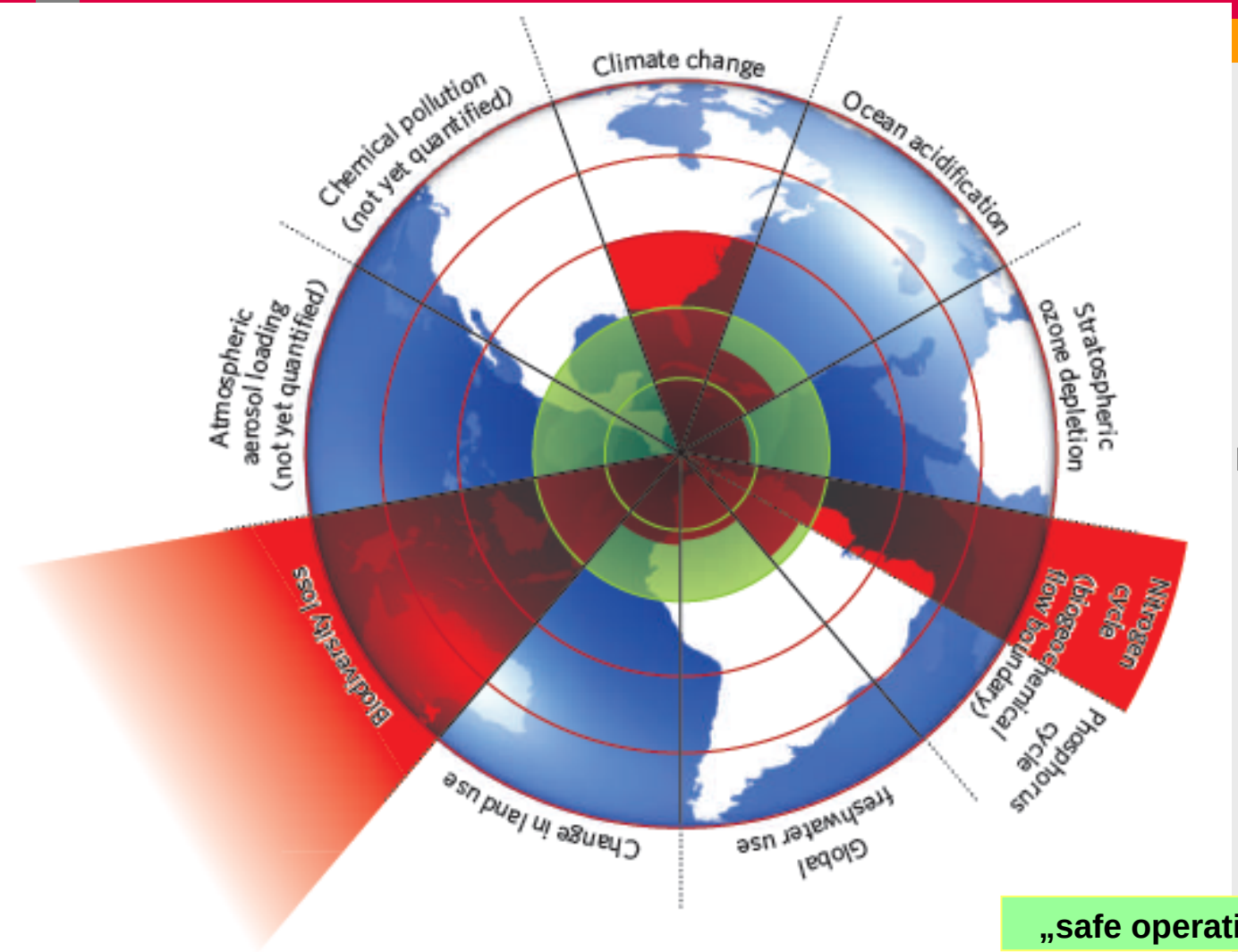
Global Development Challenges-

Getting the four fundamentals of our civilisation right!

Dirk Messner

January 18, 2010

“Global Development within the planetary Boundaries”

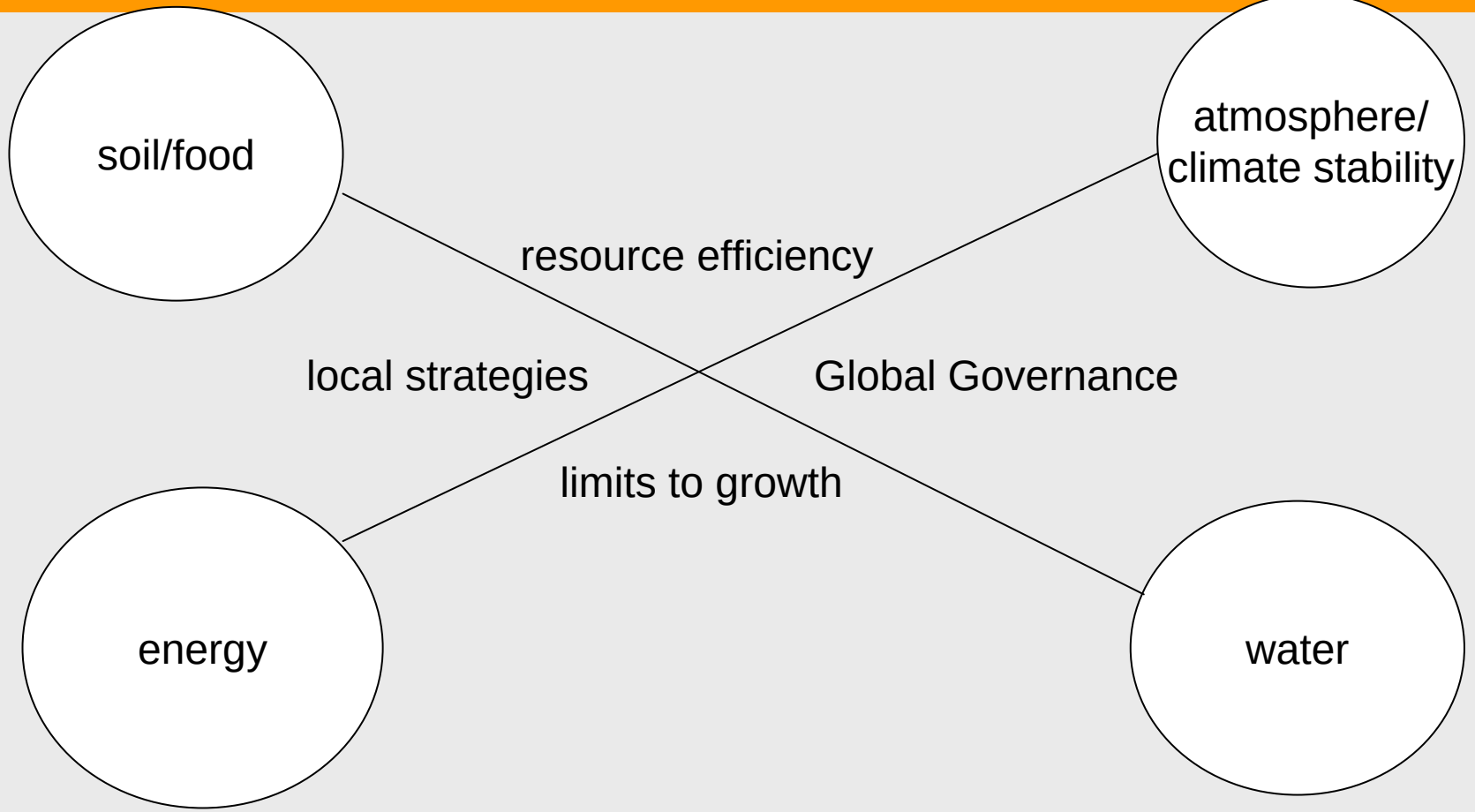


Global goals, targets, monitoring mechanisms, roadmaps

„safe operating space“ for humankind

Source: Rockström et al. in *Nature* 461, 24 September 2009

Fundamentals of global development (human mankind, civilization) under stress

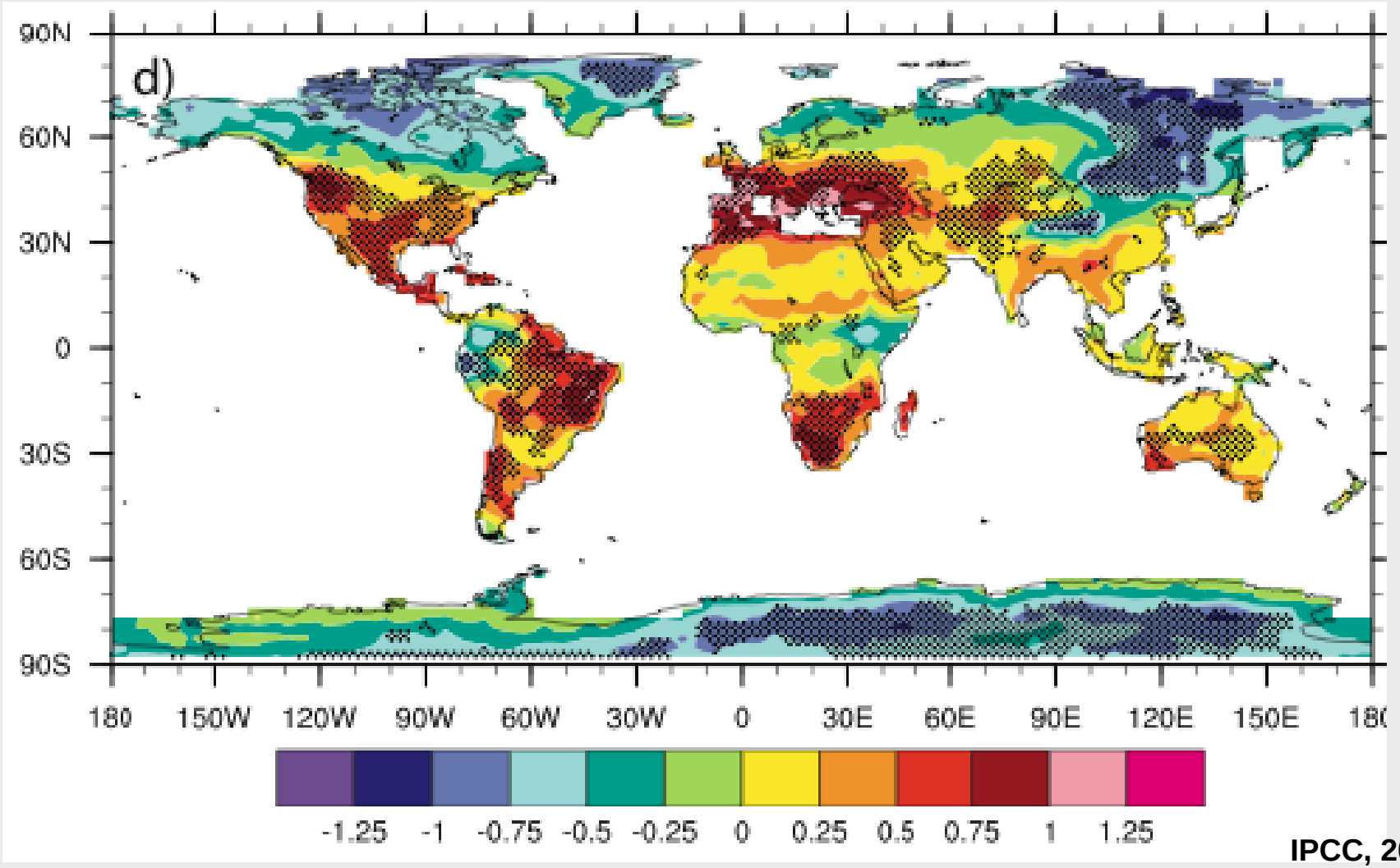


Risks for the most vulnerable ones ... and global systemic risks

How to get the four fundamentals right?

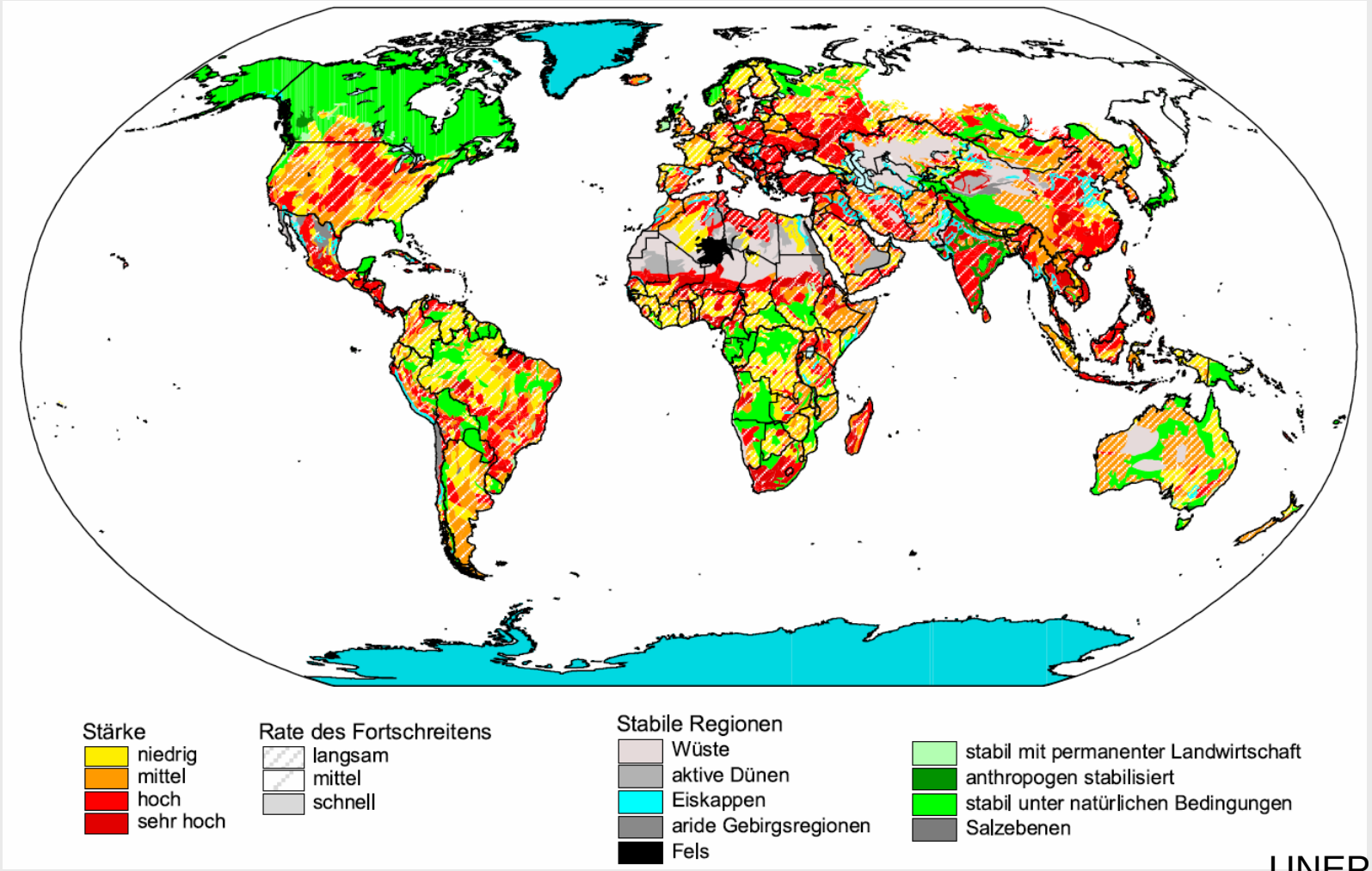
Droughts (3-4 ° celsius global warming)

Ensemble-Projections 2080-2099



IPCC, 2007

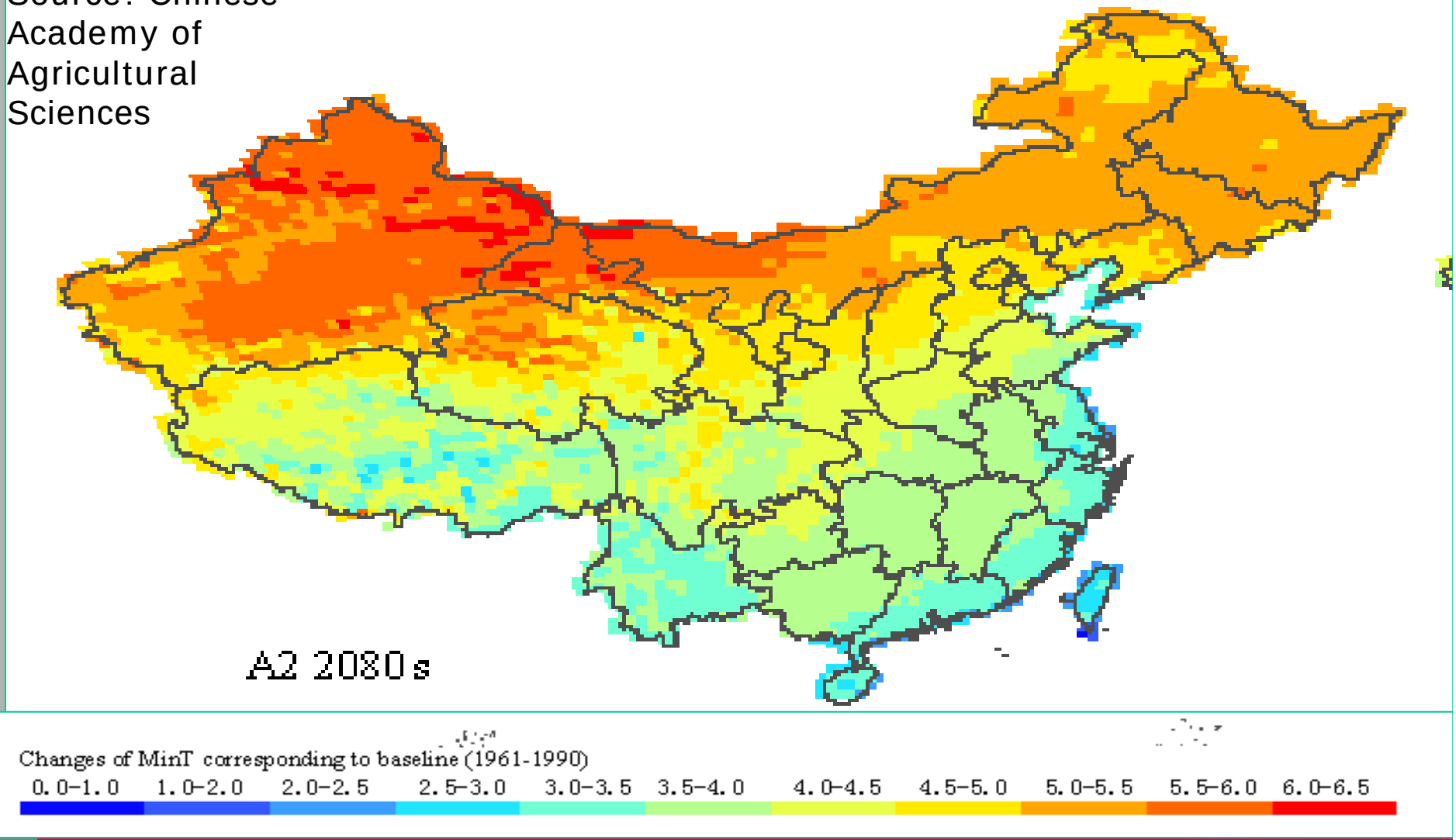
Soil degradation ... due to several drivers: 2040-2050 (intensity and dynamic)



UNEP, 2007

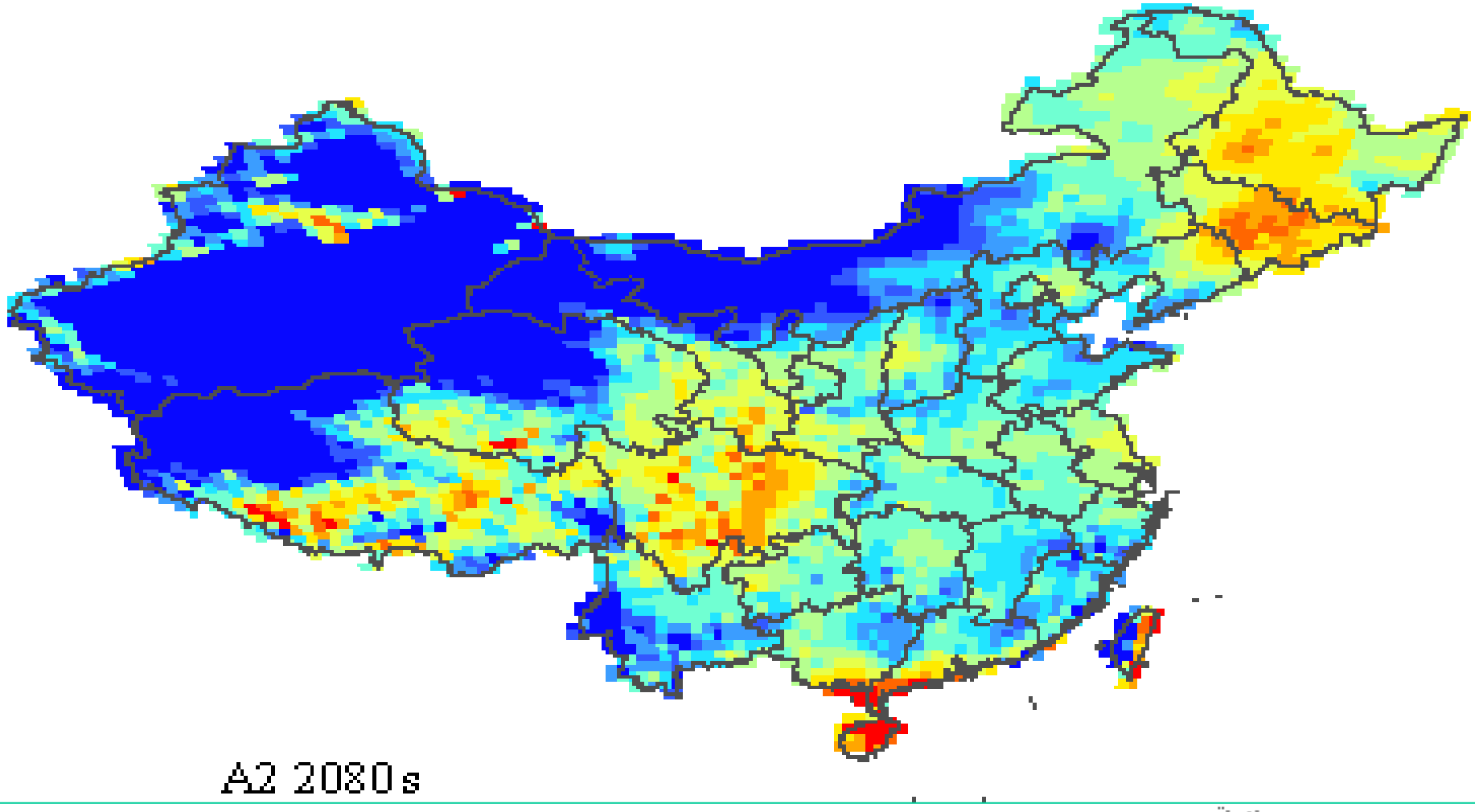
Min Temp ºC

Source: Chinese Academy of Agricultural Sciences



Source: Chinese Academy of Agricultural Sciences

Precipitation % Change



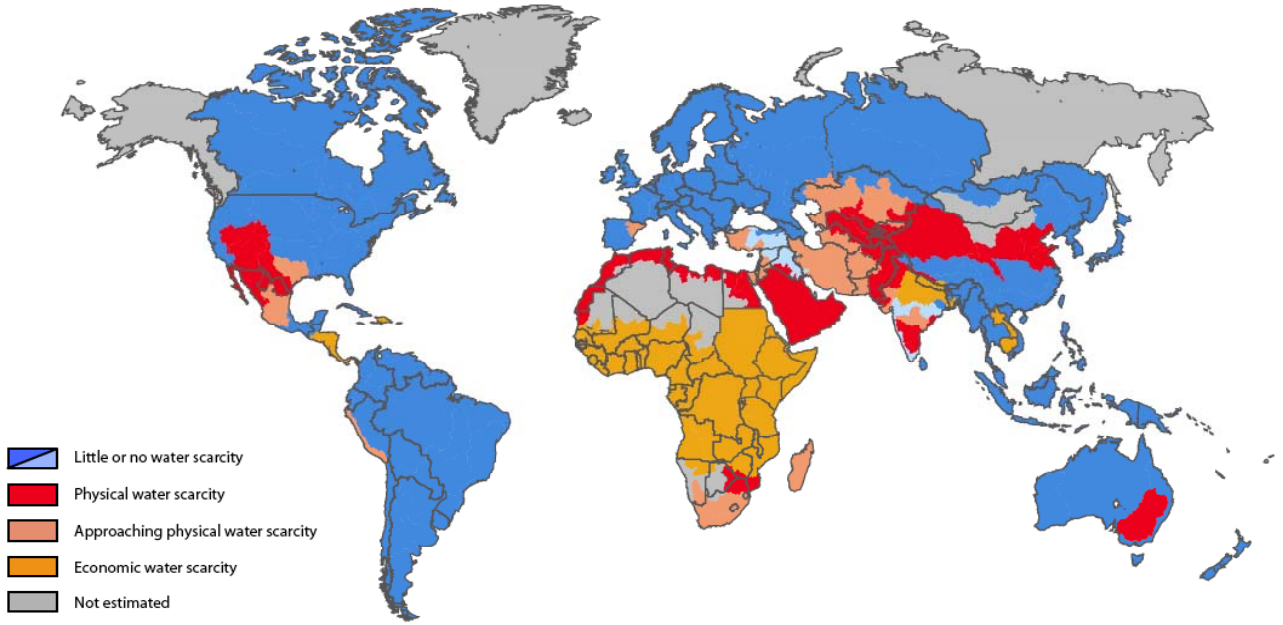
Global land-use management as a task of the future
Arable land as a scarce resource

- Soil degradation, desertification as a result of climate change
- Rising demand for food due to growing world population (FAO: + 40 - 50% by 2030; 70 – 80 % by 2050)
- Changes in food patterns due to growing affluence (China et al.) – western food patterns for 9 billion people – four planets needed
- Rising land-use pressure due to growing importance of energy crops

  FAO: 15 % additional arable land might be available

Access to Water (today)

Map 2. Areas of physical and economic water scarcity



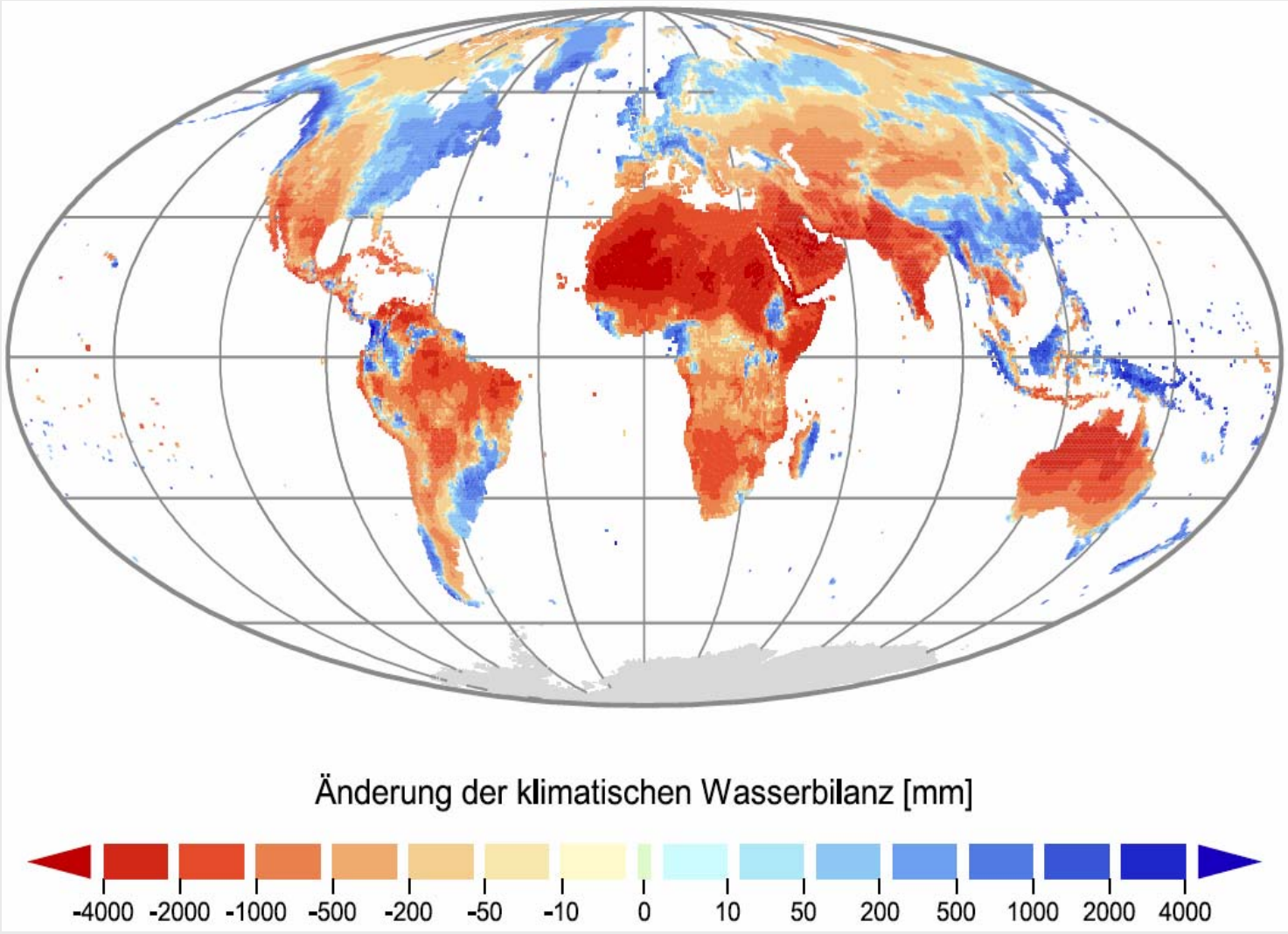
Red: Physical Water Scarcity. More than 75% of the river flows are allocated to agriculture, industries or domestic purposes (accounting for recycling of return flows). This definition of scarcity—relating water availability to water demand—implies that dry areas are not necessarily water-scarce. For example, Mauritania is dry but not physically water-scarce because demand is low.

Light Red: More than 60% of river flows are allocated. These basins will experience physical water scarcity in the near future.

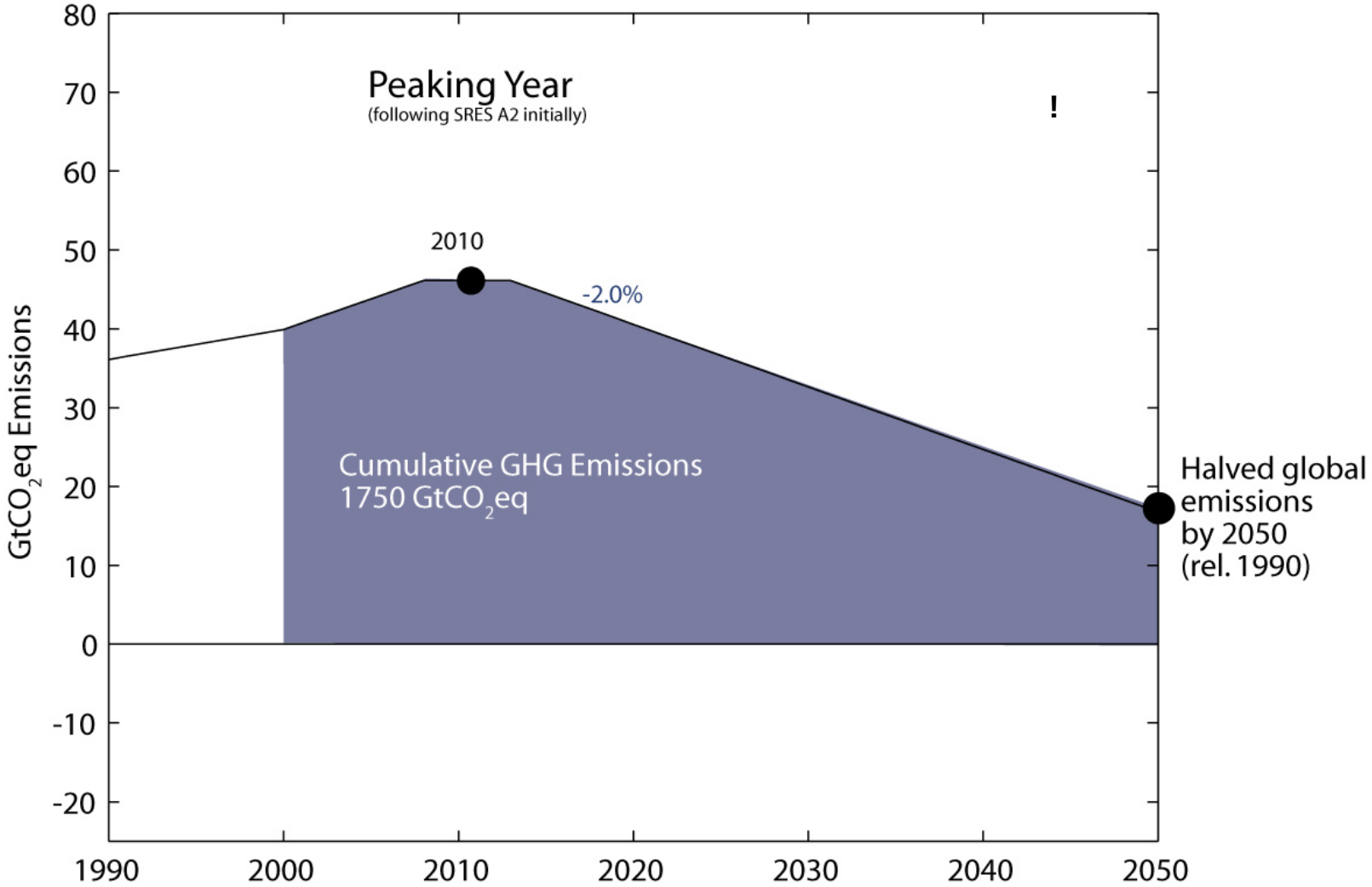
Orange: Economic Water Scarcity. Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists. These areas could benefit by development of additional blue and green water, but human and financial capacity are limiting.

Blue: Abundant water resources relative to use: less than 25% of water from rivers is withdrawn for human purposes.

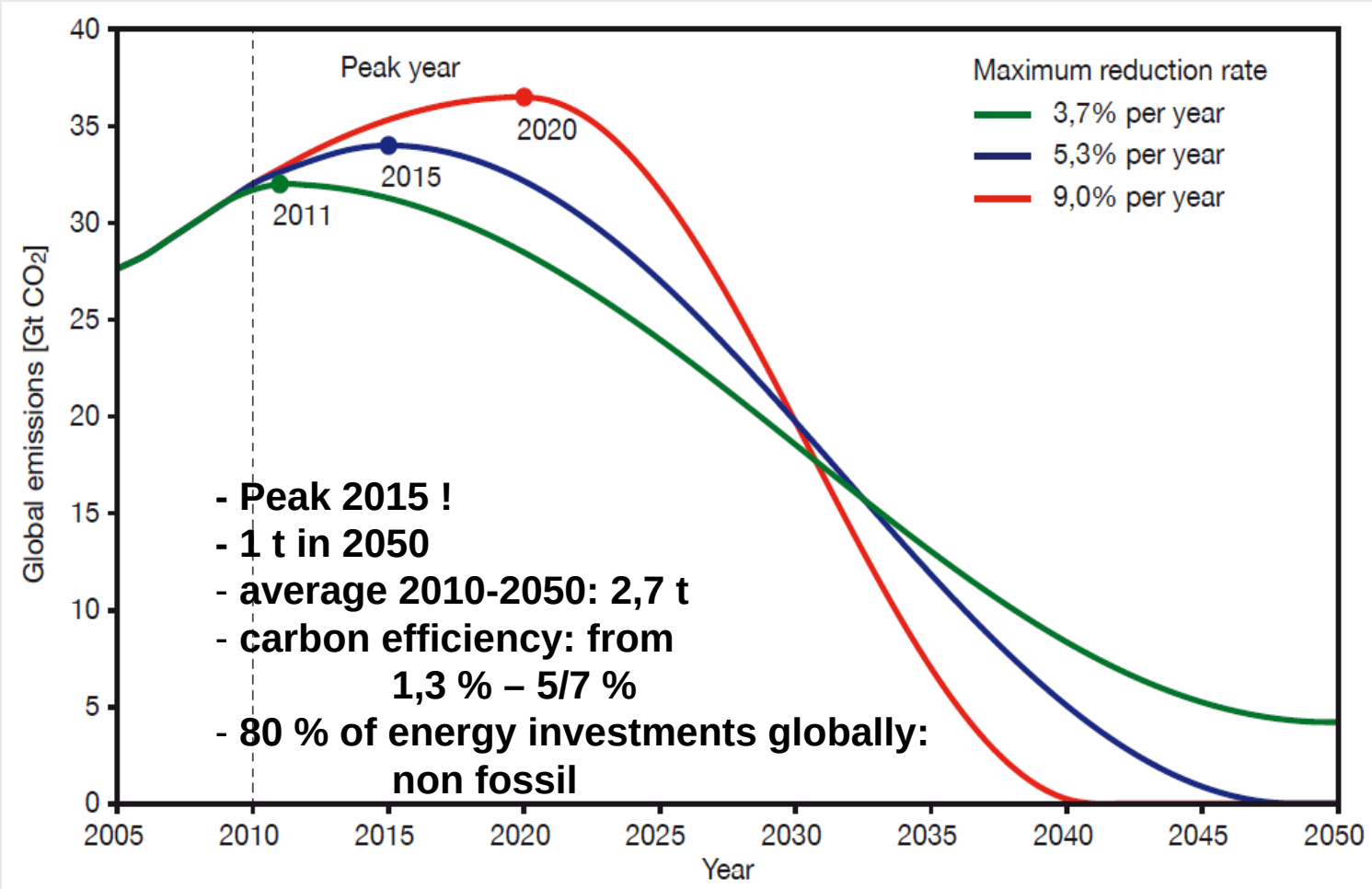
Global water map (3-4 ° C plus) 2041/2070 (Hadley Centre)



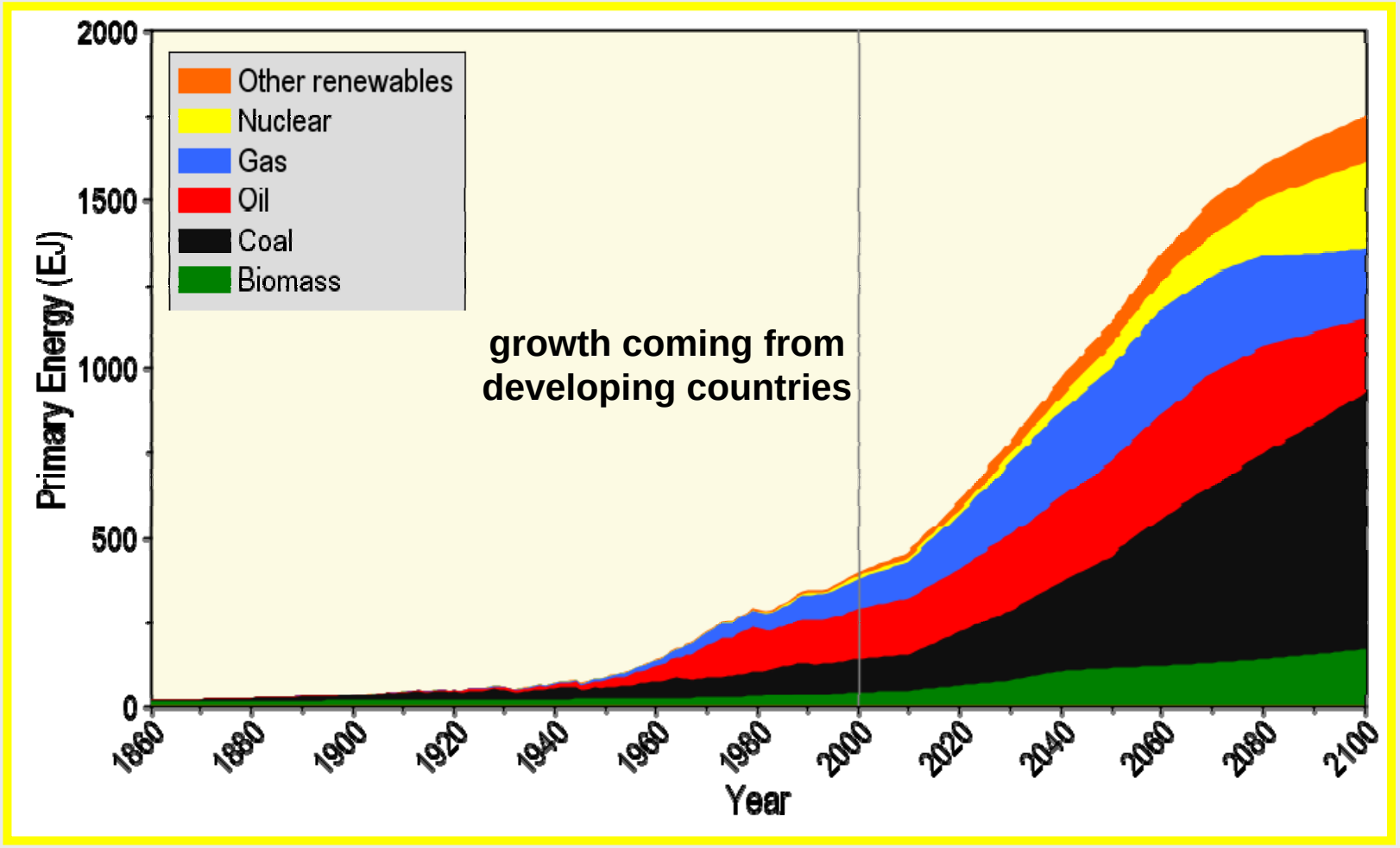
The global GHG – budget 2010-2050: 750 Gt



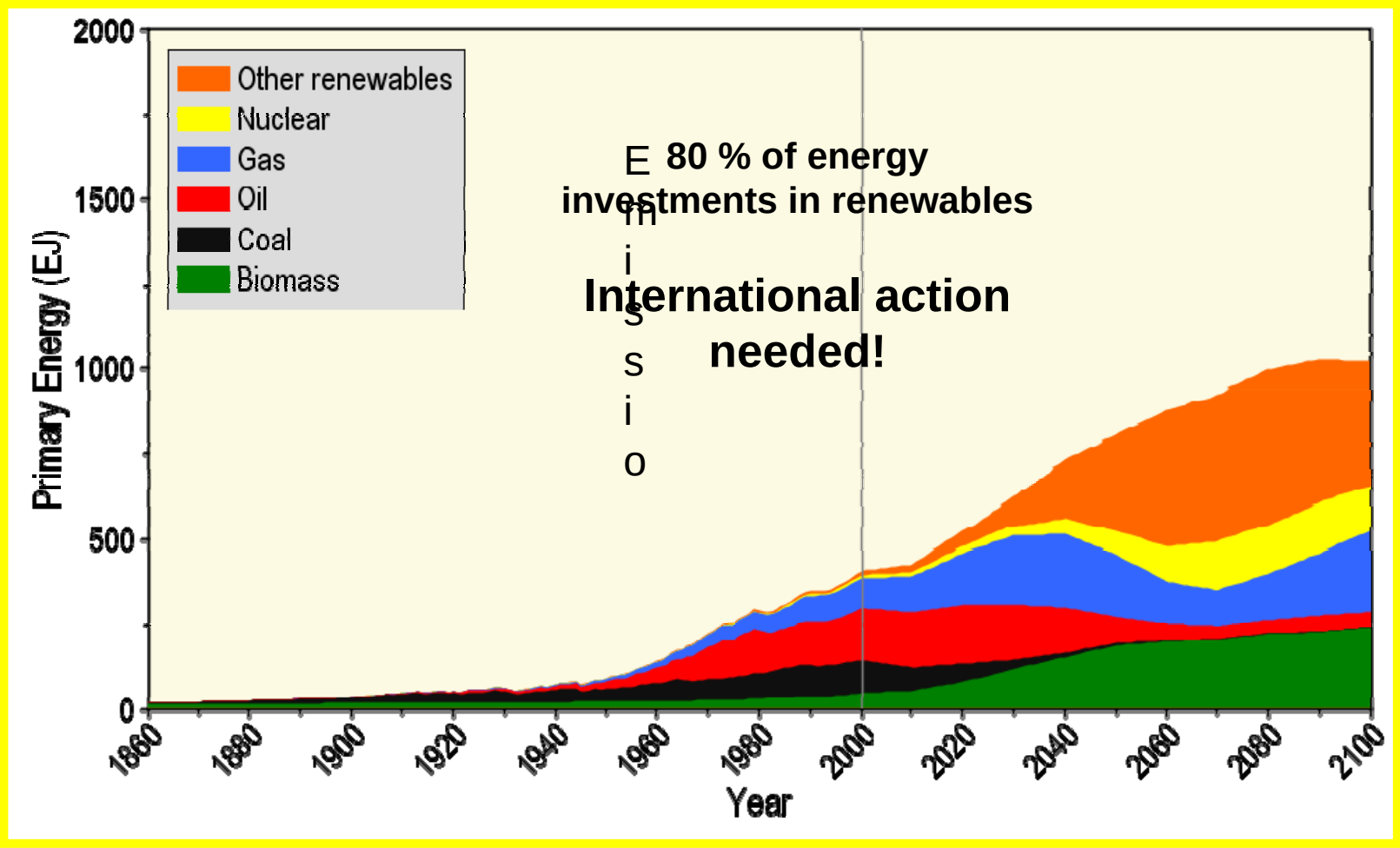
Global targets to stay into the 750 Gt budget



Primary Energy – A2r – BL: The 5-6 ° C plus world



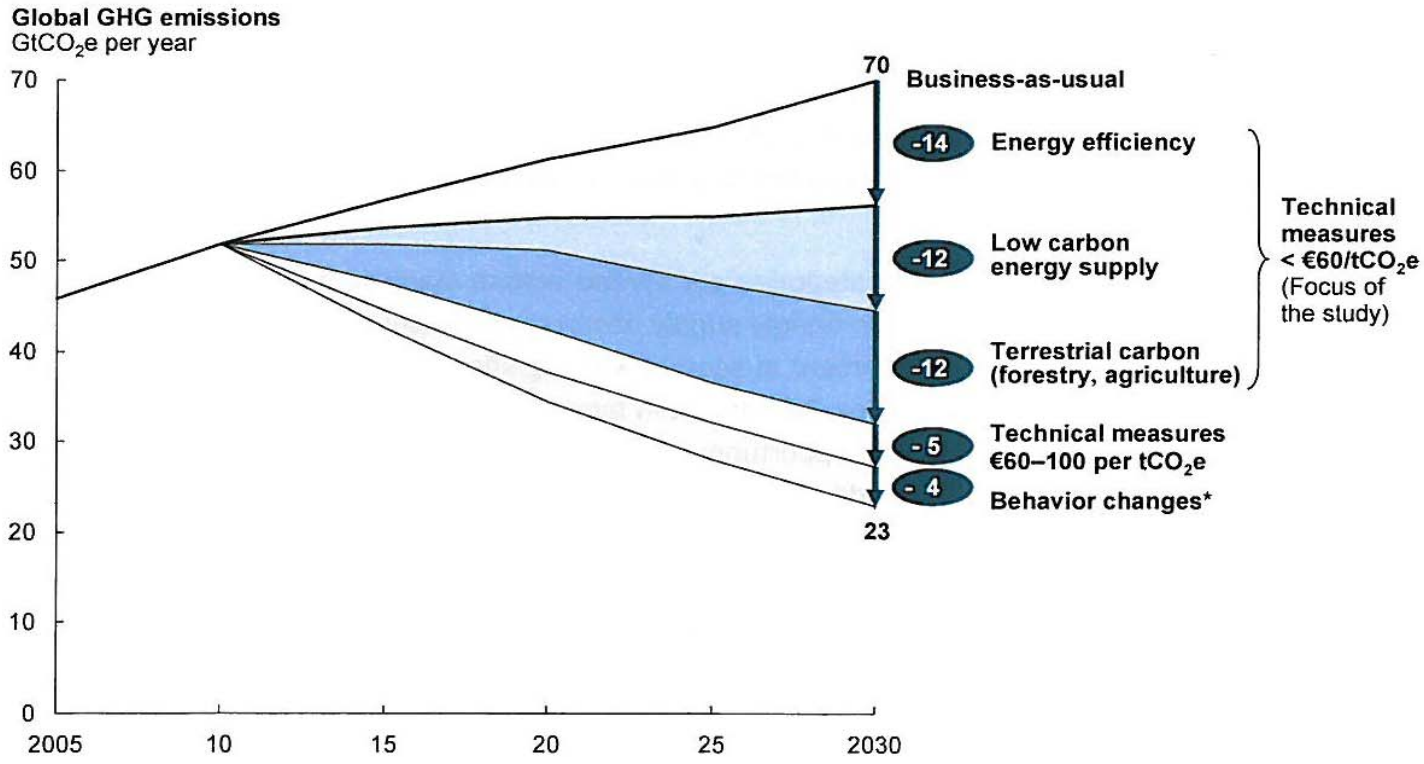
Primary Energy – B1r/ 450 ppm: The 2 ° C plus world



Roadmaps: How to reduce? Five dimensions

Exhibit 3

Major categories of abatement opportunities



* The estimate of behavioral change abatement potential was made after implementation of all technical levers; the potential would be higher if modeled before implementation of the technical levers

Source: Global GHG Abatement Cost Curve v2.0; Houghton; IEA; US EPA

Mc Kinsey

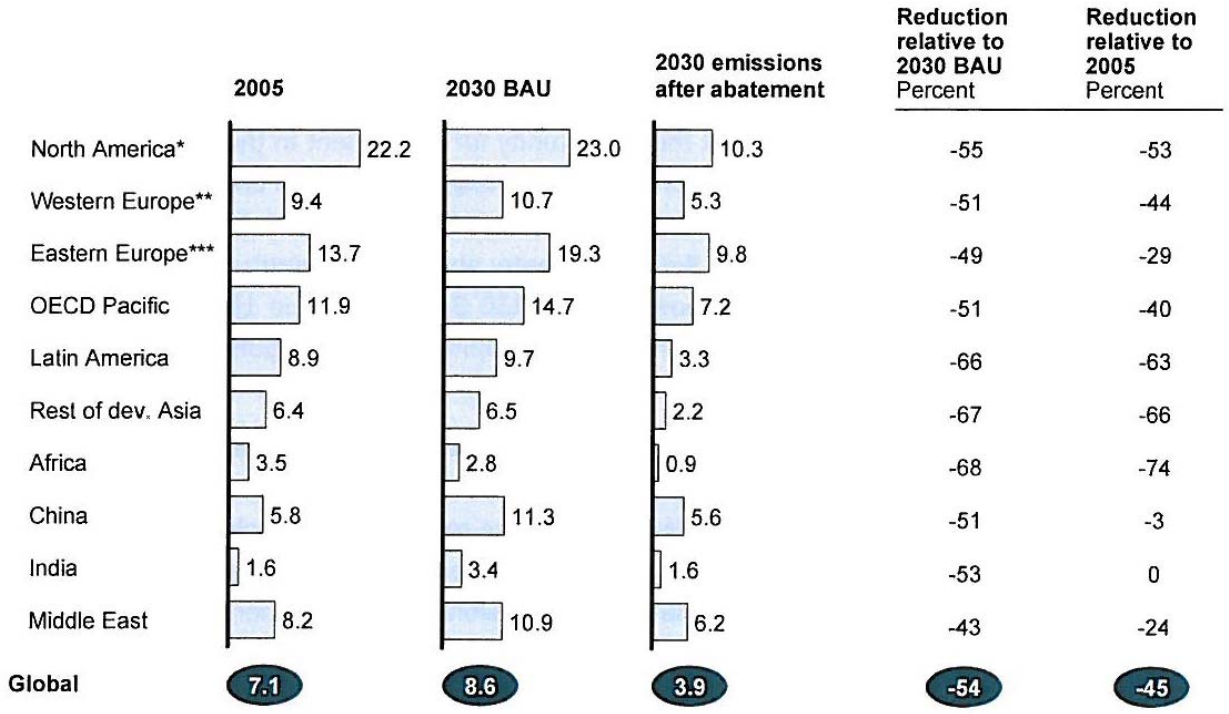
4 Key abatement data for 2020 can be found in the appendix.

Abatement potentials countries and regions

Exhibit 3.2.2

Emissions per capita development

tCO_2e per capita per year



* United States and Canada
** Includes EU27, Andorra, Iceland, Lichtenstein, Monaco, Norway, San Marino, Switzerland
*** Russia and non-OECD Eastern Europe
Source: Global GHG Abatement Cost Curve v2.0, Houghton, IEA, UNFCCC, US EPA

(Mc Kinsey)

Elements of the MDG plus Development Paradigm

MDGs: pro poor growth, investment in people, access to basic social services

Stabilizing the four pillars of civilization

- **Managing scarce resources** (water, soil, atmosphere et al.)**:** resource efficiency, avoiding conflicts, justice/ fairness (access to recources)
- **Transformation towards low carbon economies:** technology, growth patterns, life styles, governance
- **Global regimes/ governance beyond local action are key** (global land use management, international regime for sustainable bioenergy production, managing the global GHG budget ...)
- **Global development within the planetary boundaries:** multilateral action