for most of humanity
  - in spite of the fact that **growth has not produced its promised results**

Growth and the criteria of the HDI

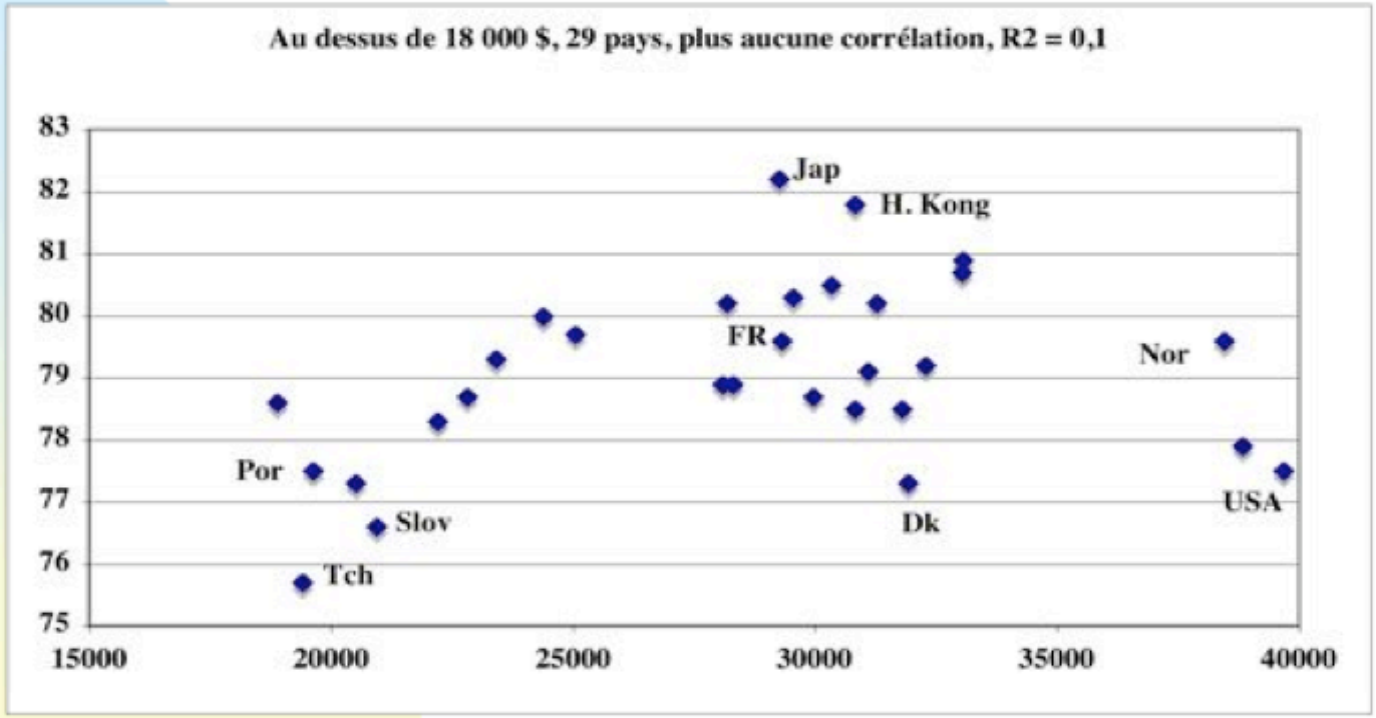
L'espérance de vie progresse nettement avec le PIB/h, mais…



For the following graphs: Jean Gadrey, « Croissance de la richesse économique ou « bien-être durable pour tous! »? », February 2009

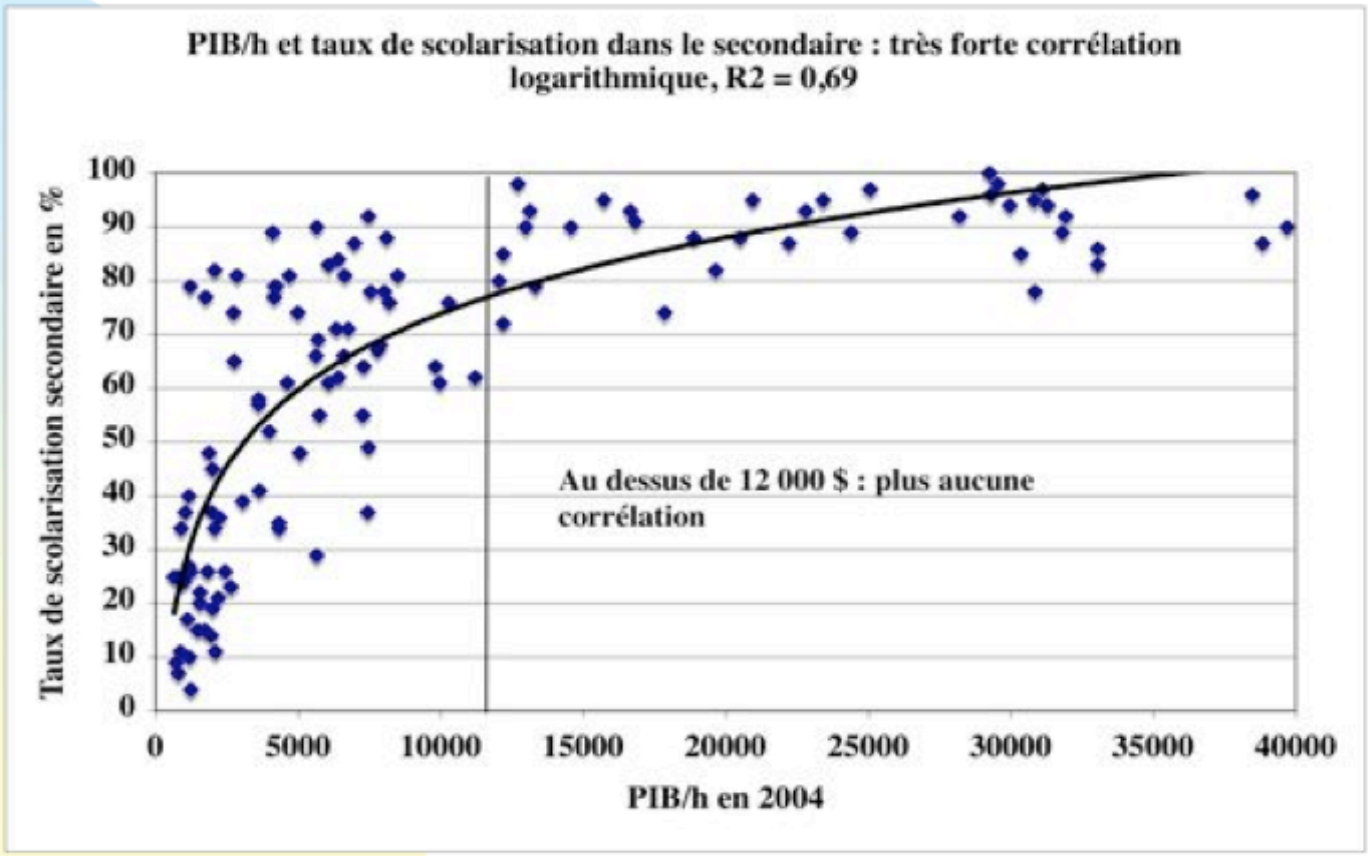
Growth and the criteria of the HDI

… au dessus de 18 000 dollars de PIB/h en 2004, l'espérance de vie n'est plus corrélée avec le PIB/h



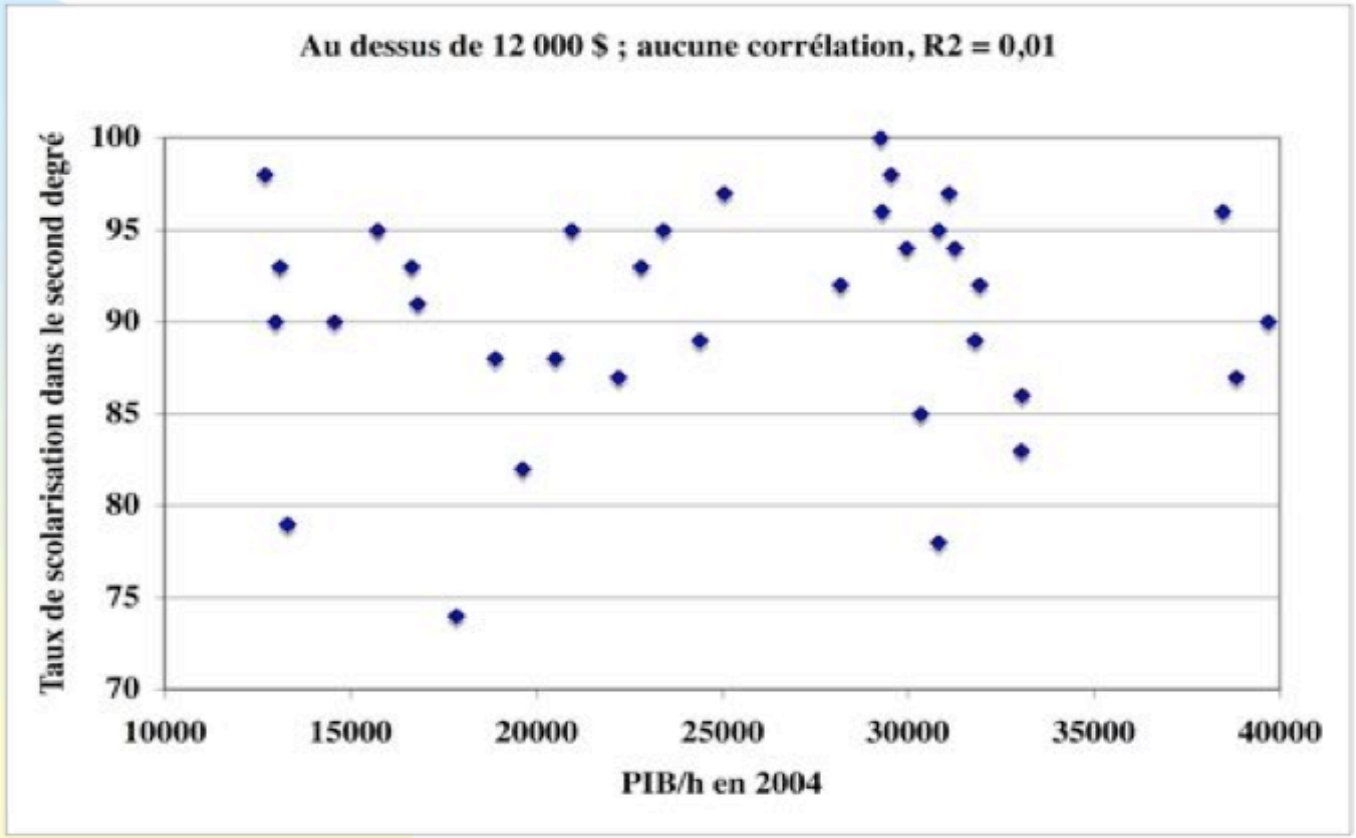
Growth and the criteria of the HDI

L'éducation, sous l'angle de la scolarisation : la corrélation avec le PIB/h est forte, mais elle disparaît au-delà de 12 000 $



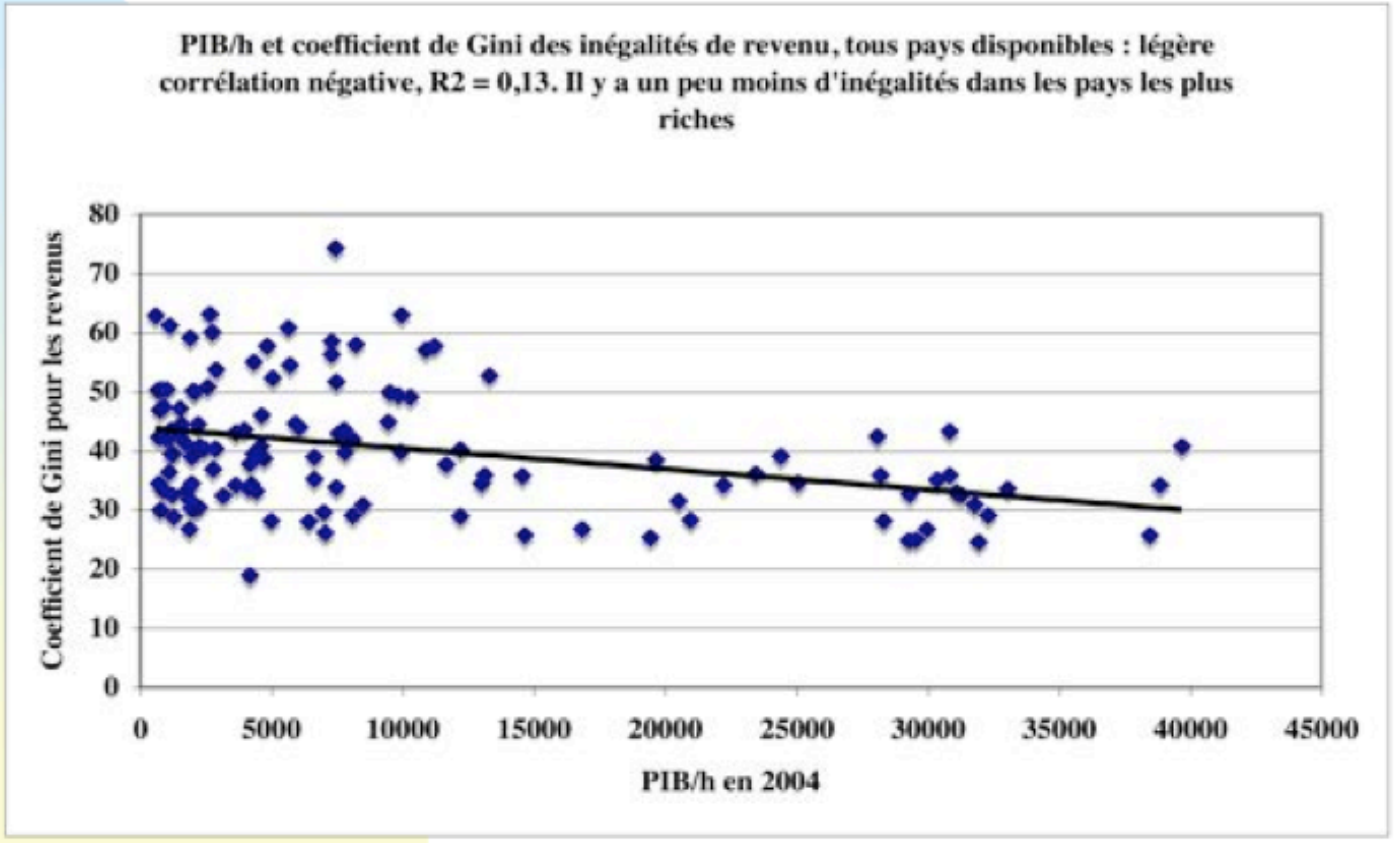
Growth and the criteria of the HDI

Suite : zoom au dessus de 12 000 dollars de PIB/h



Growth and the criteria of the HDI

PIB/habitant et cohésion sociale ? (le coefficient de Gini indique des inégalités plus fortes lorsqu'on va de 0 à 100)



Your Work: A response to peak oil by the United States and Europe

- The United Sates industry has had a particular interest in developing biobased products. On the one hand, consumers have been calling for "green products" with a lighter environmental footprint. For competitive reasons, industry has been eager to develop such products. Industry also has recognized that **the United States may never again be price-competitive on petroleum and natural gas feedstocks for developing petrochemical products** against oil and gas supplies in certain other areas of the world . Both oil and natural gas production costs seem likely to remain lower in several areas of the world such as Russia, West Africa, and the Middle East than in the United States. A number of these countries currently are pursuing a development policy focused on exploiting their economic advantage in petroleum and natural gas production by moving downstream in the industry to develop petrochemical industries to serve world markets. On the other hand, **U.S. industry seems convinced that the United States can meet world-class feedstock competition in the production of bio-based feedstocks for its chemical industries. This is their fundamental point of departure**, replacing oil with bio.... USDA paper (Duncan, Conway et al)

And it's not just peak oil that's involved

- Homer-Dixon's tectonic stresses
  - population stress (growth rates and megacities)
  - energy stress (declining EROI et scarcity)
  - environmental stresses (fisheries, forests, land, water)
  - climate stress
  - economic stress (instability of financial system, inequity)
- And their multipliers
  - Rising speed and global connectivity
  - Escalating power of small groups to destroy

Thomas Homer-Dixon, *The Upside of Down: Catastrophe, Creativity and the Renewal of Civilization* (2006)

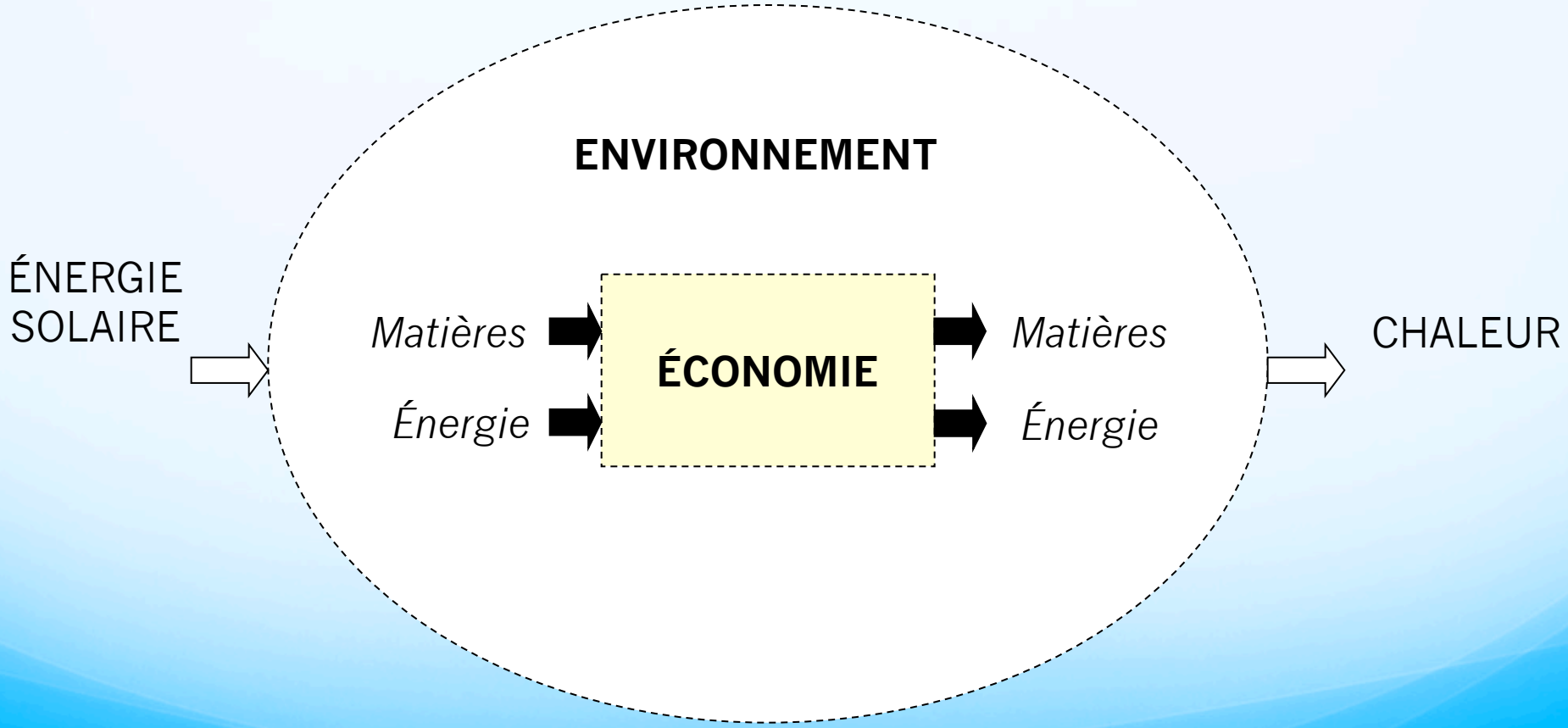
The same old story…

- *Energy Independence and Security Act* (2007):
  - 36 billions gallons of biofuels in 2022, 15 from corn-based ethanol and 21 from cellulose, relative to oil…
  - decision made for political reasons, environmental – and even economic - assessment coming in downstream
- PROBIP 2008 projections for bioplastics:
  - 420 kt in 2007, 4175 kt in 2020
- *Biofuel Directive* of the EU: 10% for 2020
- The calculations on land needed for replacing oil with ethanol?
  - putting off the decision(s)
- Look again at NAFTA, Doha, Kyoto-Copenhagen

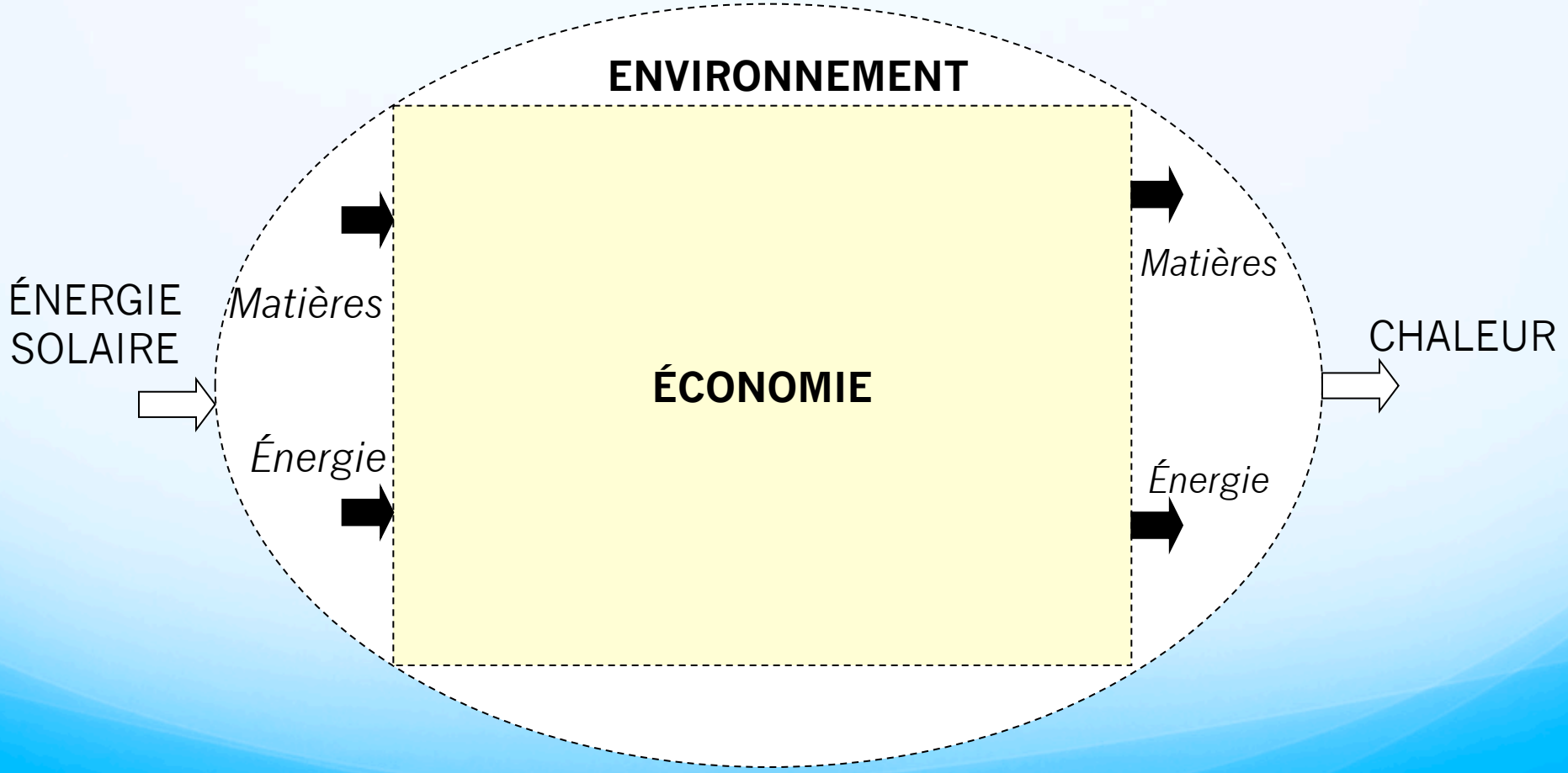
Sustainability, Brundtland and Crises

- Brundtland commission report in 1987
  - Numerous crises in need of urgent response
- GEO4 report in 2007, twenty years after
  - All the crises still there, it's probably too late
- Report from first OECD workshop in 2003
  - the way one views sustainability
  - how one frames the question of sustainability
- Your comprehensive approach not comprehensive
  - LCA a serious approach
  - The three-stool conception inadequate: no indications of life cycle

Early sustainability for ecological economists - 1



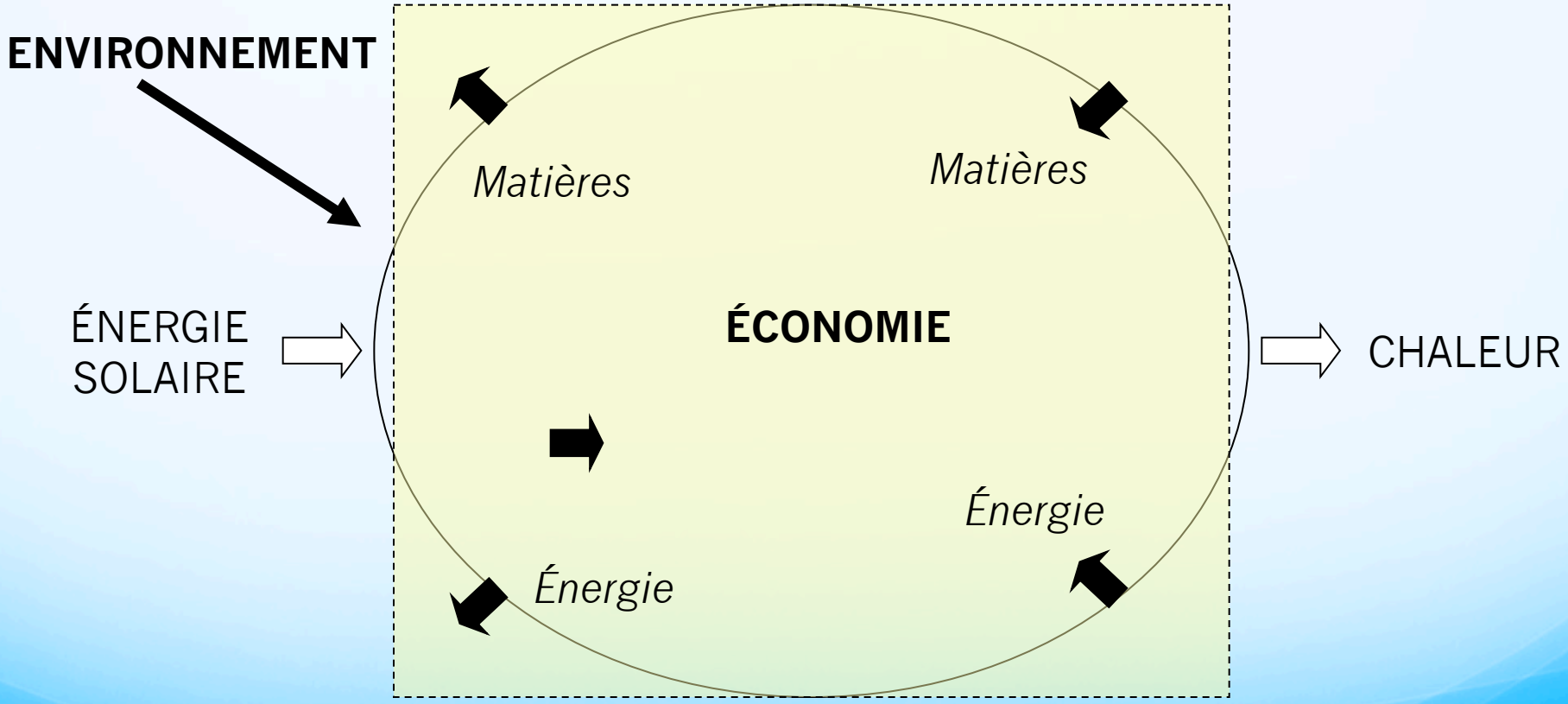
Sustainability earlier on for ecological economists - 2



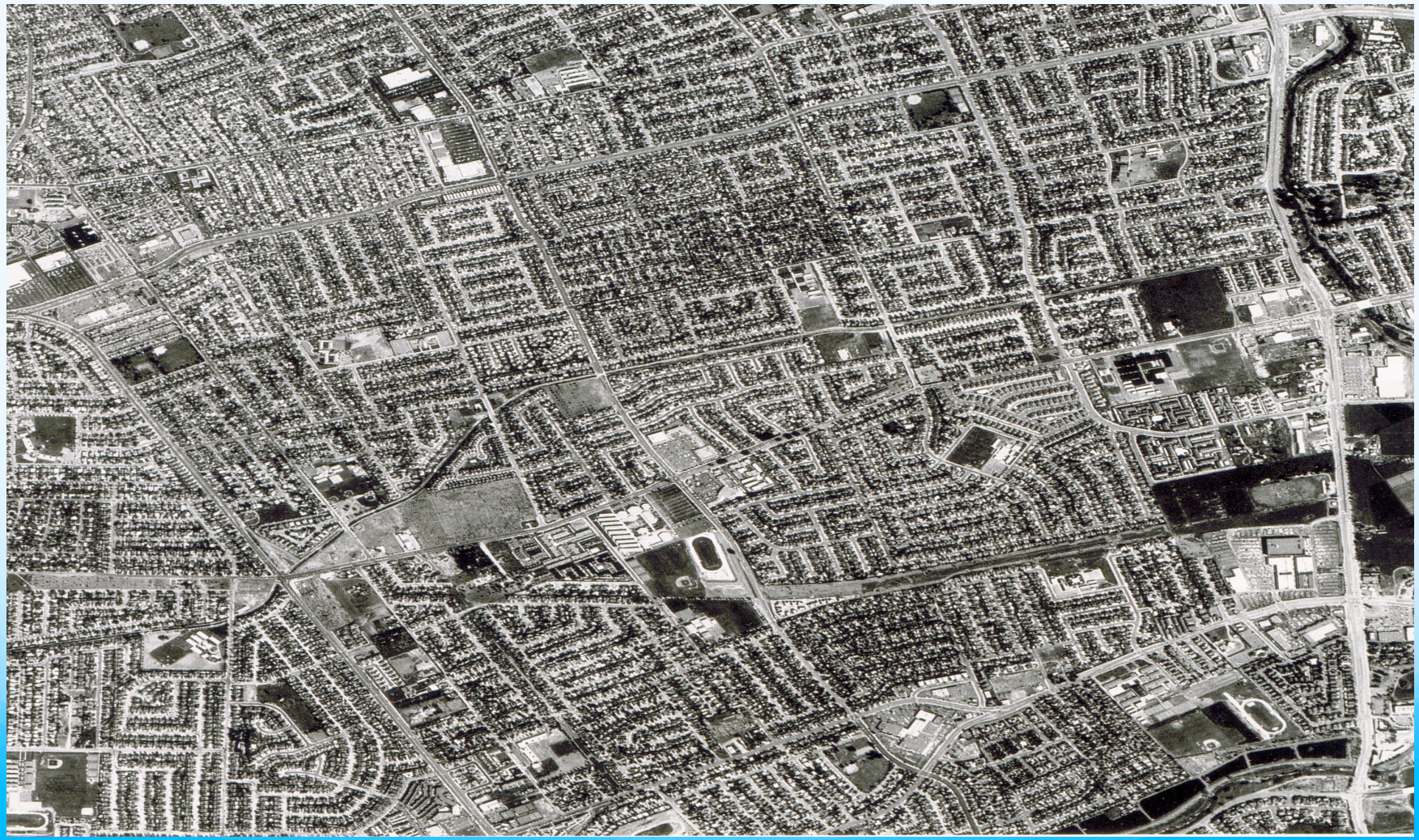
Silicon Valley : Open Earth

Source: An Introduction to the World Conservation Strategy, United Nations Environment Programme, p. 10.

Today's lack of sustainability for ecological economists - 3

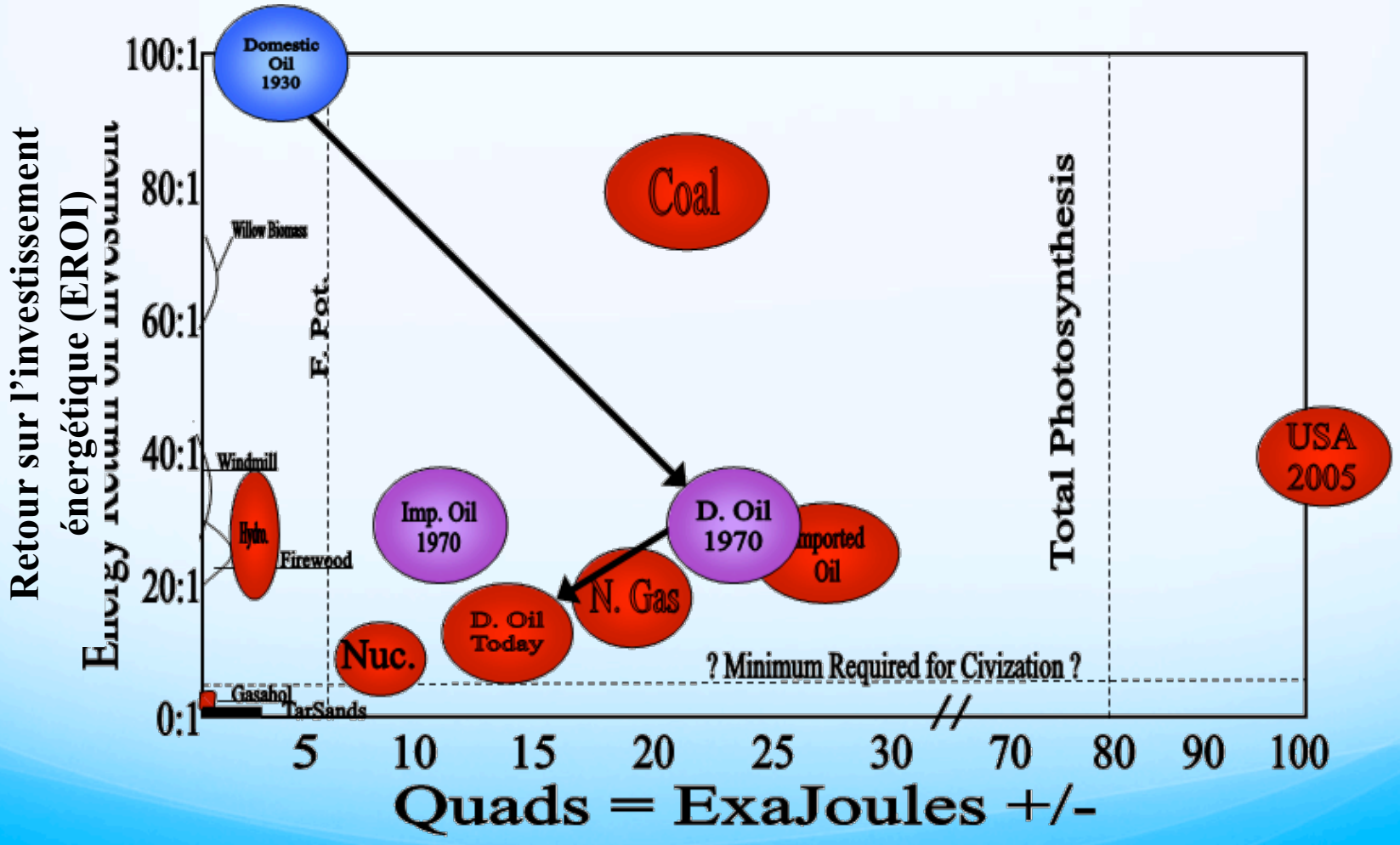


Silicon Valley : Full Earth



Source: An Introduction to the World Conservation Strategy, United Nations Environment Programme, p. 10.

Energy return on investment (EROI) : Things have changed since 1930



The missing figures before starting your work

- IIASA estimates (German report, p.47) perhaps 13% of total land area not cultivated suitable for agriculture
  - German report proposes that this is almost all primary forest which will be under pressure (next slides)
- Population is expected to increase unsustainably by almost 50%, independently of biofuels, bioproducts, increasingly meat-based diet - **we'll lose them anyway**
- **Conclusion: There is no land available for bioproducts**
  - Eliminate biofuels
  - Focus on some biochemicals (what we should be doing already, with oil and gas – wasteful as fuel)

Our Occupation of the Planet

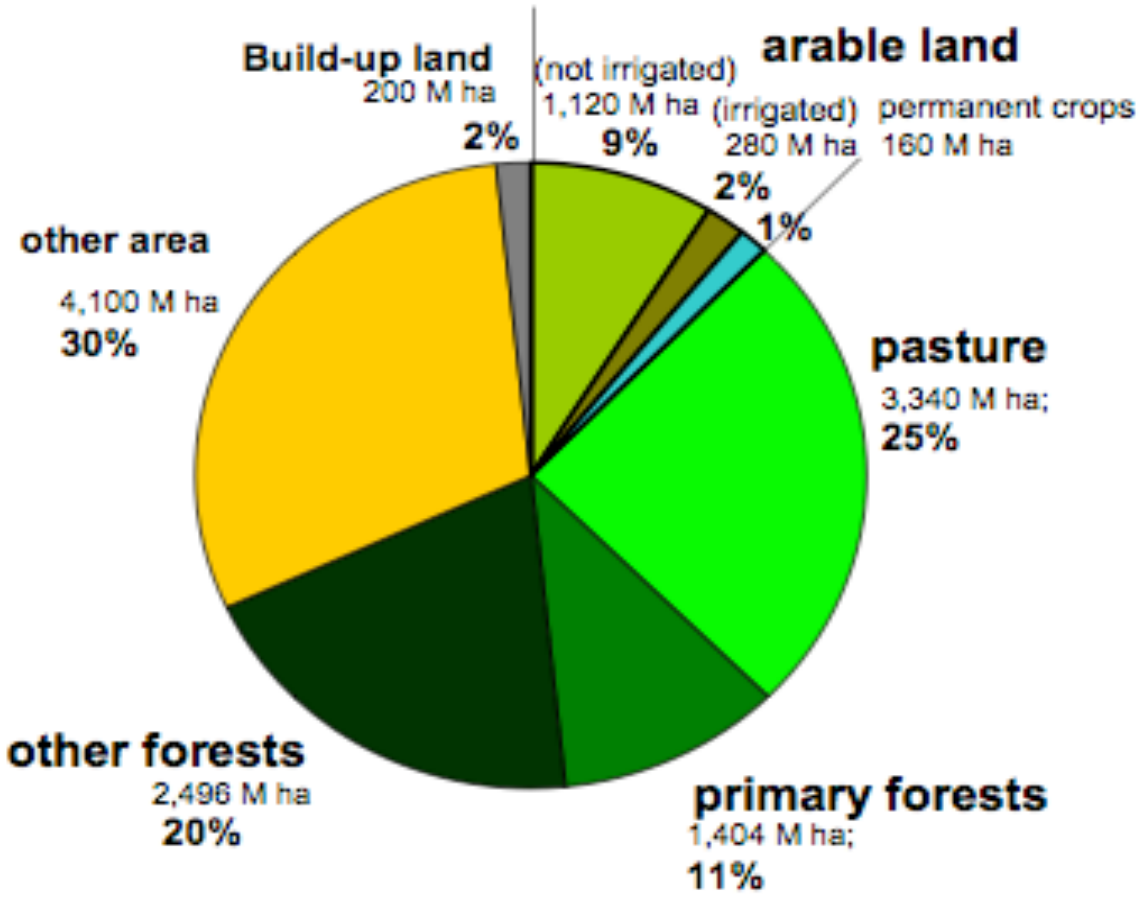


Figure 2 Current global land use structure (sources: FAOSTAT, IIASA)

(Source: German report, p.47)

"Highest potential of biomass production … in exactly those zones with very high or high biodiversity"

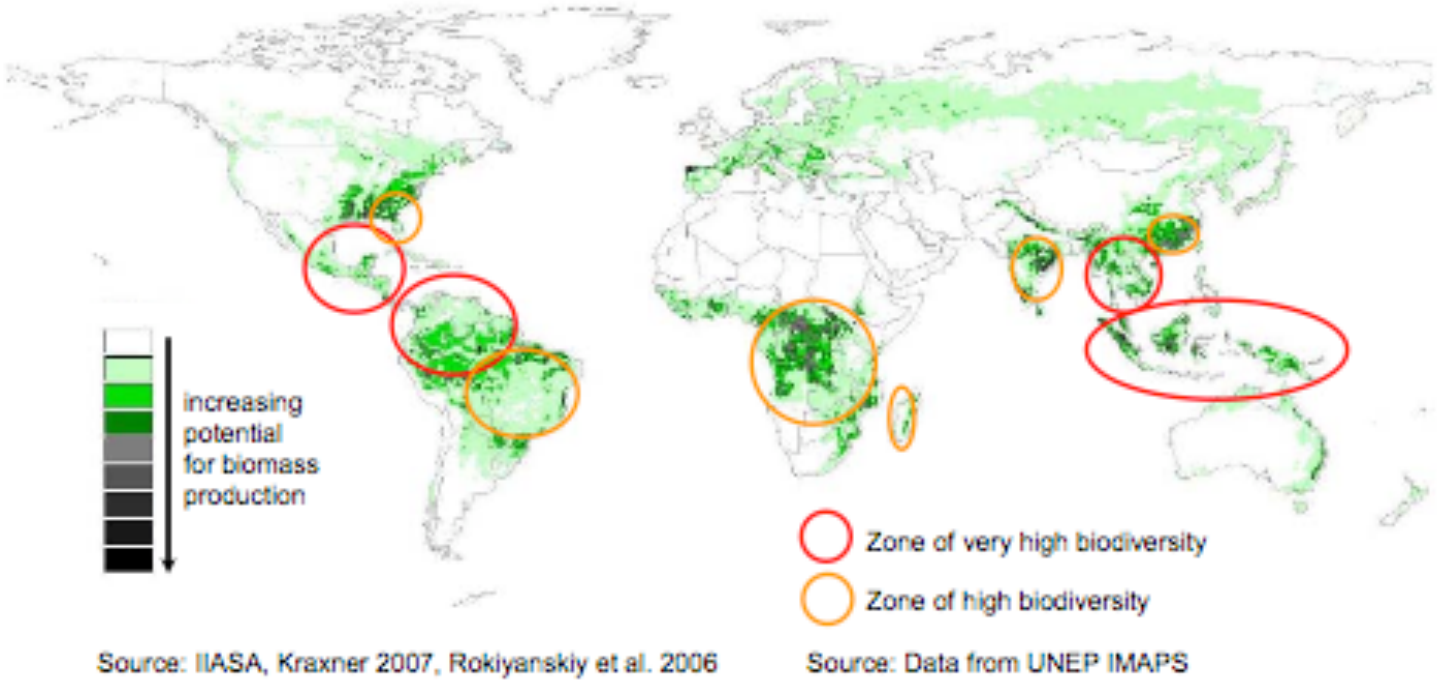
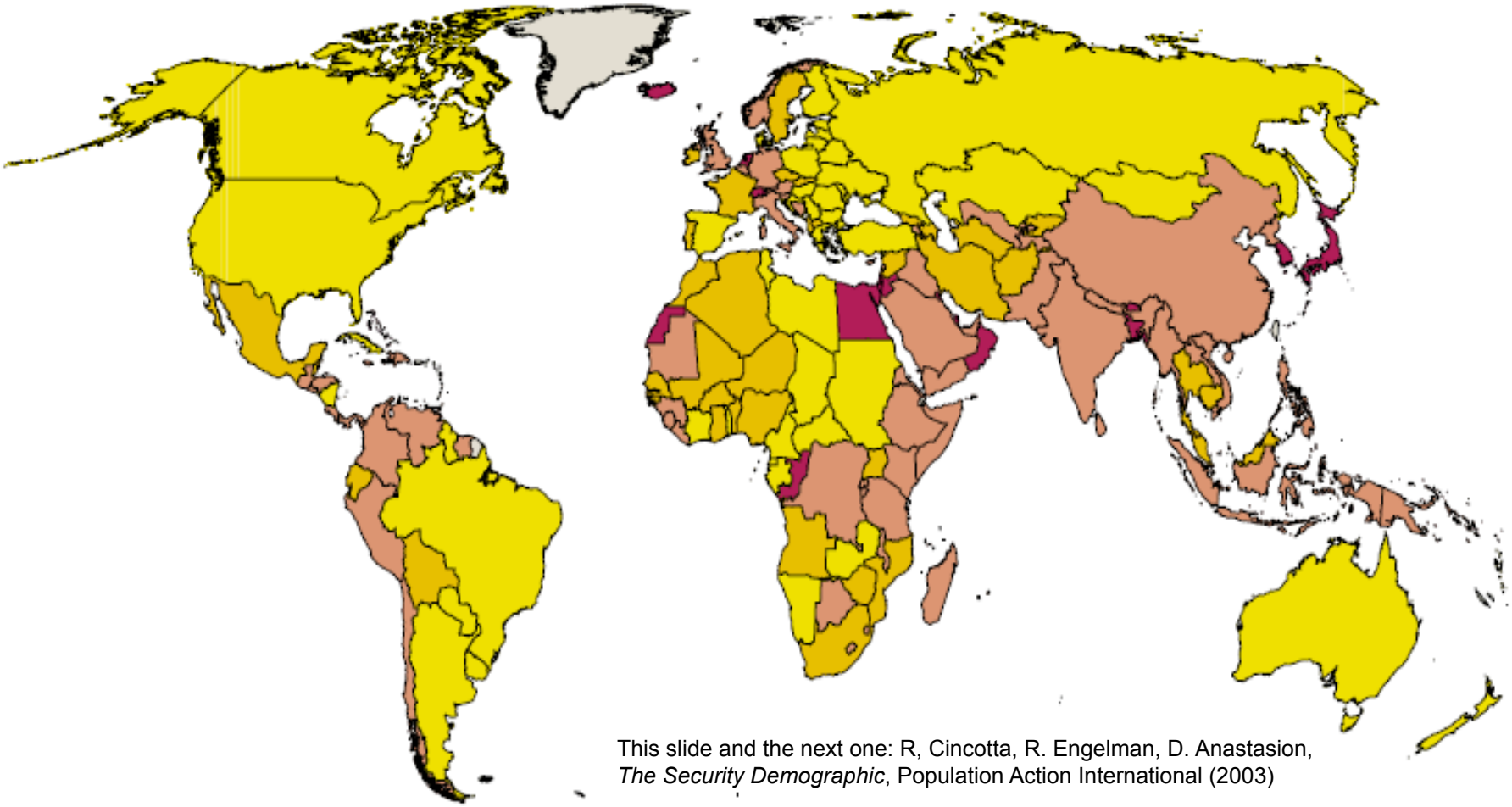


Figure 9 **Conflict zones: high potentials for biomass production vs. high biodiversity**

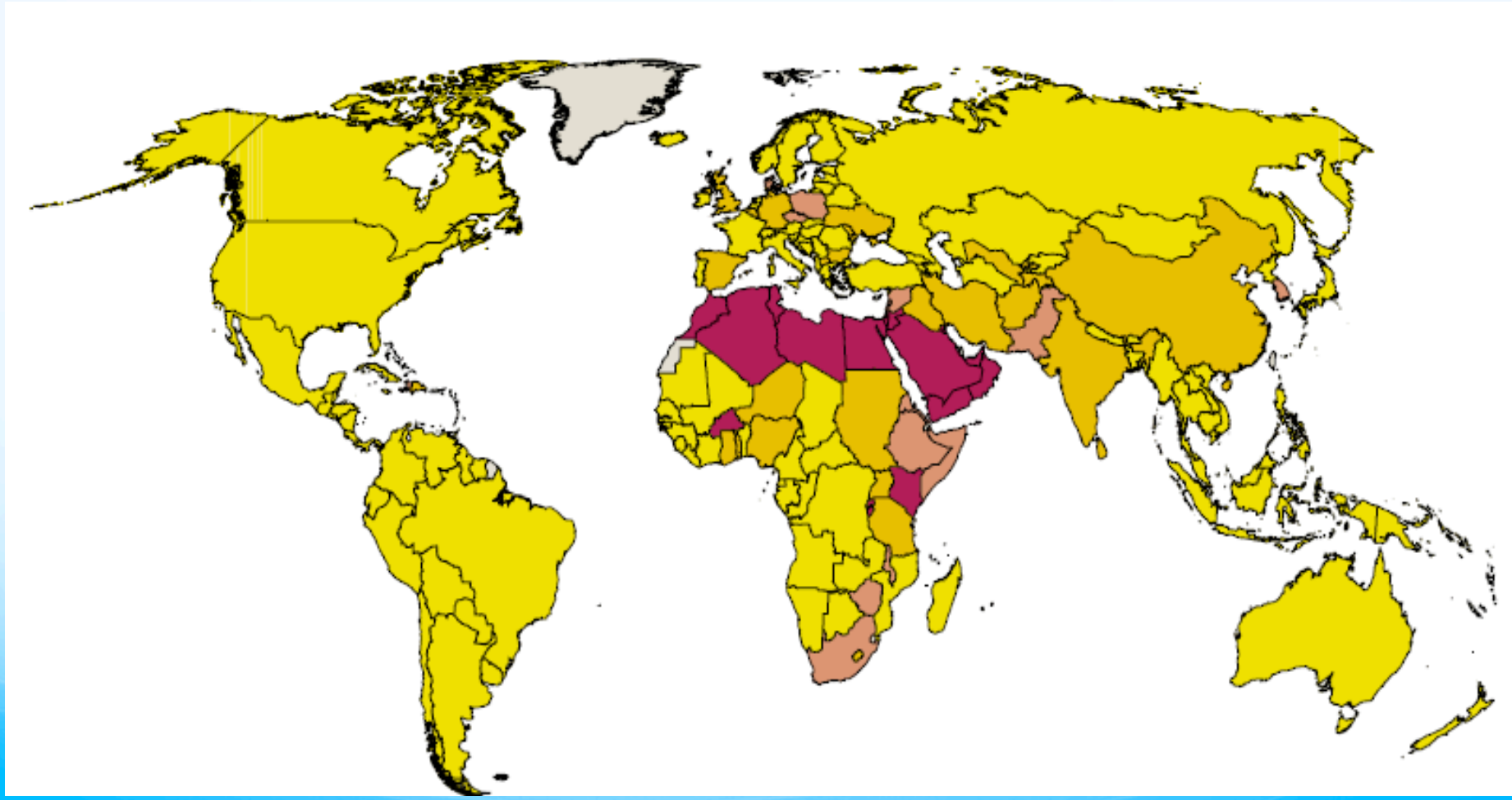
Source: German report, p.57

Zones At Risk On the Planet For Land and Food

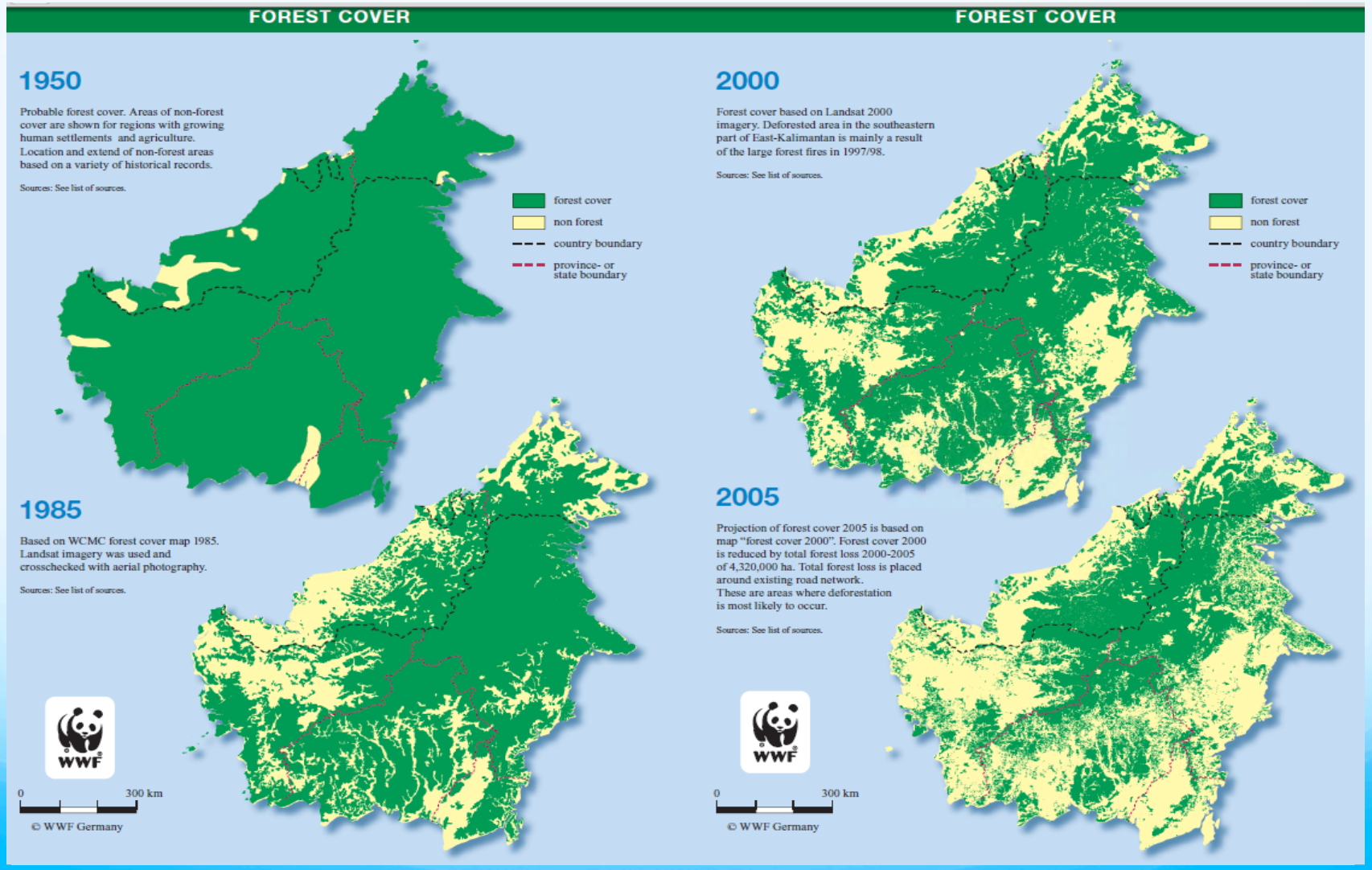


This slide and the next one: R, Cincotta, R. Engelman, D. Anastasion, *The Security Demographic*, Population Action International (2003)

Zones At Risk On the Planet For Water and Food



Bioproducts in Borneo 1985-2005

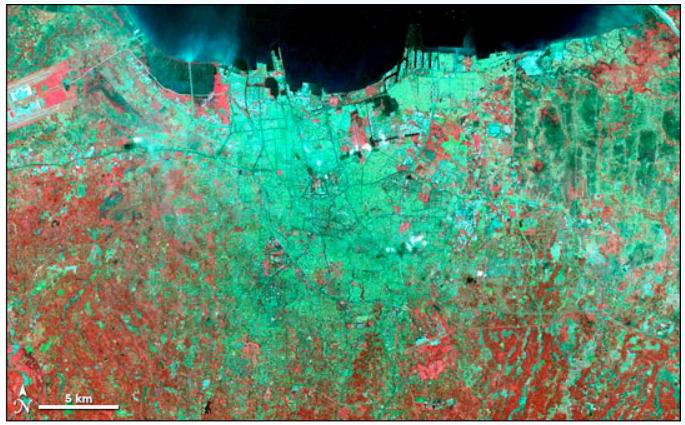


German Report on Biofuels

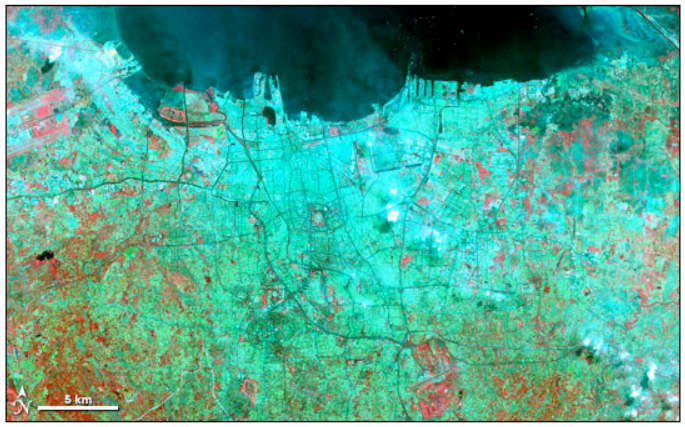
- 800 studies looked at
- Legislators will link biofuels integration with binding **confirmation of:**
  - **sustainable management of agricultural areas;**
  - **protection of natural biospheres in the production of the biomass used (protection = 10%?);**
  - **specific CO2 reduction potential.**
- **Such results never experienced** - enormous challenges (and cf. ADEME in September):
  - meaning of "area of high natural value"
  - stricter certification = lower market share (FSC 2%) or government adoption
  - ...

Sustainable management of agricultural land: Jakarta:1976-2004

1976 : 5 millions d'habitants

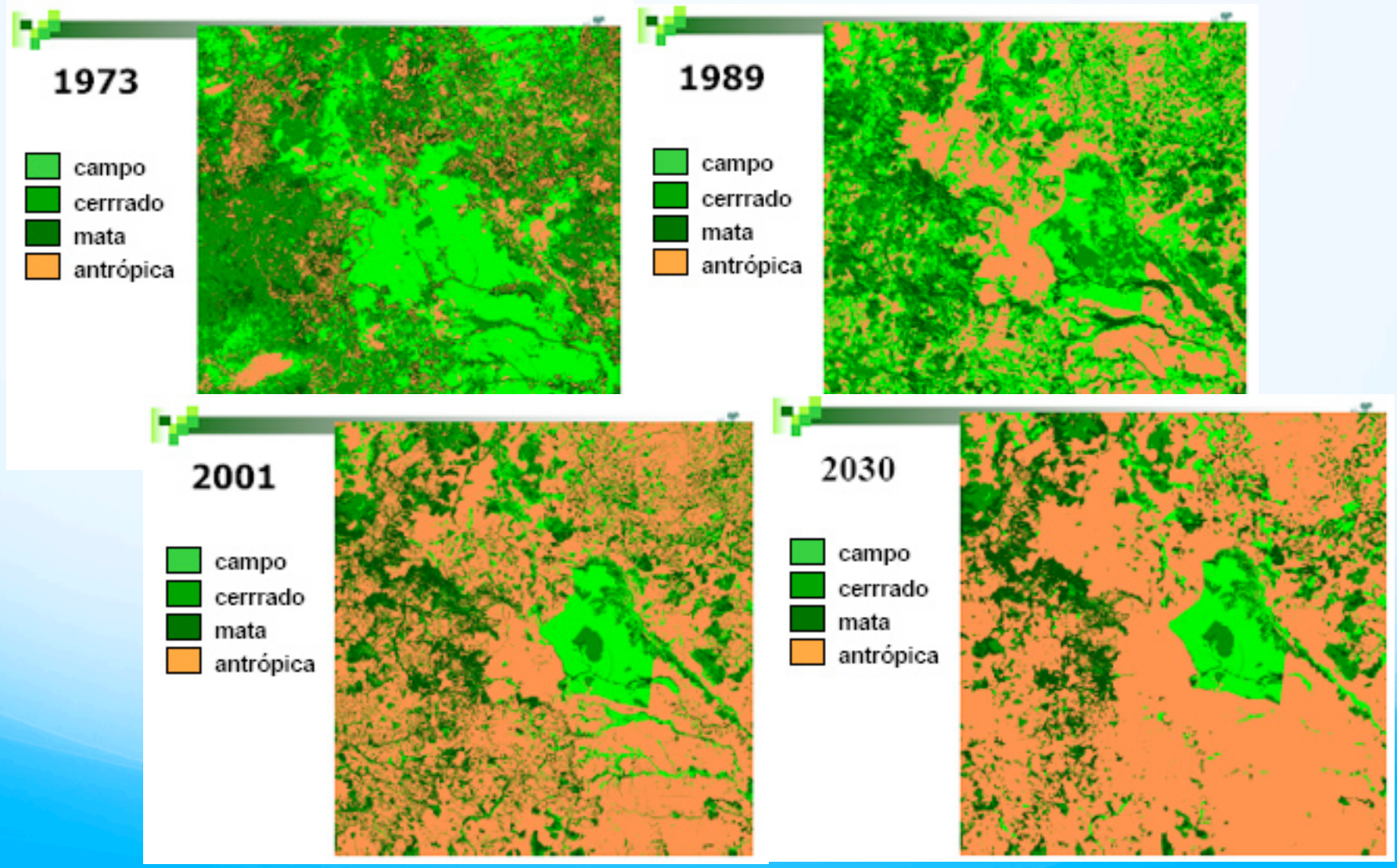


1989 : 7,4 millions d'habitants



2004 : 13 millions d'habitants

Protection of natural biosphere areas (forests, grasslands, ...)



Preliminary Questions Remaining Apparently Unasked, Unanswered

- What surface area is needed for biofuels to replace oil?
- What surface area is left for chemical bioproducts to replace petrochemicals? They'll need biofuels....
- How much land needed to accommodate increasing population at their present standard of living?
- How much further land needed to allow poor populations to reach a decent standard of living?
- What is the productivity of cereals by comparison with oil?
- What is the 'oil content' of cereals (life cycle)?
- What is the potential of GMOs to provide bioproducts capable of rivaling oil?

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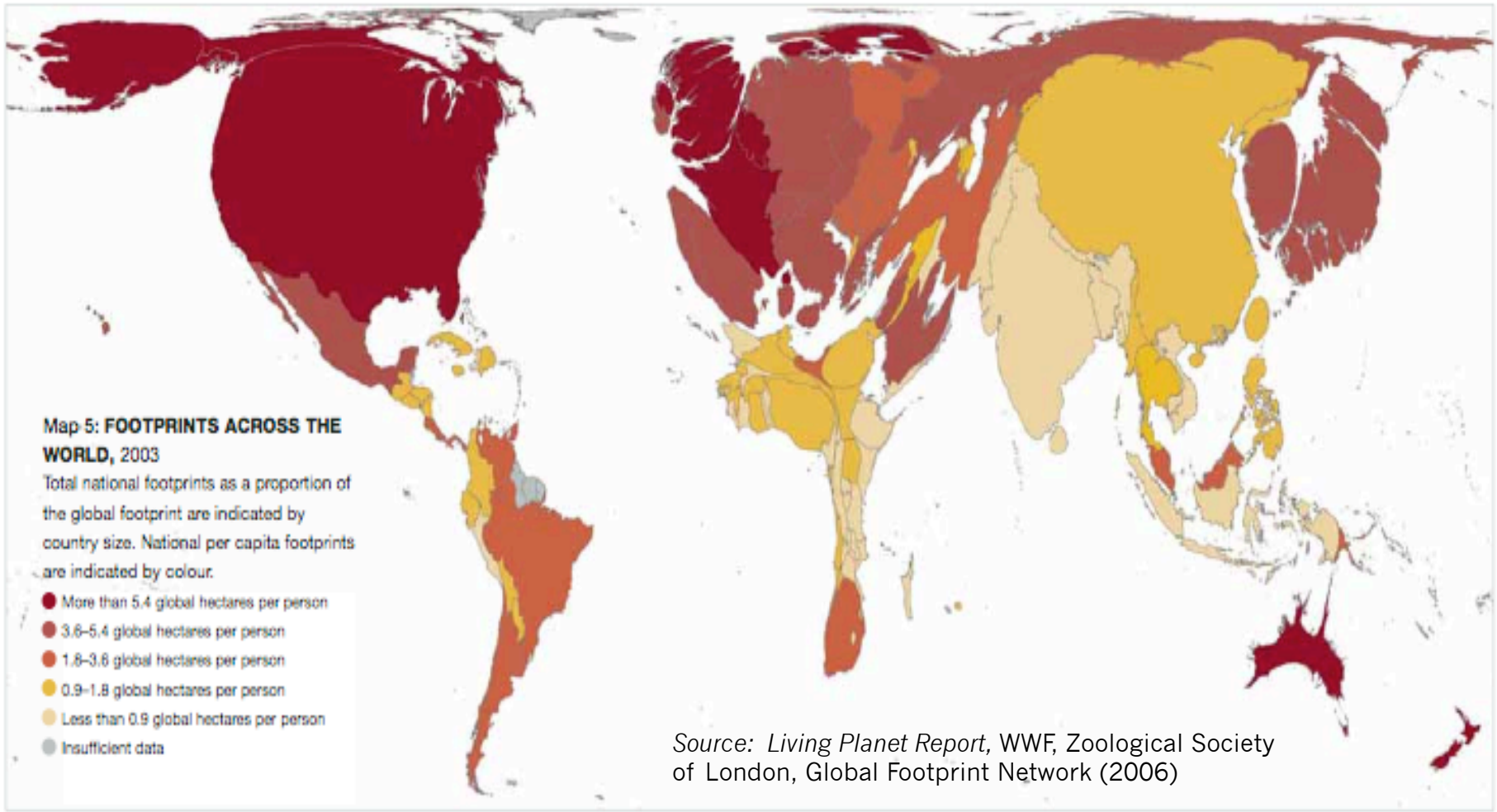

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