Virtual Academy for Sustainability

WBGU
German Advisory Council on Global Change

Lecture 2: Global Megatrends

Episode 2: Megatrends of the Global Economy and Society

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World in Transition: A Social Contract for Sustainability *supported by*

DBU
Deutsche Bundesstiftung Umwelt

Episode 1: Megatrends of the Earth System

Episode 2: Megatrends of the Global Economy and Society

Episode 3: Interview

Learning Outcomes

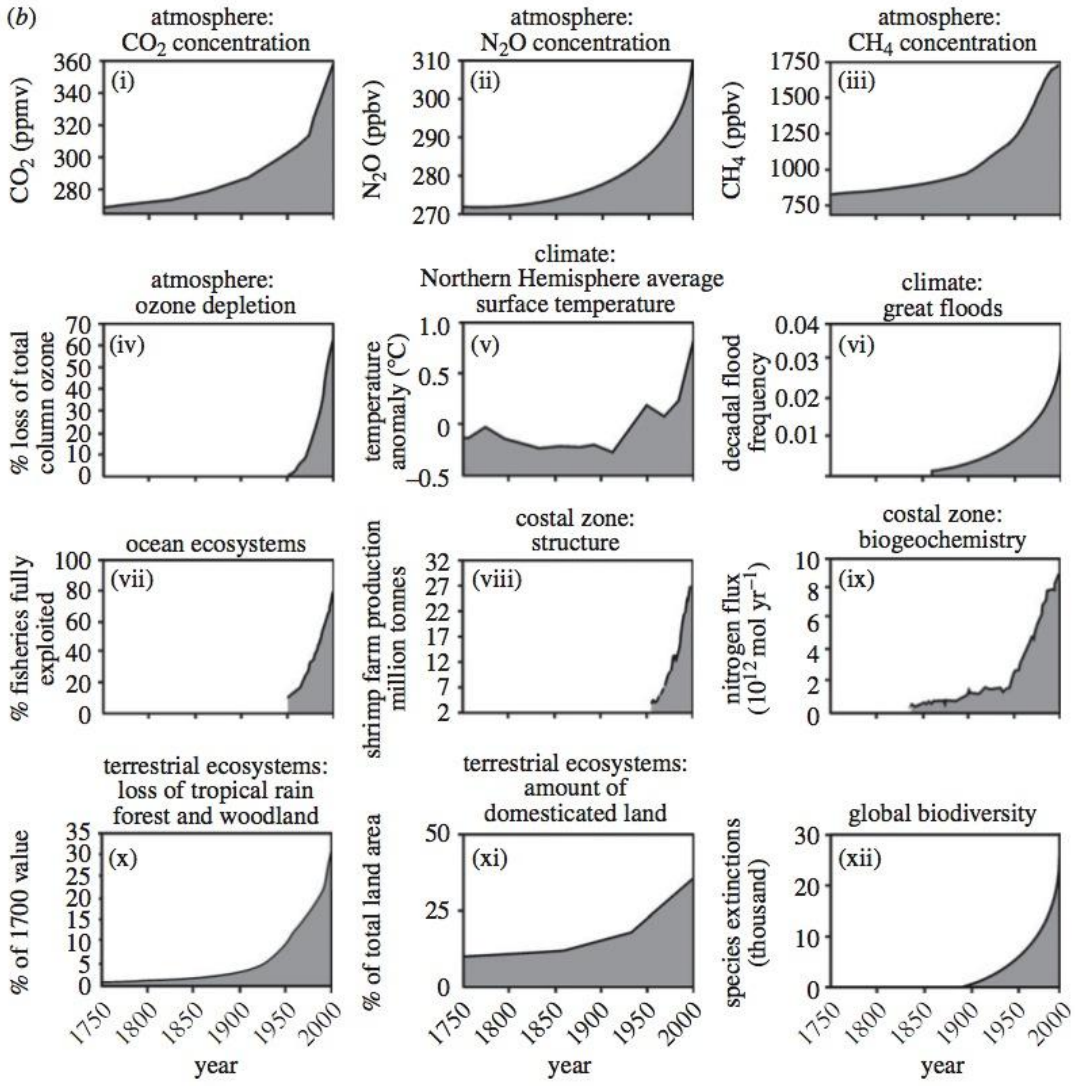
You will learn

1. how **societal and environmental changes** are closely **interrelated** as one megasystem, especially since the Great Acceleration;
2. that **global development** has **advanced** in an astonishing way, however, **without respecting planetary guard rails**;
3. why **democratisation is a prerequisite**, not an obstacle for the Great Transformation towards sustainability;
4. that **urbanisation** must be a **key target** for the Great Transformation towards sustainability
5. that **land use** presently is **not based on systemic knowledge**
6. that **already changing values** do provide justified **hope** for the success of the Great Transformation

Content

- Interaction of Natural Spheres and the Anthroposphere
- Development Trends
- Democratisation Trends
- Global Energy Trends
- Urbanisation Trends
- Increasing Land Use Competition
- Changing Values

The Great Acceleration



Atmospheric gases

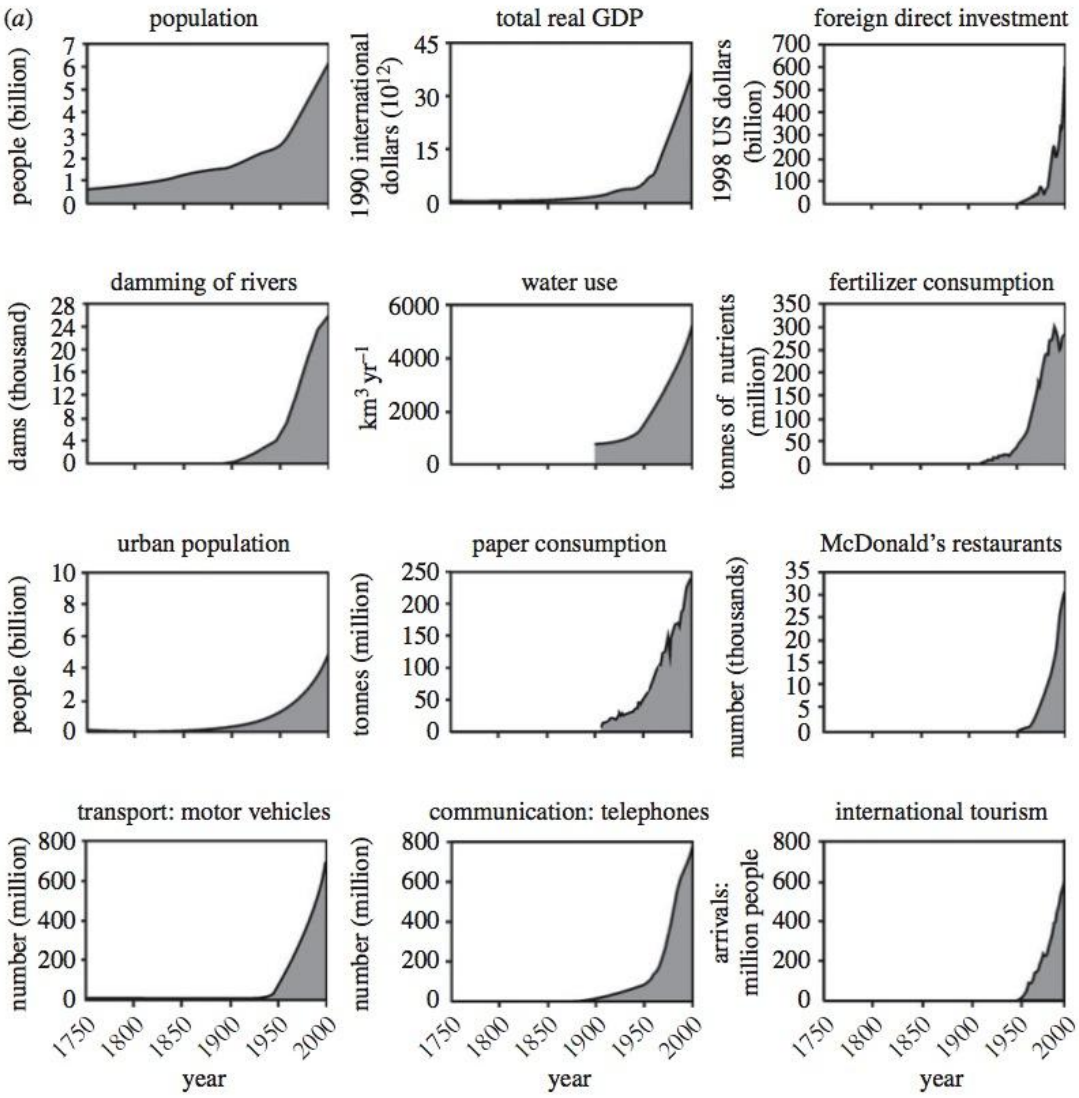
Climate change effects

Ocean structure

Ecosystems and biodiversity

Source: Steffen et al., 2011

The Great Acceleration



Population and economy

Land management

Cities and consumption

Infrastructures

Source: Steffen et al., 2011

Interaction of Natural Spheres and the Anthroposphere

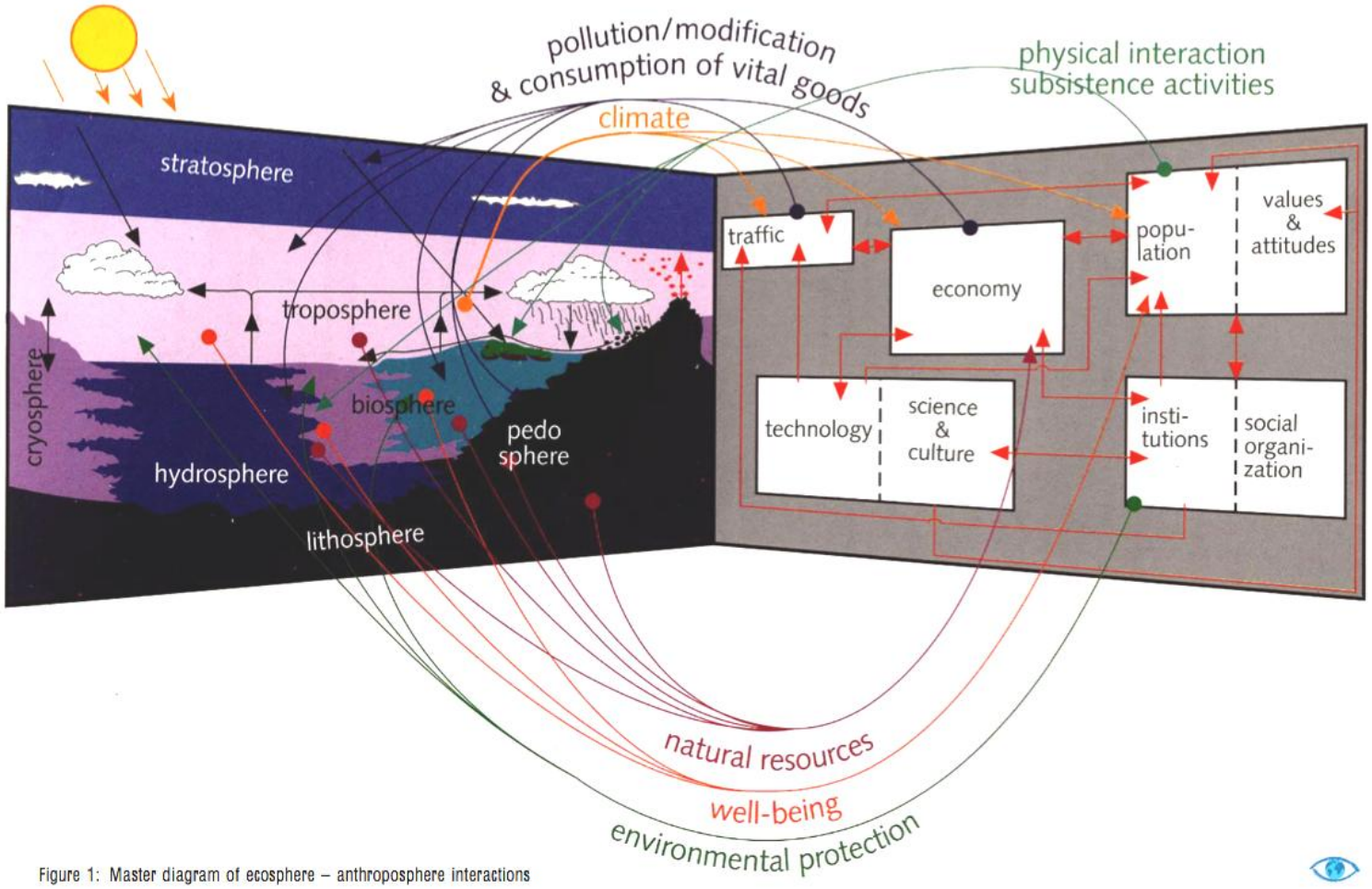
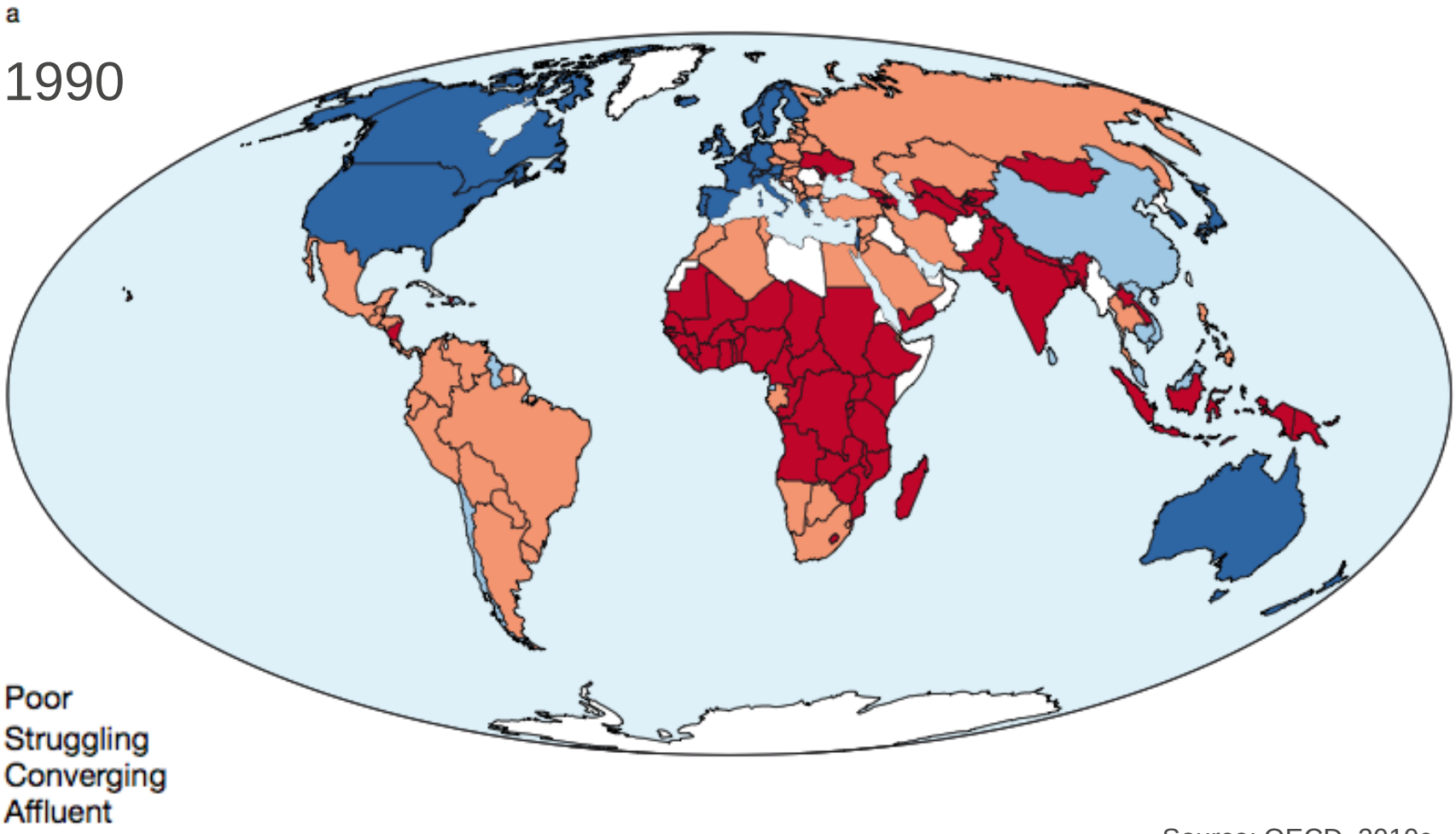


Figure 1: Master diagram of ecosphere – anthroposphere interactions

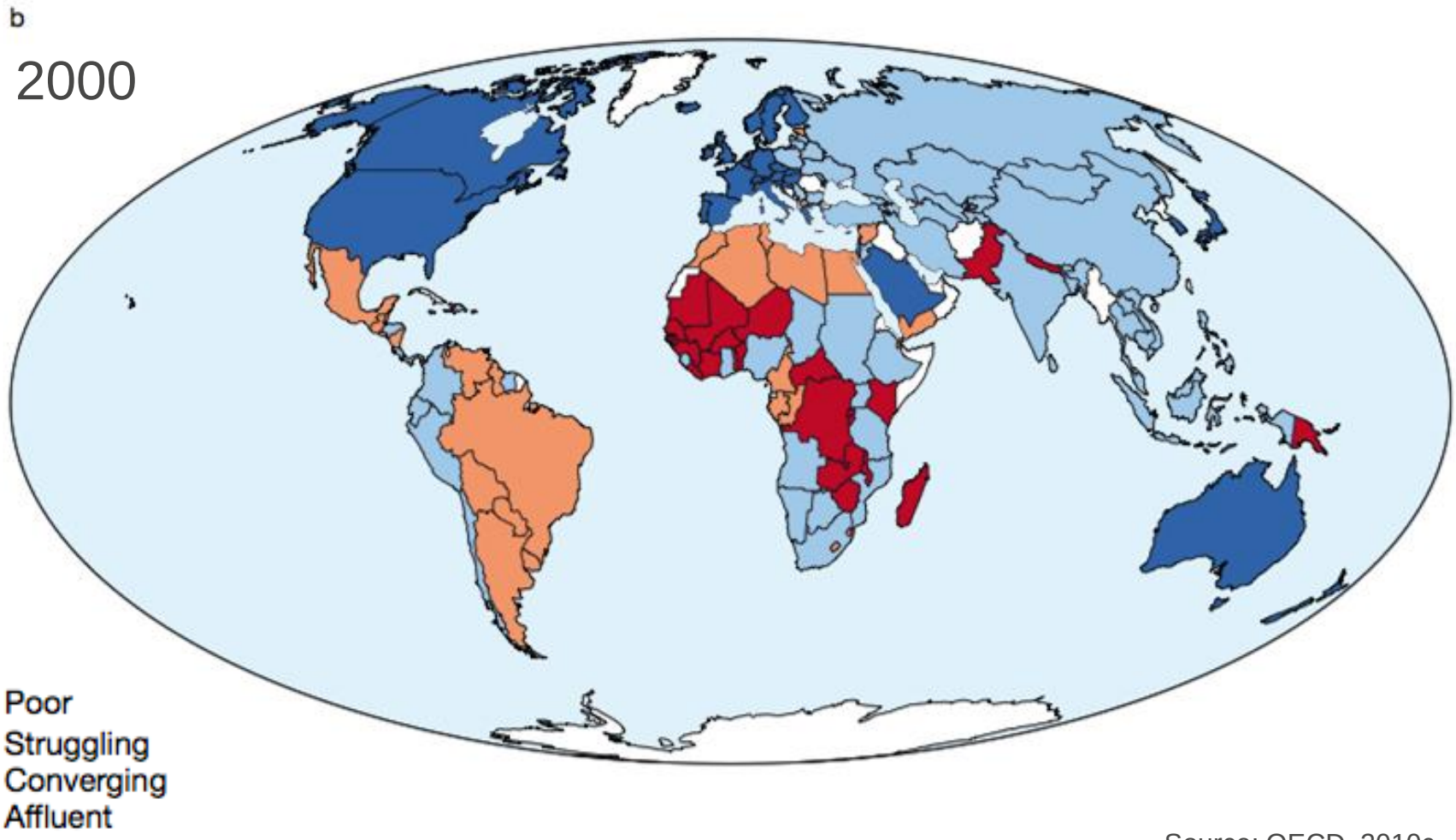
Source: WBGU, 1993

Dynamics of national wealth development



Source: OECD, 2010c

Dynamics of national wealth development



Source: OECD, 2010c

Progress in many areas of human development **over past 20 years:**

- healthier and longer life
- better education
- improved changes of covering basic needs

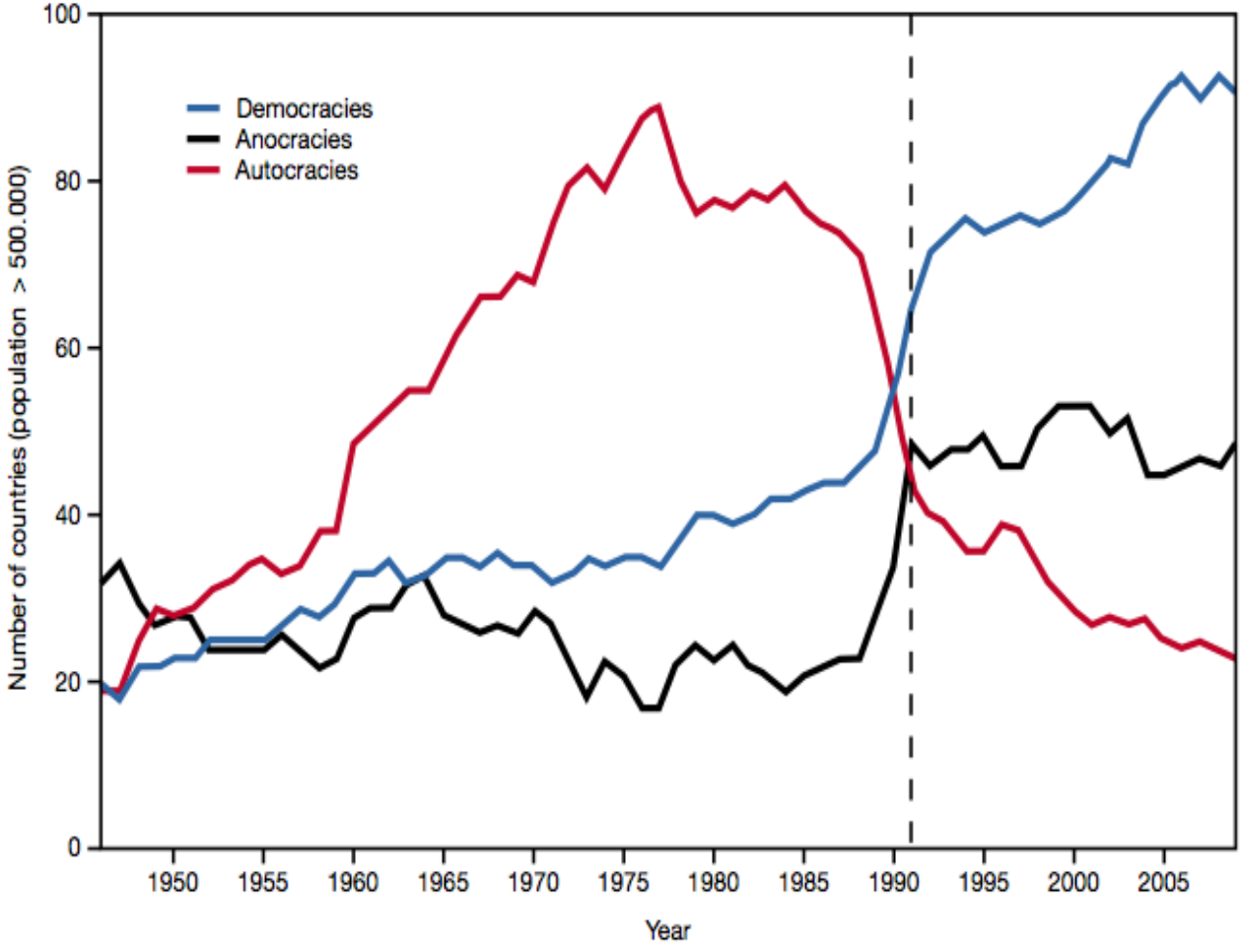
Most significant **development progress in poor countries** (e.g. Nepal, Oman, Tunisia)

- **1990: 1.81 billion people below poverty line** (US$ 1.25/day)
- **2005: 1,38 billion people**
- „bottom billion“ today in middle-income countries (India, China, Nigeria, Indonesia, Pakistan, South Africa)
- rest in low-income countries
- improving trend, despite financial crisis

Very **different speeds, counterdevelopment** in health improvement in 19 countries (adult mortality); **strong socio-economic disparities**

However: Growth trends are unsustainable: fossil fuel, resource-based export models (agricultural etc.); thread for further economic development

Democratisation Trends



1828-1926: American/French revolution etc.

1943-1962: Post-war (W-Germany, Italy, Japan)

1970-80s: Portugal, Latin America, Africa, East Asia

1981-1991: Collapse of E. European socialist systems (see left)

Present: „Arabellion“?

Source: Marshall and Cole, 2009

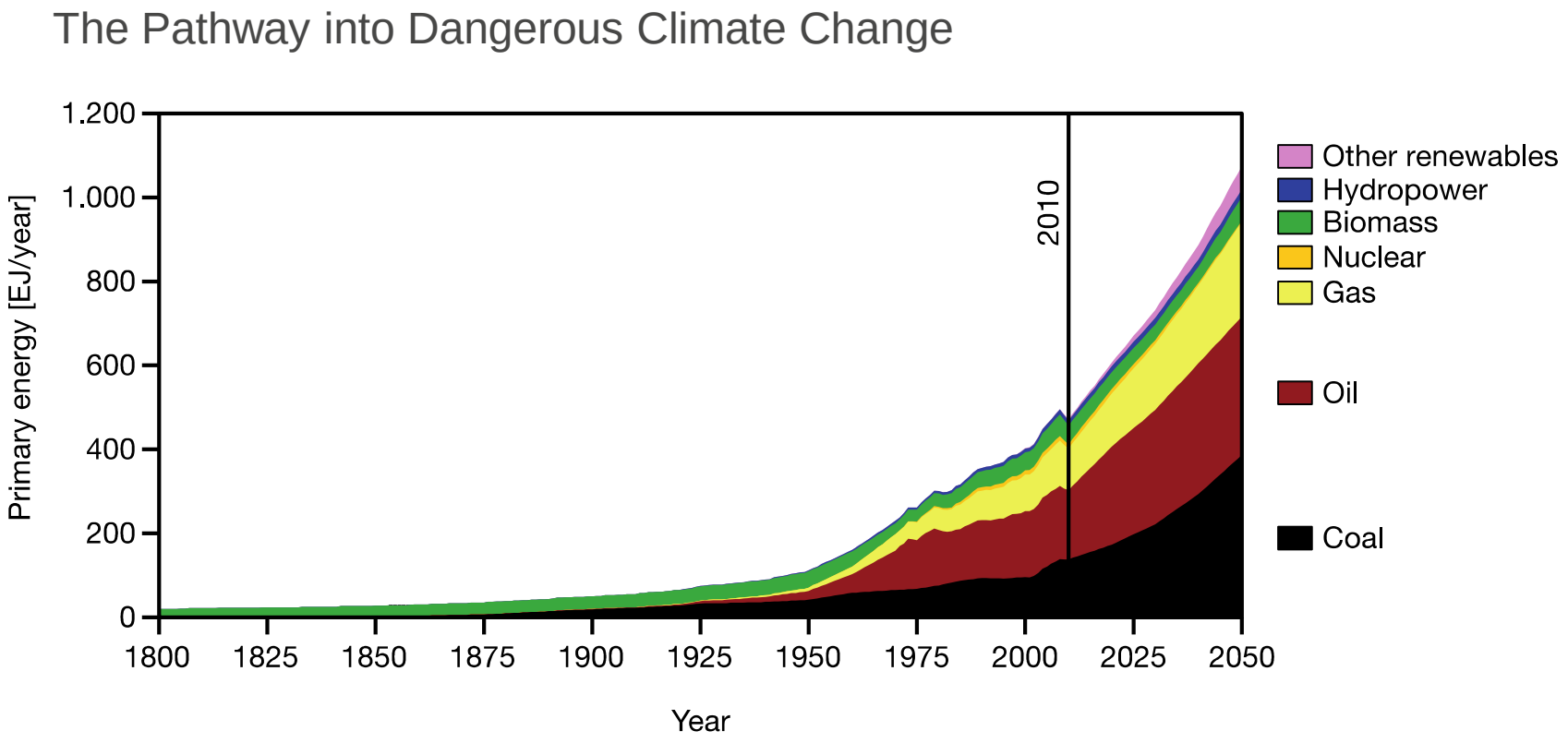
- Transformation is about the **finding of legitimate, fair, creative and permanent problem solutions for a sustainable life**
- Needs **citizens to actively participate** in shaping visions
- Aims of a good life **must be discussed globally by citizens**

> **Only a democratic public**

  - **allows** this kind of **debate**
  - can make the **required self-restrictions and chances** for a better life plausible
  - can form the **basis for** the necessary political **decisions**

> **Transformation is a societal search process and requires more, rather than less, democracy**

Projection Primary Energy Demand BAU



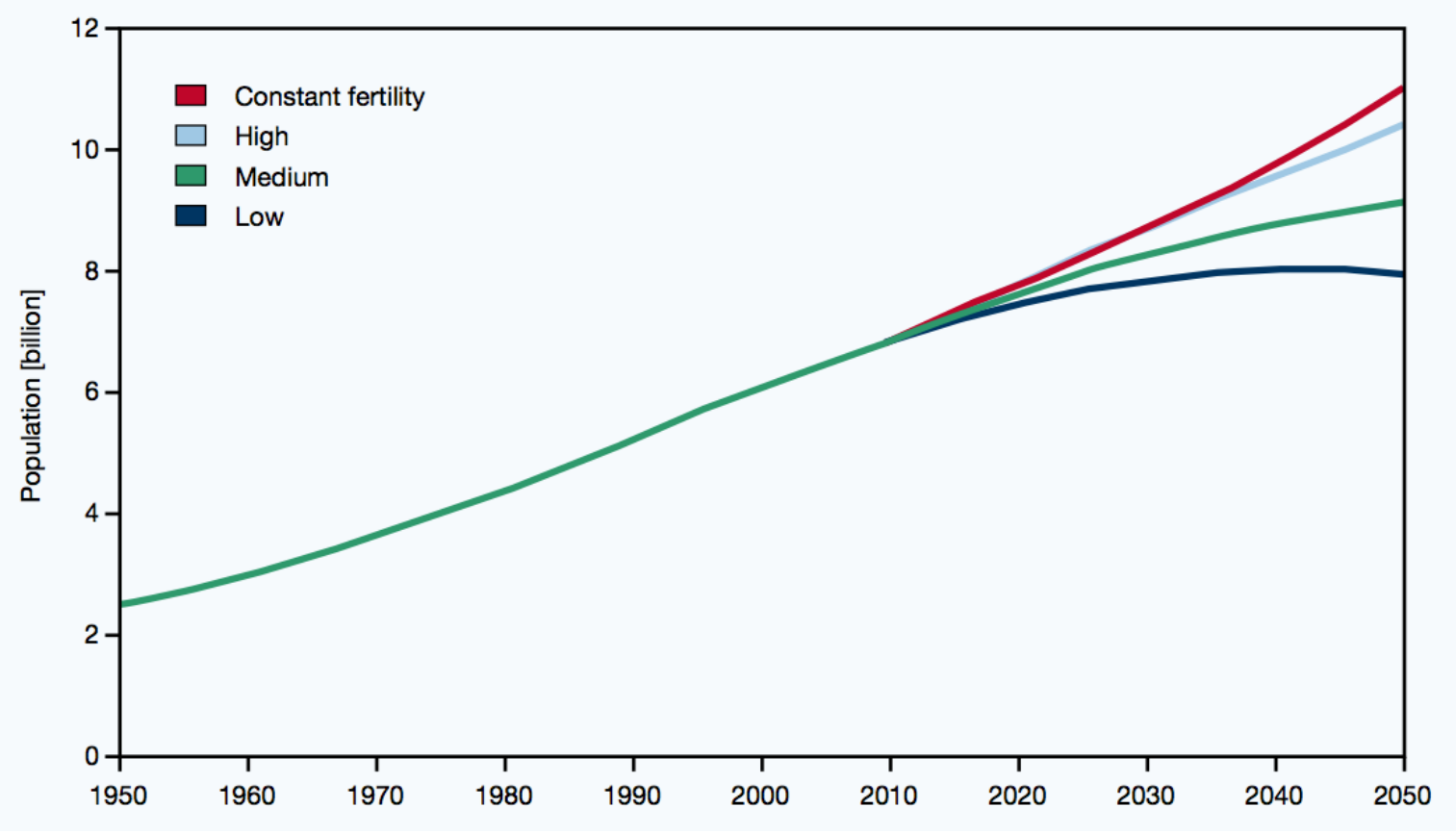
Source: WBGU based on data from GEA, 2011

- **OECD** countries:
  - **half of global** primary energy **demand**
  - **only 20%** of global **population**
  - **three-quarters of global GDP**

- **2.8 billion** people use **traditional biomass for cooking**
- **1.4 billion people** do **not** have access to **electricity**
- **BAU**: primary energy demand + 1.2% annually**: 2035: 36% higher than 2008**
  (93 % would be from non-OECD countries, from this: China 36%, India 18%)
- **Coal:** 2000 vs. 2008: 24% vs. 28% of primary energy
- **Nuclear**: 1990 vs. 2008: 18% vs. 13% of global electricity generation
- **Modern renewables**: 2010: 19% of global electricity supply, 10% of heating needs

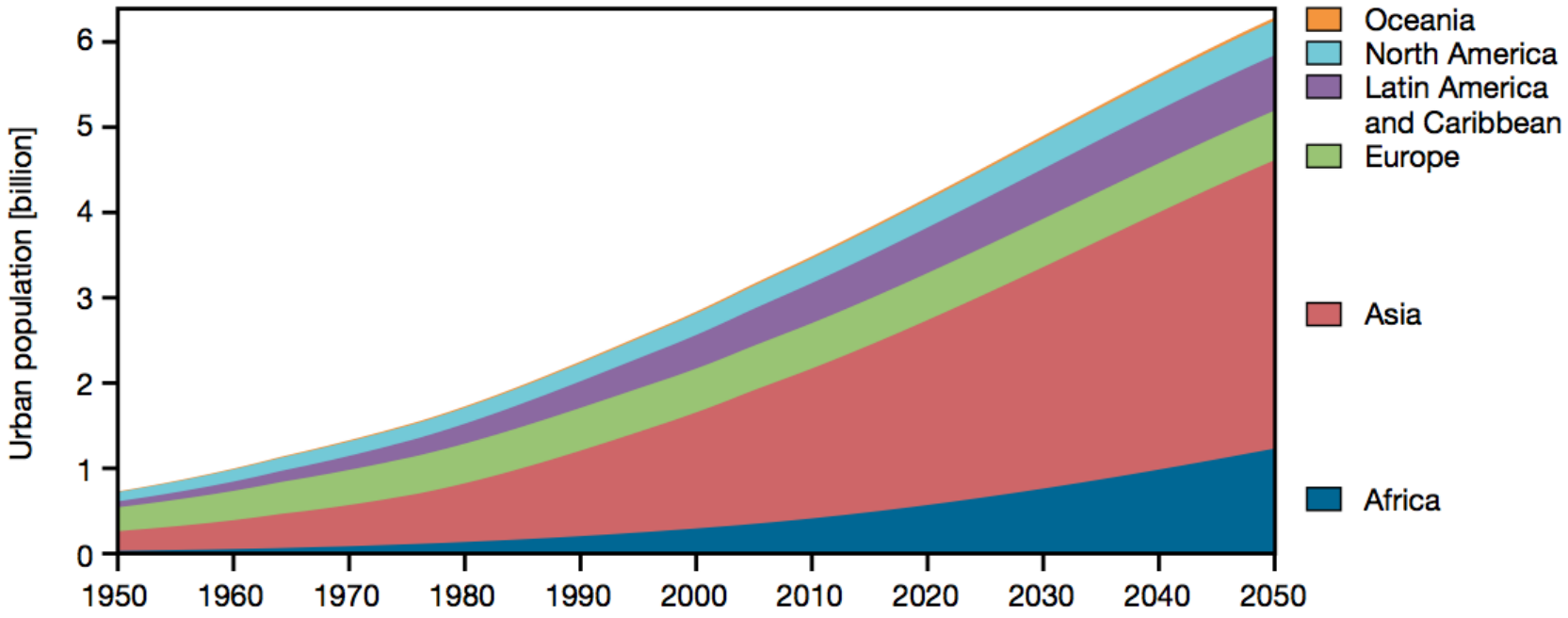
Source: WBGU based on data from GEA, 2011

Global Population 1950-2050



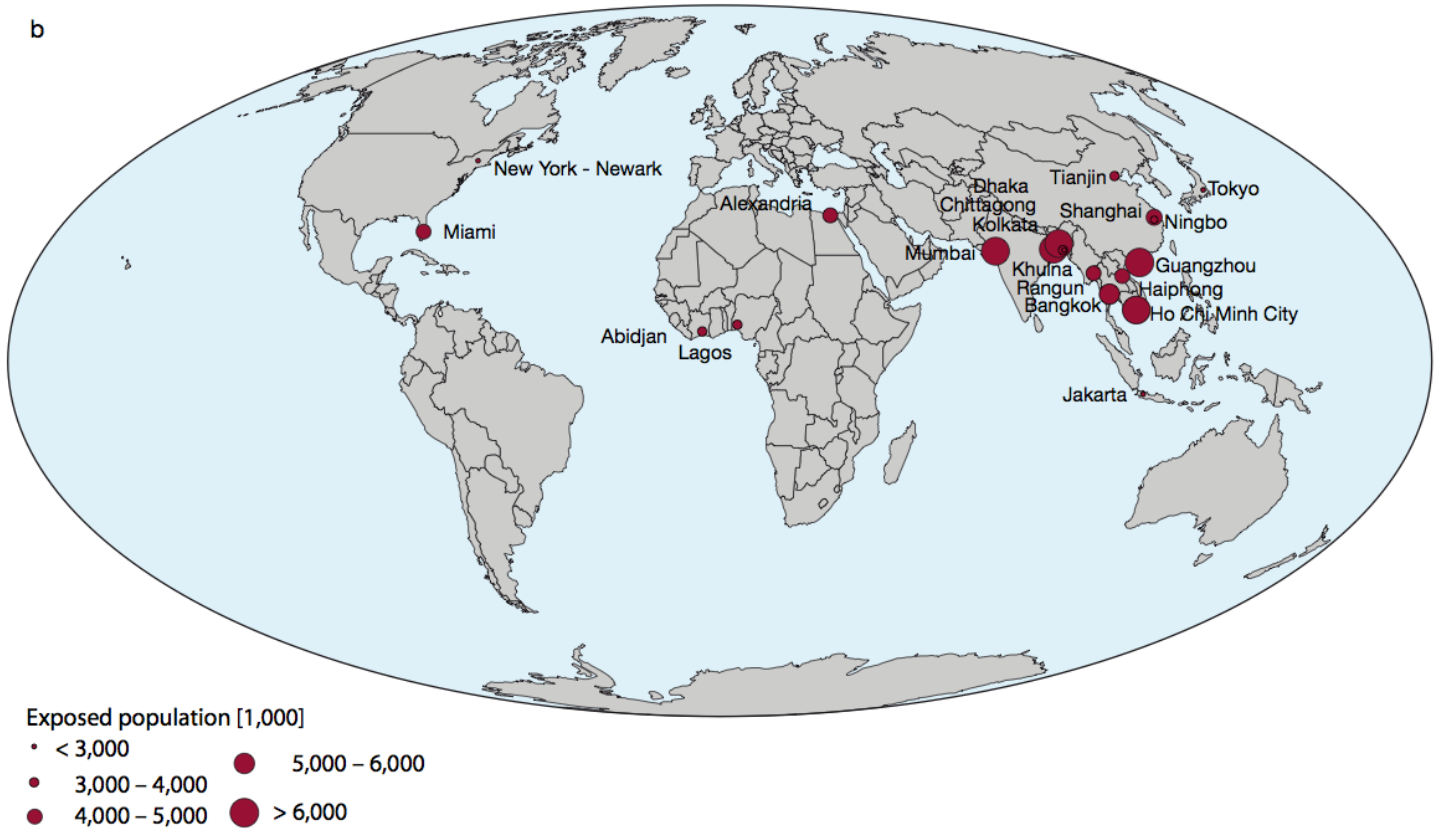
Source: UN DESA 2009

Urban Population 1950-2050



Source: UN DESA 2009

People exposed to climate change risk



Source: Nicholls et al., 2008

Transformation field urbanisation

Trends:

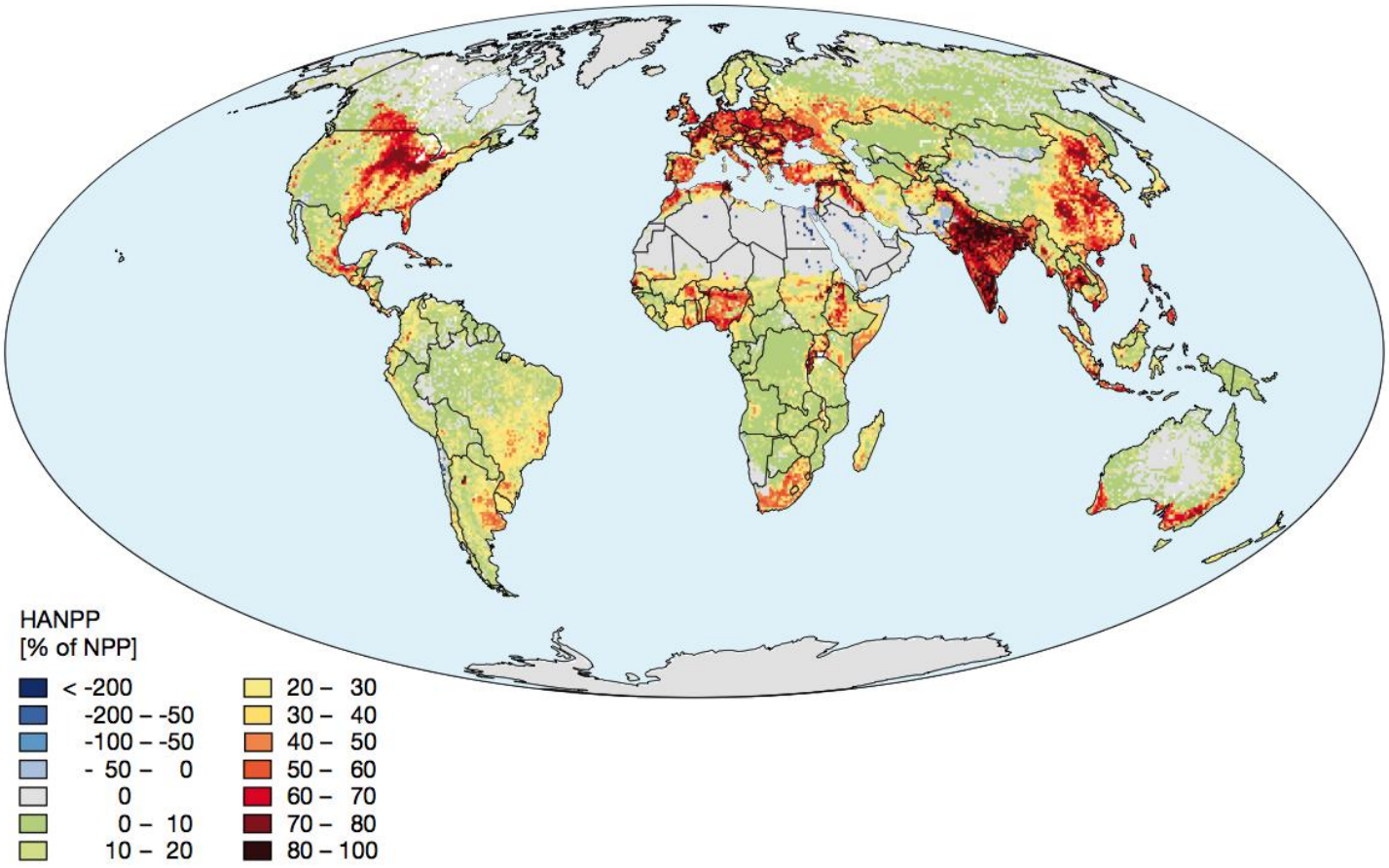
- **About ¾ of** global **end energy** is **used in cities**, increasing trend
- Expansion of cities creates **new long-term infrastructures** and is influencing the demand for end energy over a long time span
- **Half of world population** lives **in cities**: **2050 ca. 6 billion**
- **Asia**: **until 2030 urban** population will double to **3 billion**

Challenges:

- **Managing** low-carbon urbanisation quickly
- Low-carbon **conversion** of existing cities

„Emergency plan“ – time pressure – no low-carbon model city

Human appropriation of net primary production



Source: Haberl et al. 2007

Transformation field land-use

Trends:

- **Conversion** of forest, grassland and wetland in agricultural land

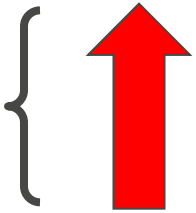
Challenges:

- **Deforestation** and **forest degradation**
- **Increasing food demand**: sustainable increase of global food production until 2050 up to 70 %
- **Changing** nutrition **habits**
- Increasing **use of bioenergy, biomass**

No consensus about a low-carbon agriculture!

Example Biofuels: False incentives created by the Kyoto Protocol

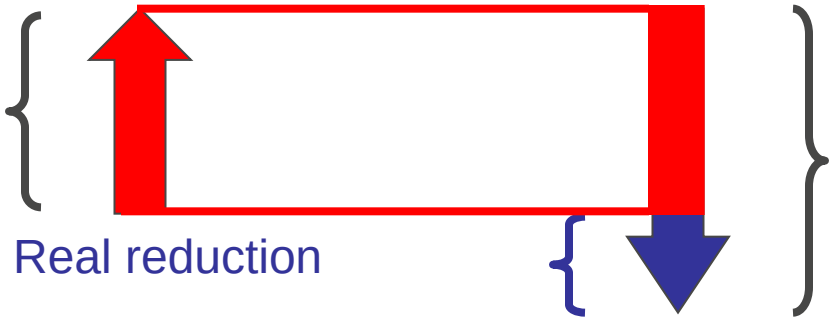
Emissions generated



Developing country: Cultivation of energy crops leads to emissions (e.g. deforestation)

Export (e.g. palm oil)

Example Biofuels: False incentives created by the Kyoto Protocol



Developing country:
Cultivation of energy crops leads to emissions
(e.g. deforestation)

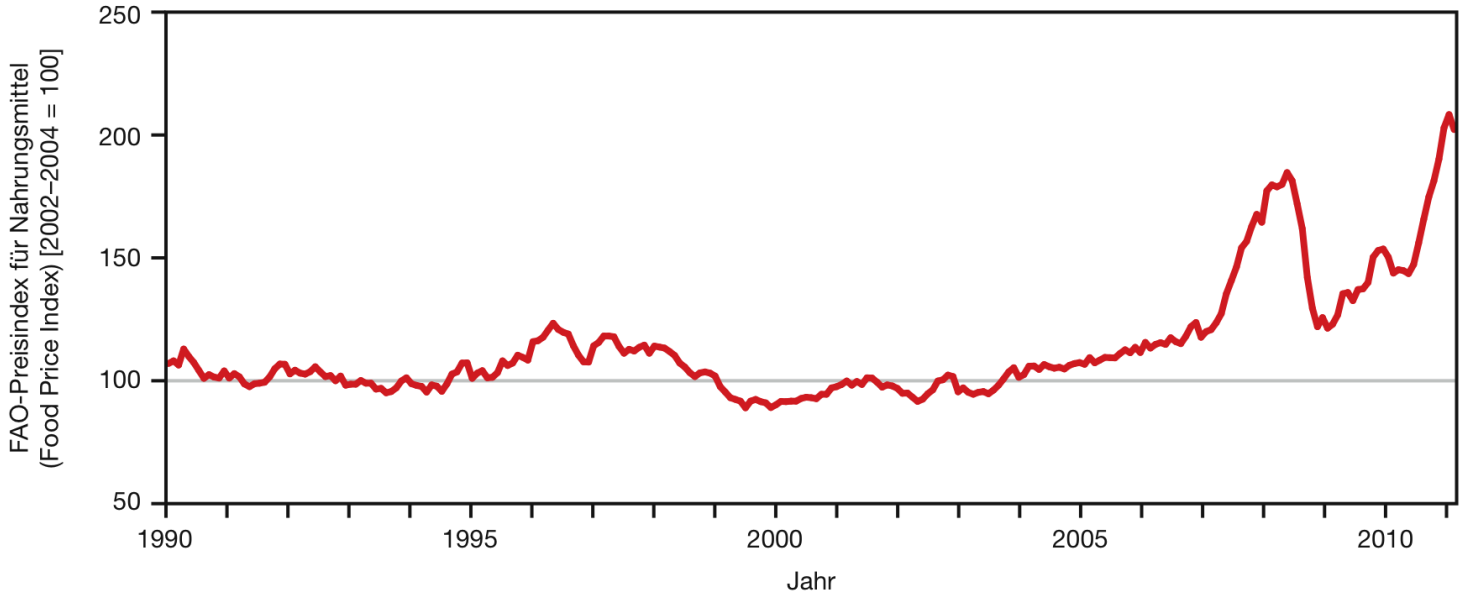
Export
(e.g. palm oil)

Industrialized country:
Use of bioenergy prevents fossil emissions
(e.g. diesel)

Accounted reduction > real reduction

Example Biofuels: fuel vs. food

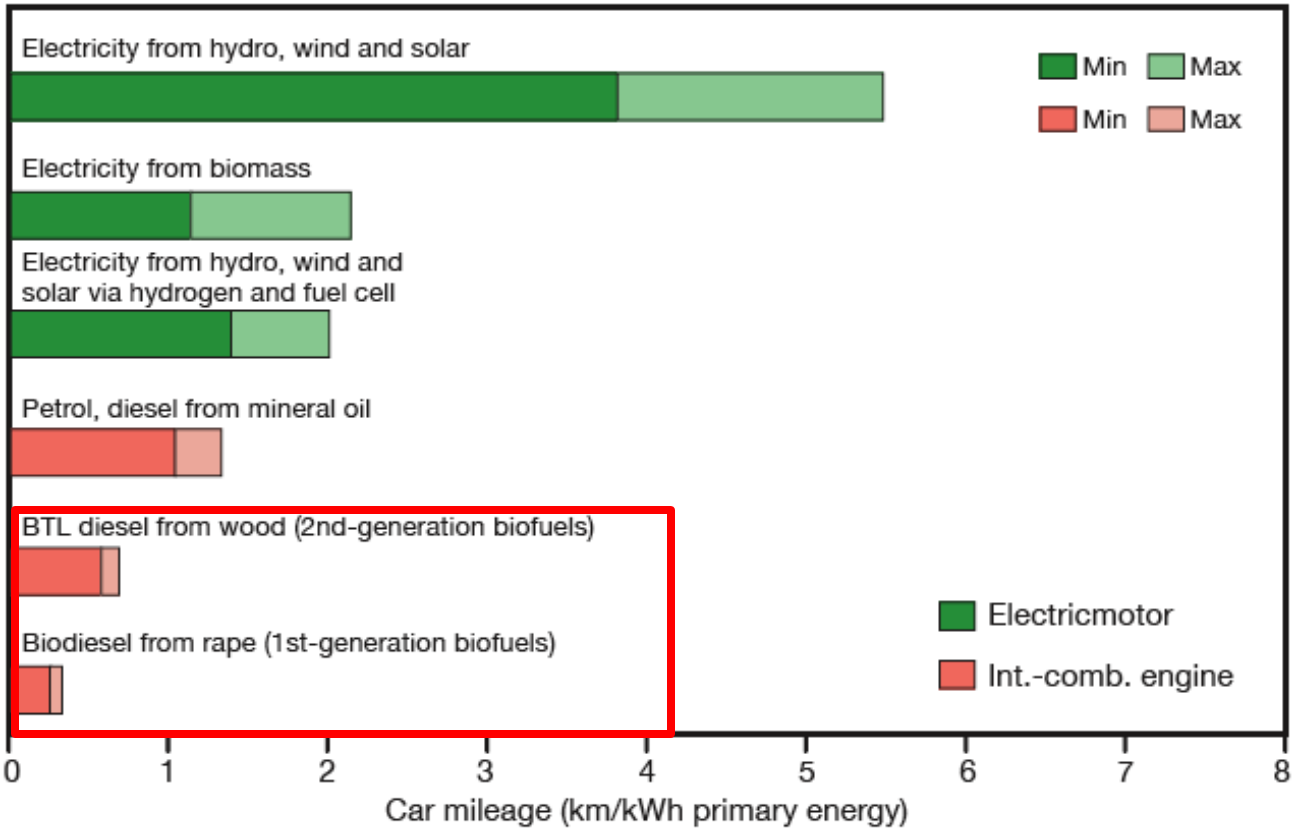
Food prices 1990-2011:



Source: FAO, 2011

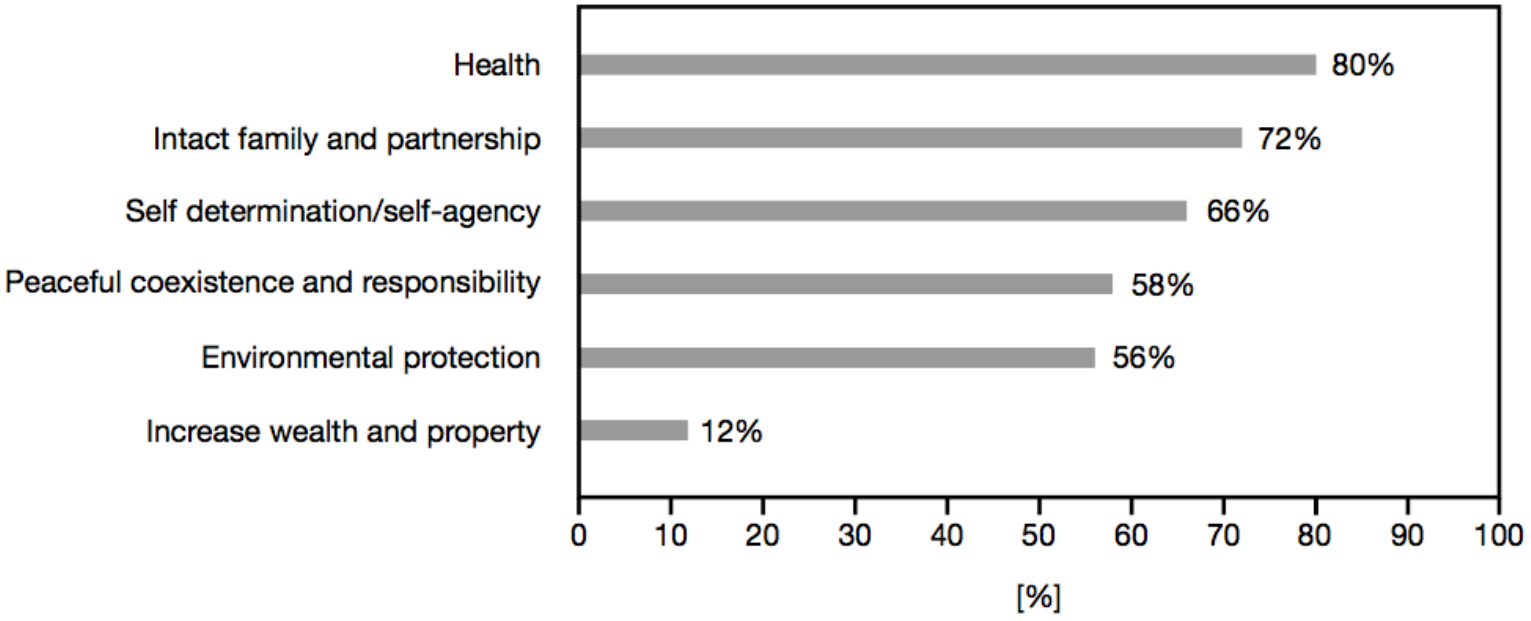
Example Biofuels: Lack of Efficiency

Efficiency of Energy Types for Cars



Source: WBGU, 2008

Quality of Life, Germany



Emnid Institute, telephone survey, N=1001

Source: Bertelsmann Foundation, 2010

The World Values Survey

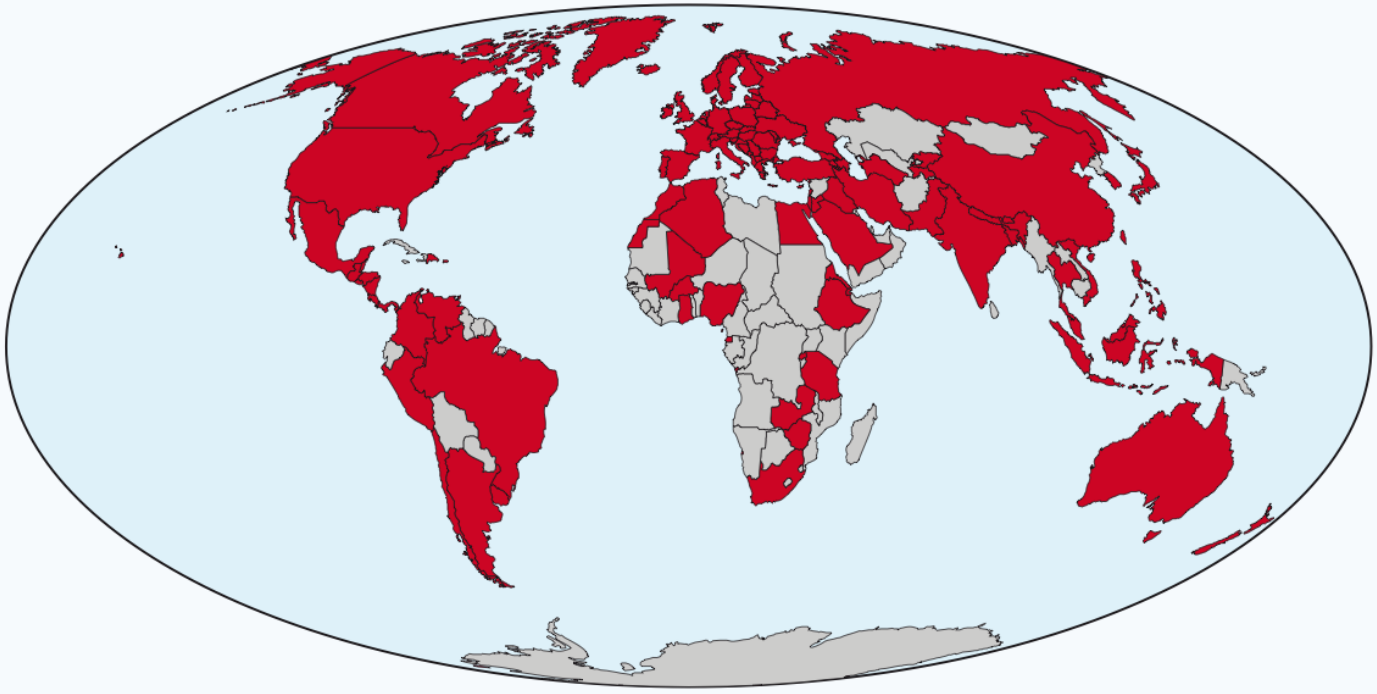
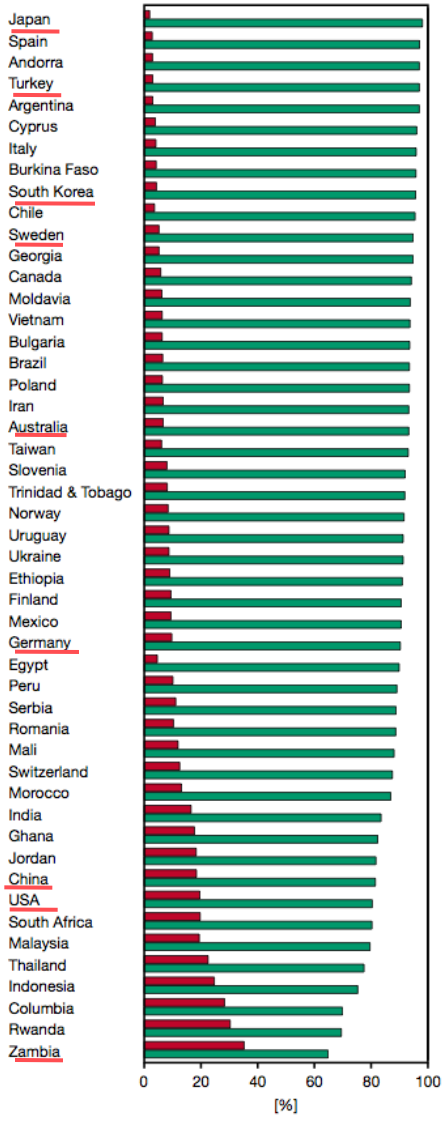


Figure 2.2-1
Countries covered by the World Values Survey, and sample sizes.
Red: 97 countries where people have been interviewed for the WVS up to 2007.
Source: WVS, 2010

Wave	Years	Countries	Population	Sample
1	1981–1984	20	4.7 billion	25,000
2	1989–1993	42	5.3 billion	61,000
3	1994–1998	52	5.7 billion	75,000
4	1999–2004	67	6.1 billion	96,000
5	2005–2008	57	6.7 billion	> 77,000

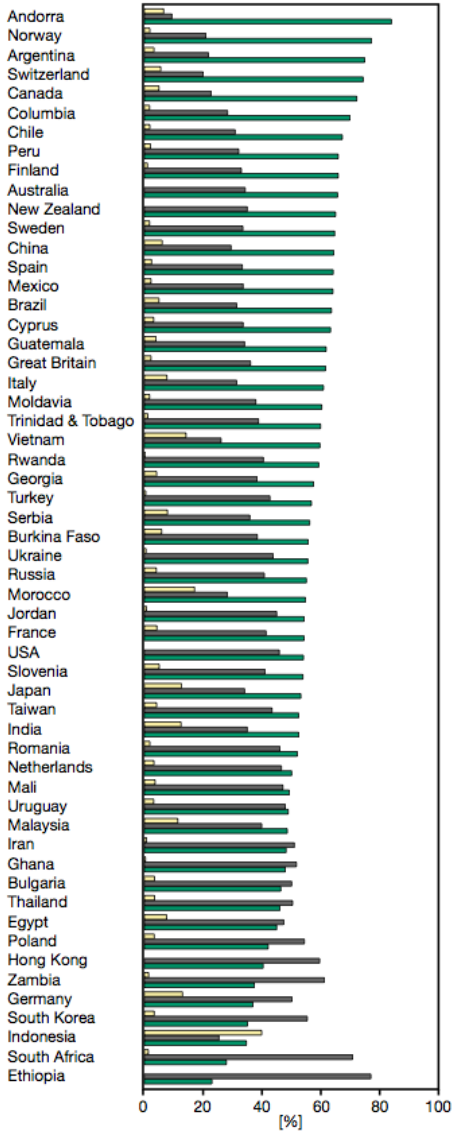
Changing Values



Left: **How serious** an issue is **global warming**, or the greenhouse effect?

Serious to very serious

Not very serious / not serious at all



Left: What is more important: protecting the **environment**, or **economic growth** and **creating jobs?**

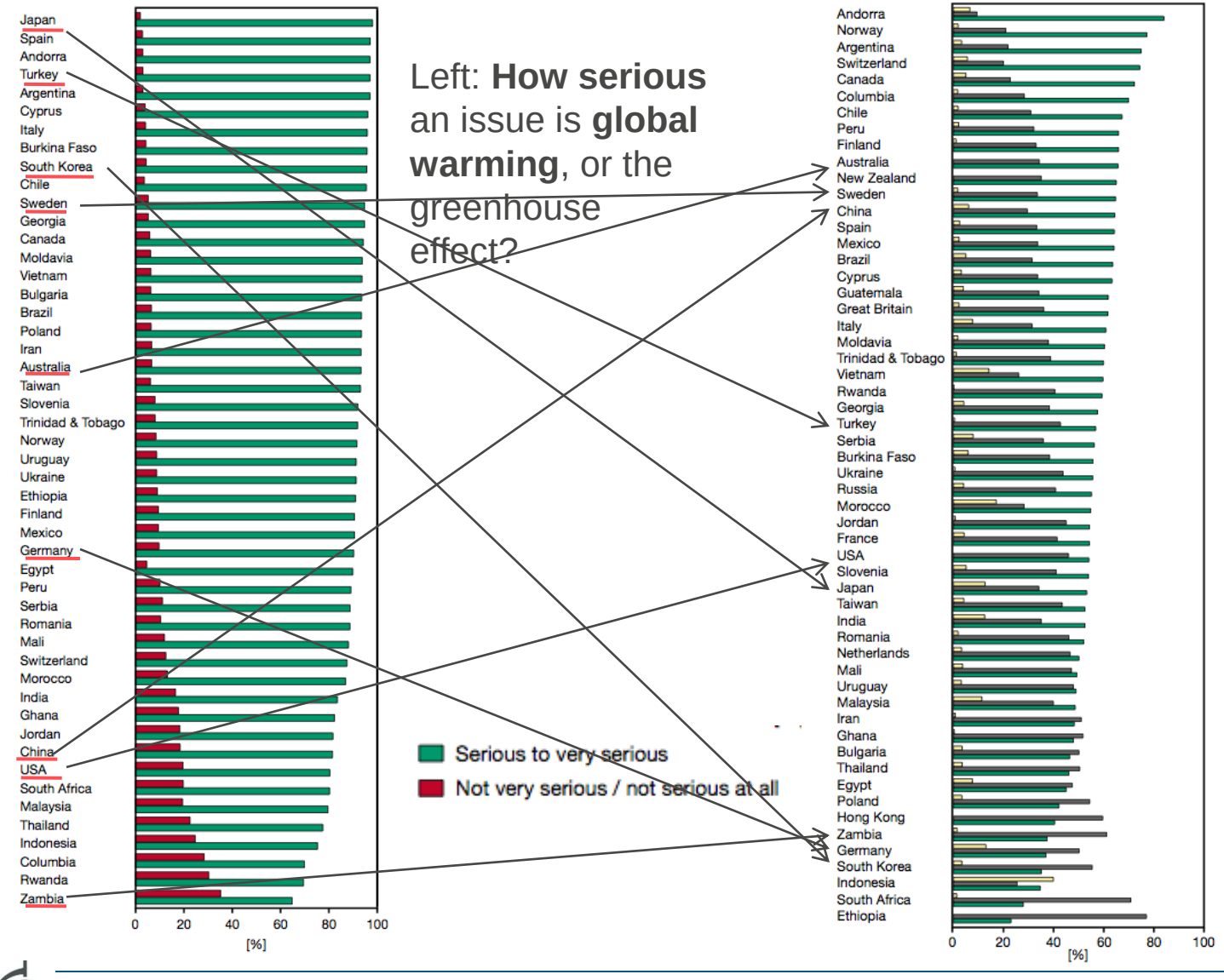
Other

Economic growth & employment

Environmental protection

Source: WVS, 2009

Changing Values



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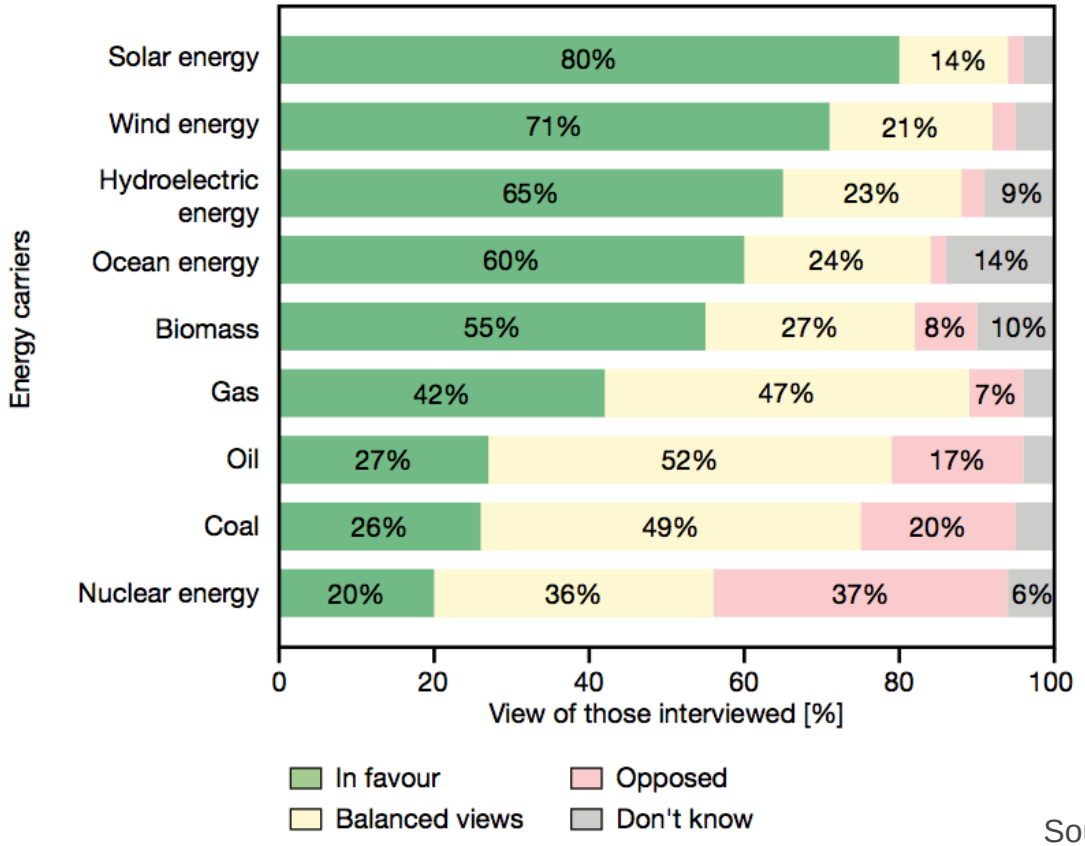
Other
Economic growth & employment
Environmental protection

Source: WVS, 2009

Acceptance of different energy sources within the European Union



Source: Eurobarometer, 2007

Overview of concepts for measuring welfare and sustainability

Type of measuring concept	Name of index/indicator	Economic Dimension	Social Dimension	Ecological Dimension
Beyond GDP: monetised indicators/indices	Measure of Economic Welfare	x	x	x
	Index of Sustainable Economic Welfare (ISEW)	x	x	x
	Genuine Progress Indicator (GPI)	x	x	x
	Full Cost of Goods and Services (FCGS)	x		x
	National Welfare Index (NWI)	x	x	x
Beyond GDP: overall eco-balance/ satellite systems	Overall eco-balance/UN System of Environmental and Economic Accounting (SEEA)	x		x
Non-monetised indicators/indices	Ecological Footprint			x
	Living Planet Index			x
Compound indicators/indices (integration of monetised and non-monetised values)	Human Development Index (HDI)	x	x	
	Index of Economic Wellbeing	x	x	x
	Happy Planet Index*		x	x
	KfW Sustainability Indicator	x	x	x
	Sustainable Development Indicators (Eurostat)	x	x	x
	Index of Economic Freedom	x	x	
	Environmental Sustainability Index (ESI)/ Environmental Performance Index (EPI)	x		x
	Gross National Happiness* (Bhutan)	x	x	x
	Canadian Index of Wellbeing* (CIW)			
	Corruption Perception Index (CPI)		x	
	National Accounts of Well-being*		x	

(*index includes subjective indicators)

Source: WBGU, 2011

Exercises for self study

1. Can you identify additional examples for the Great Acceleration?
2. Check the WBGU flagship report 2011 for impacts of global financial and economic crisis on carbon emissions.
3. Why are current economic BAU growth trends incompatible with many Millenium Development Goals?
4. Did earlier waves of democratisation address environmental issues? How about the present trends in democratisation? (e.g. Tunisia, Myanmar etc.)
5. Which different sustainable pathways do you see to feed 10 billion people in the future?

References

Basic reading:

- WBGU (2011): World in Transition: A Social Contract for Sustainability, chapter 1. Berlin. www.wbgu.de

Further reading:

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