Policy-relevance of the Working Group II Contribution to IPCC AR4 (Fourth Assessment Report)

Jean-Pascal van Ypersele*
(jean-pascal.vanypersele@uclouvain.be)
IPCC Vice-chair,
With the kind collaboration of Chris Field, IPCC WGII Co-chair, and the IPCC Secretariat

(UNFCCC, Barcelona, 3 November, 2009)

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Following addressed by WG II in AR4:

- Impacts observed so far
- Future scenarios
- Impacts on sectors:
  - Water
  - Ecosystems
  - Agriculture, forestry, fisheries
  - Coasts
  - Settlements and industry
  - Health

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Following addressed (cont.):

- Impacts on regions:
  - Africa, Asia, Australia and New Zealand, Latin America, North America, Polar regions, Small islands, and
  - Europe (including the Alps)

- Adaptation practices
- Adaptation vs. mitigation
- Key vulnerabilities
- Sustainability

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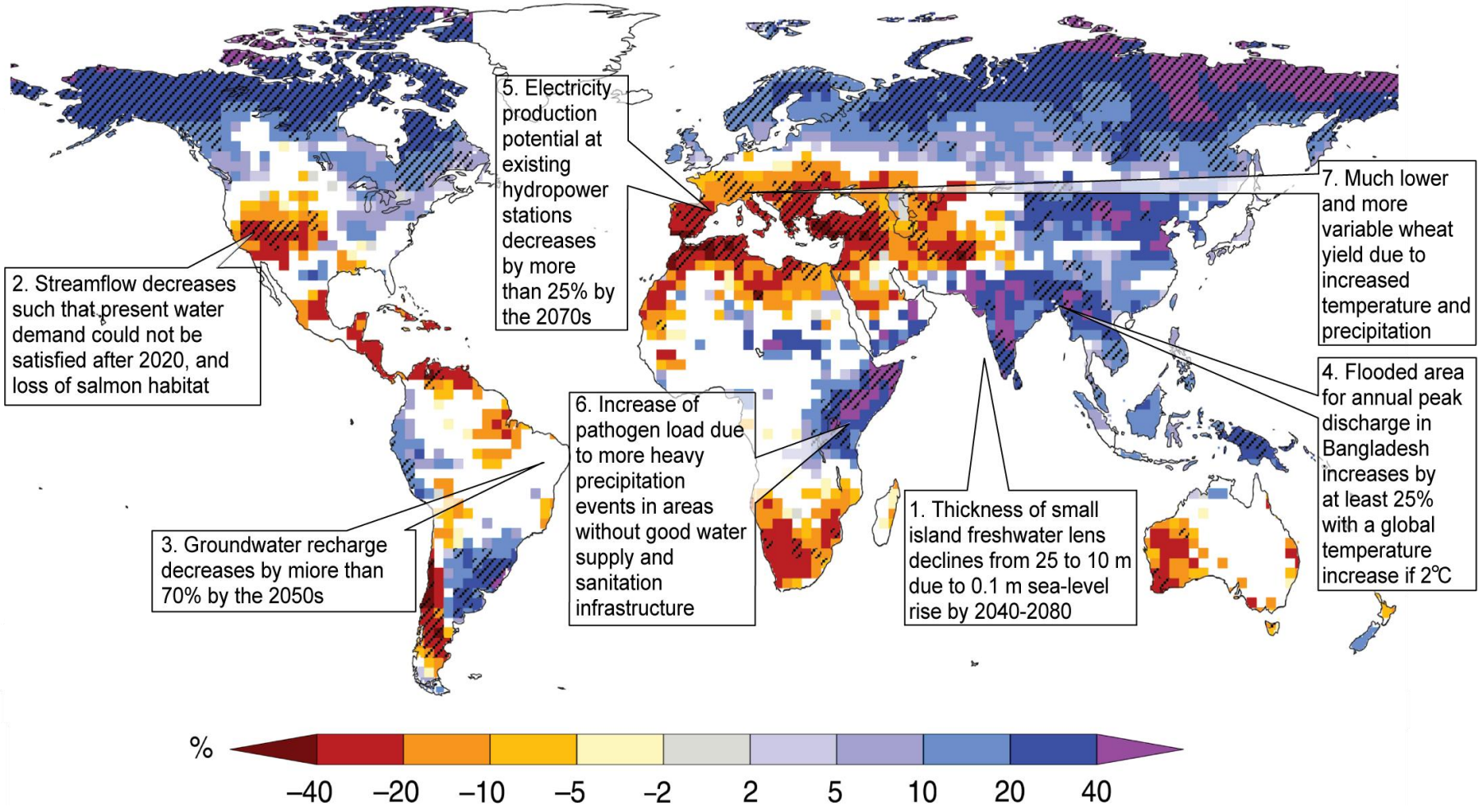
Water at the end of the 21st century for SRES A1B



TP Water Figure 3.4: Ensemble mean change of annual runoff, in percent, between present (1980-1999) and 2090-2099 for the SRES A1B emissions scenario (based on Milly et al., 2005).

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Case Study on Impacts

Glacial retreat in the Himalaya

- ***receding and thinning*** **of Himalayan glaciers can be attributed primarily to the global warming; in addition, high population density near these glaciers and consequent *deforestation and land-use changes* have adversely affected these glaciers**
- **the total glacial area will likely shrink from the present 500,000 to 100,000 km^2 (or disappear entirely) by the year 2035**
- **the 15,000 Himalayan glaciers form a unique reservoir of water which in turn, is the lifeline of millions of people in South Asian countries**
- **it is likely that glacial melt will *turn the big Asian river systems into seasonal rivers* and affect economies in the region**

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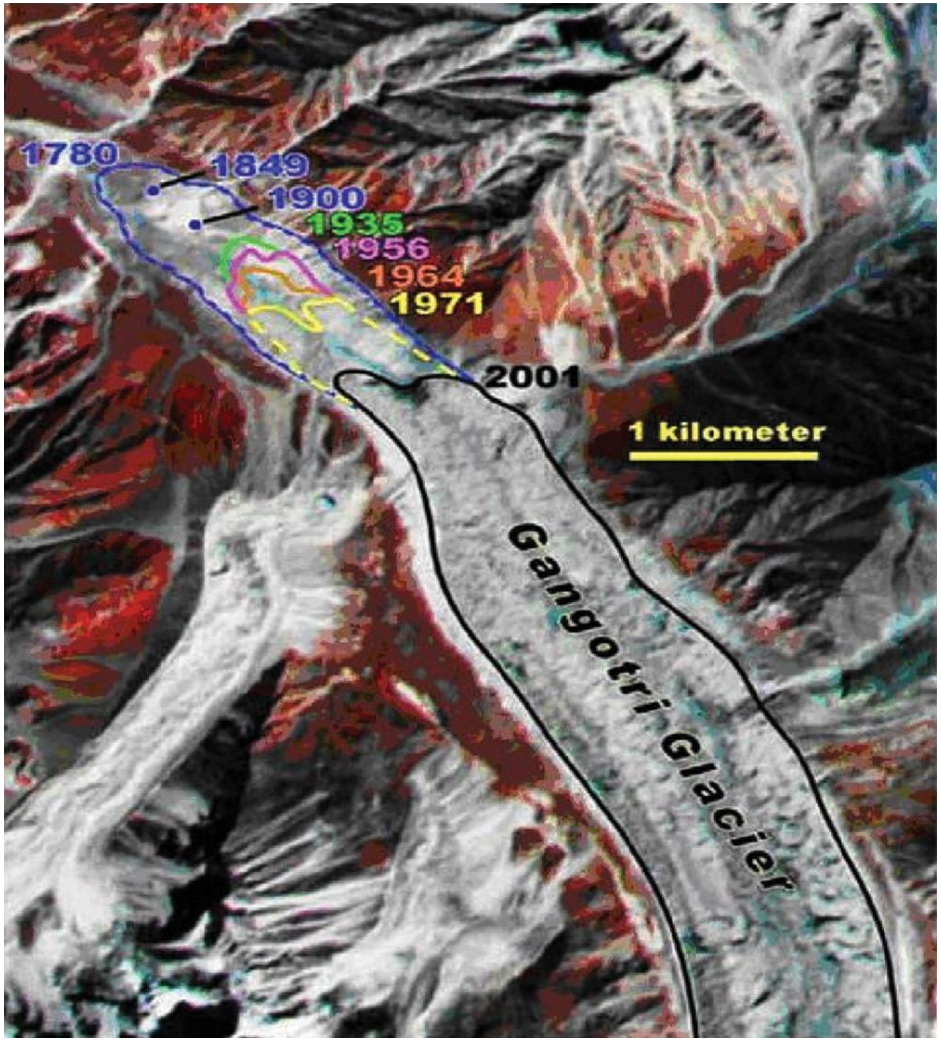
Case Study on Impacts

Glacial retreat in the Himalaya



> WG II, Figure 10.6 Composite satellite image showing how the Gangotri Glacier terminus has retracted since 1780. The 30.2 km long Gangotri glacier has been receding alarmingly in recent years. Between 1842 and 1935, the glacier was receding at an average of 7.3 m every year; the average rate of recession between 1985 and 2001 is about 23 m per year.

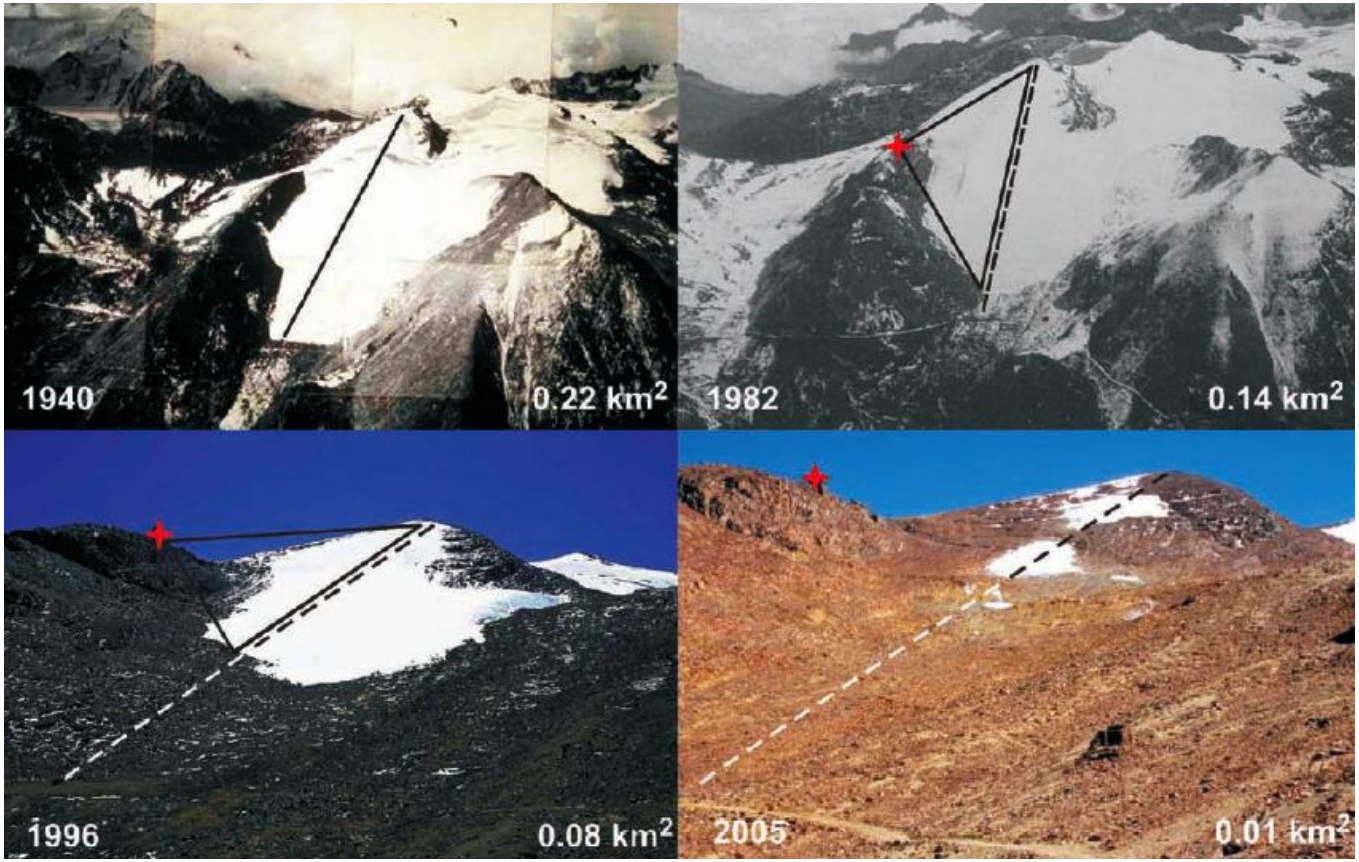
Case Study on Impacts

Glacial retreat in the Andes

- small tropical glaciers show *significant retreat* due to climate warming; many such glaciers have already disappeared during 19th century
- observed *ascent of the 0°C isotherm* of about 50 m per decade in the tropical Andes since 1980
- tropical glaciers are important as water resources and for recreation/tourism

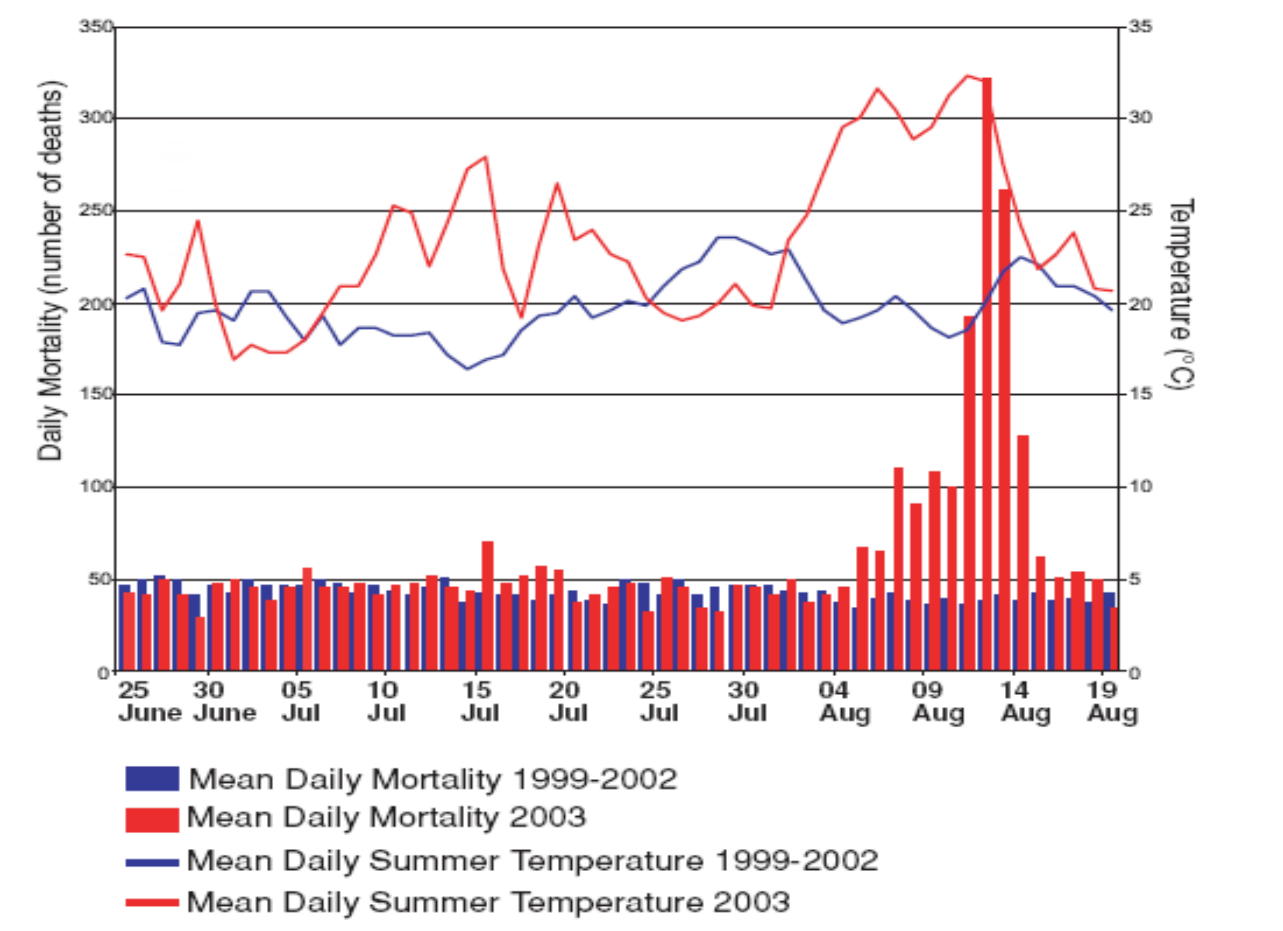
Case Study on Impacts

Glacial retreat in the Andes



> WG II Box 1.1
Figure 1.1 Areal extent of Chacaltaya Glacier, Bolivia, from 1940 to 2005. With an altitude of 5'260m above sea level, the glacier was the highest skiing station in the world; the skiing hut is indicated by a red star.

Daily mortality in Paris (summer 2003) (IPCC AR4 Ch 8)



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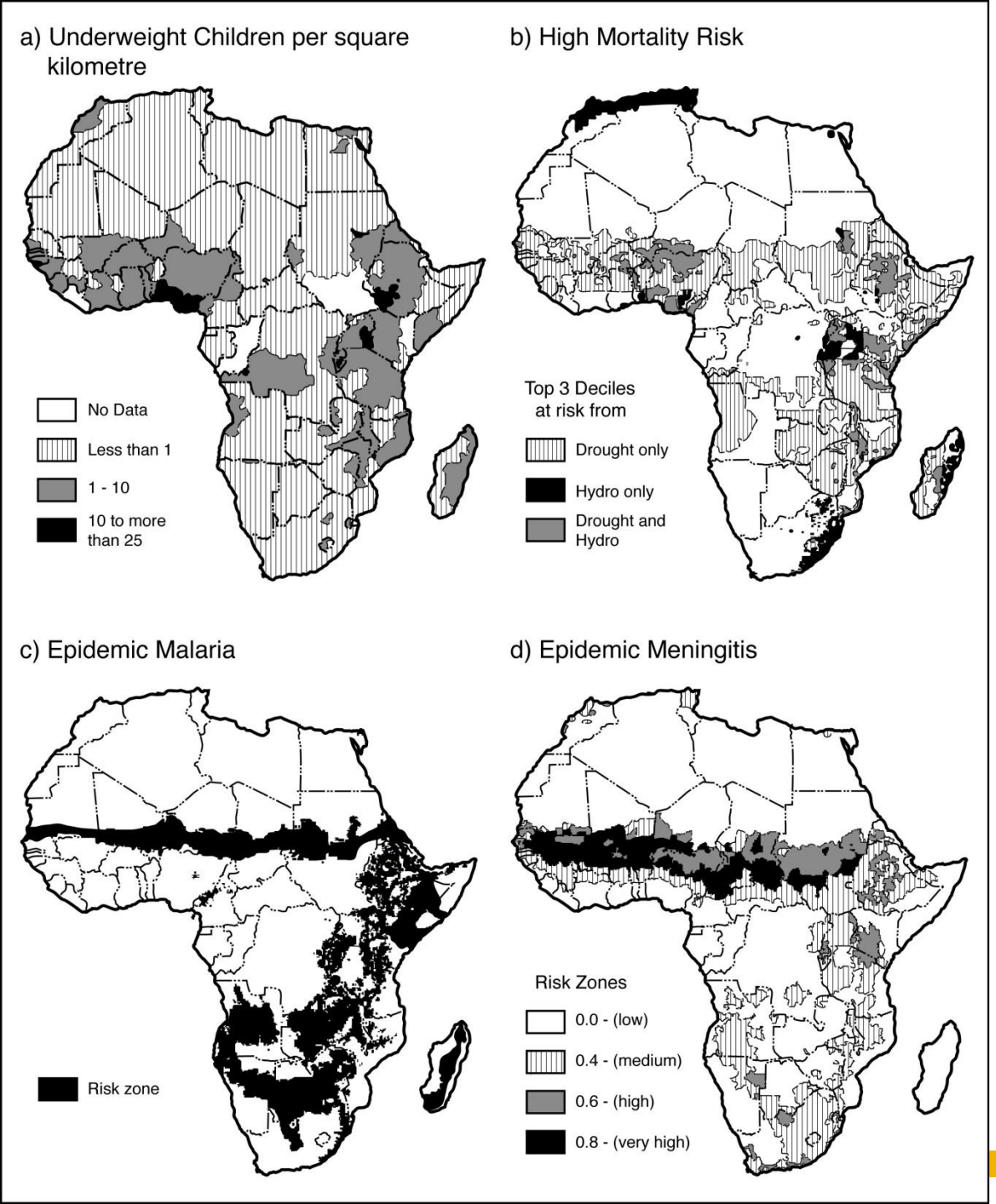

Vulnerability to climate change can be made worse by the presence of other stresses:

Multiple stresses in Africa (Ch 9)

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20% - 30% of plants and animals species at increased risk of extinction

if ΔT 1.5°C - 2.5°C (above 1990 temperature)

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Case Study on Impacts

Hotspots megadeltas

> WG II, Box 6.3, Figure 6.6 Relative vulnerability of coastal deltas as shown by the indicative population potentially displaced by current sea-level trends to 2050 (Extreme = > 1 million; High = 1 million to 50,000; Medium = 50,000 to 5,000).

Regions most affected

- The Arctic
- Sub-Saharan Africa
- Small islands
- Asian & African megadeltas

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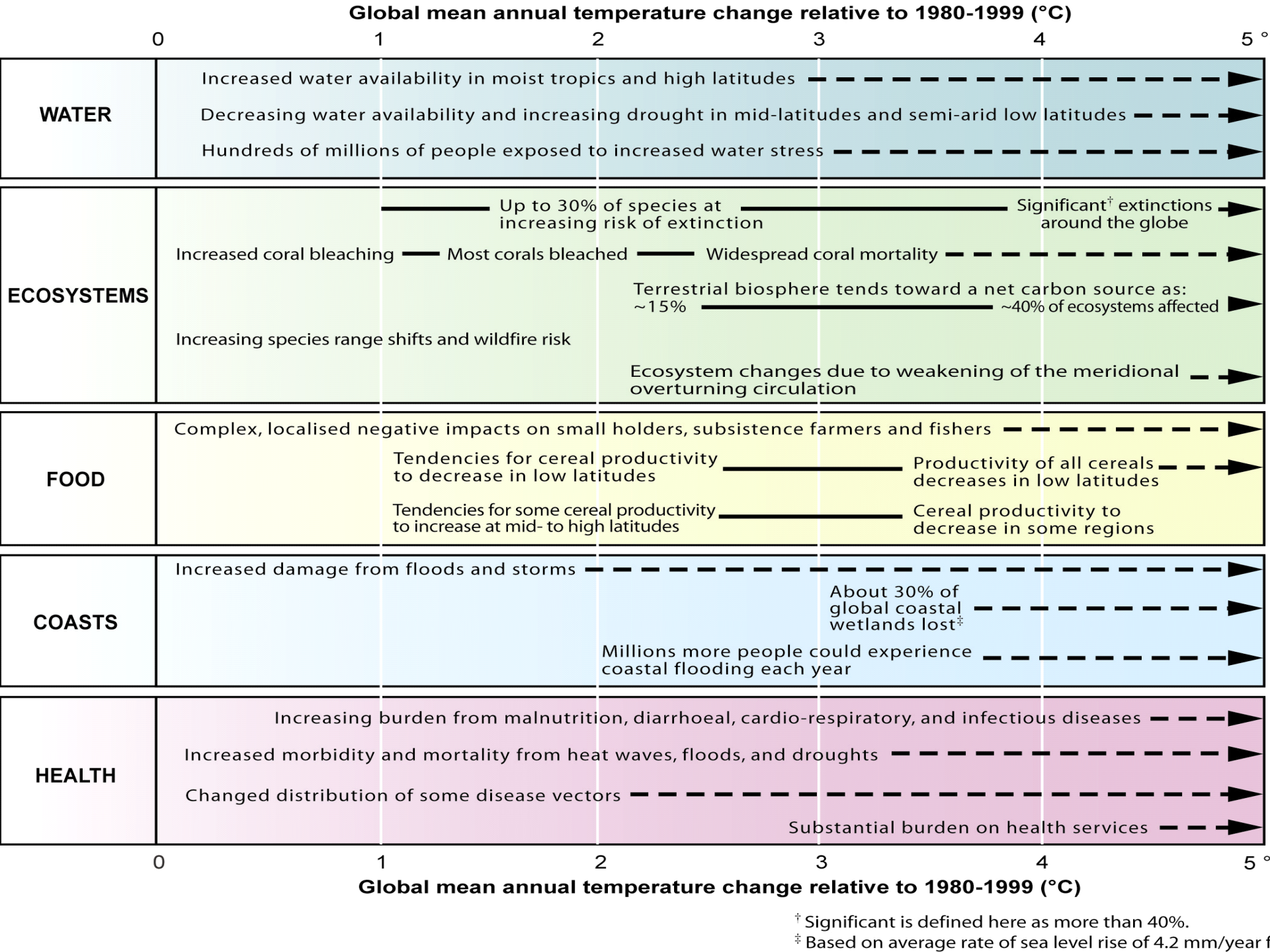
In all regions, there are some areas and communities which are particularly vulnerable

- The poor
- Young children
- The elderly

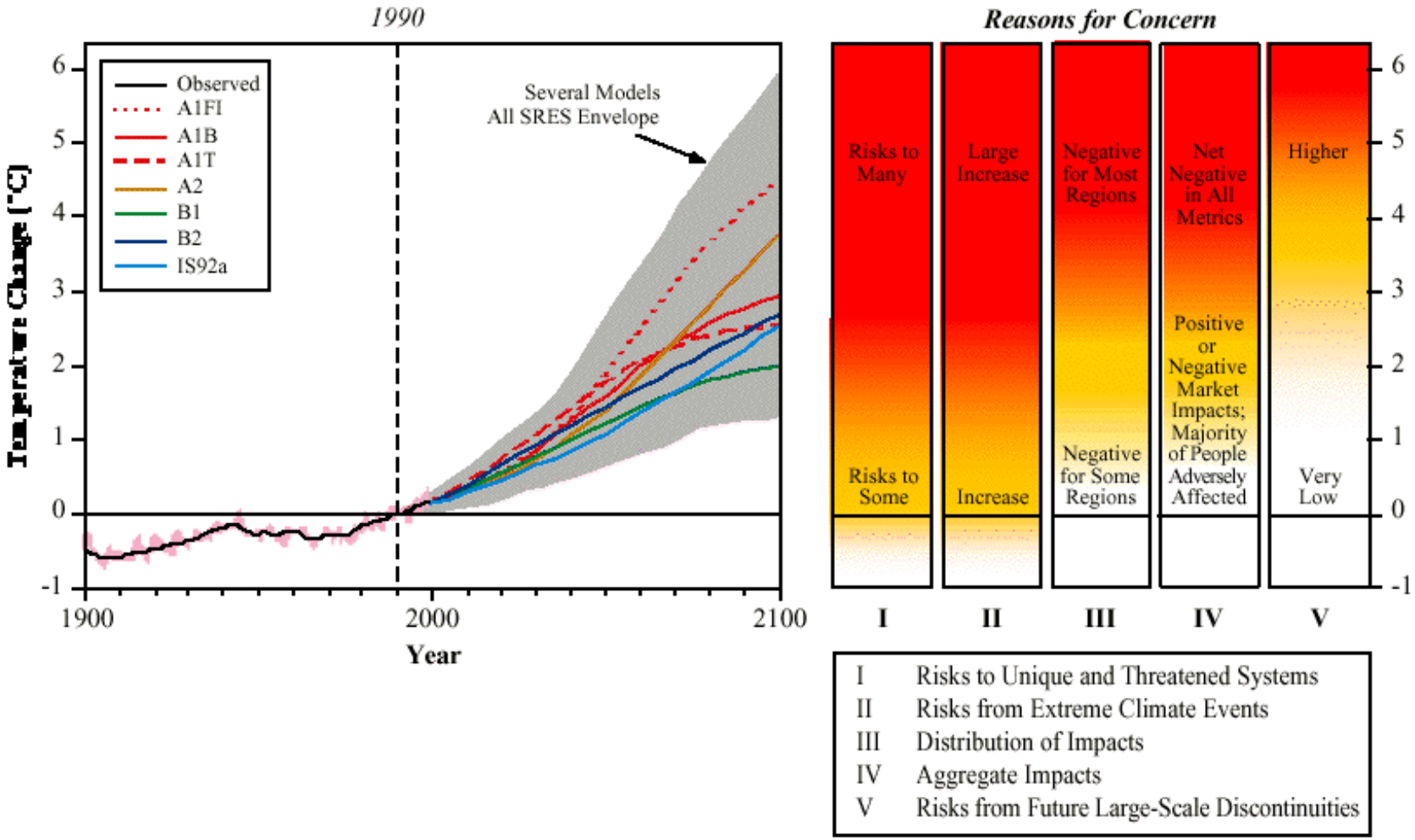


† Significant is defined here as more than 40%.

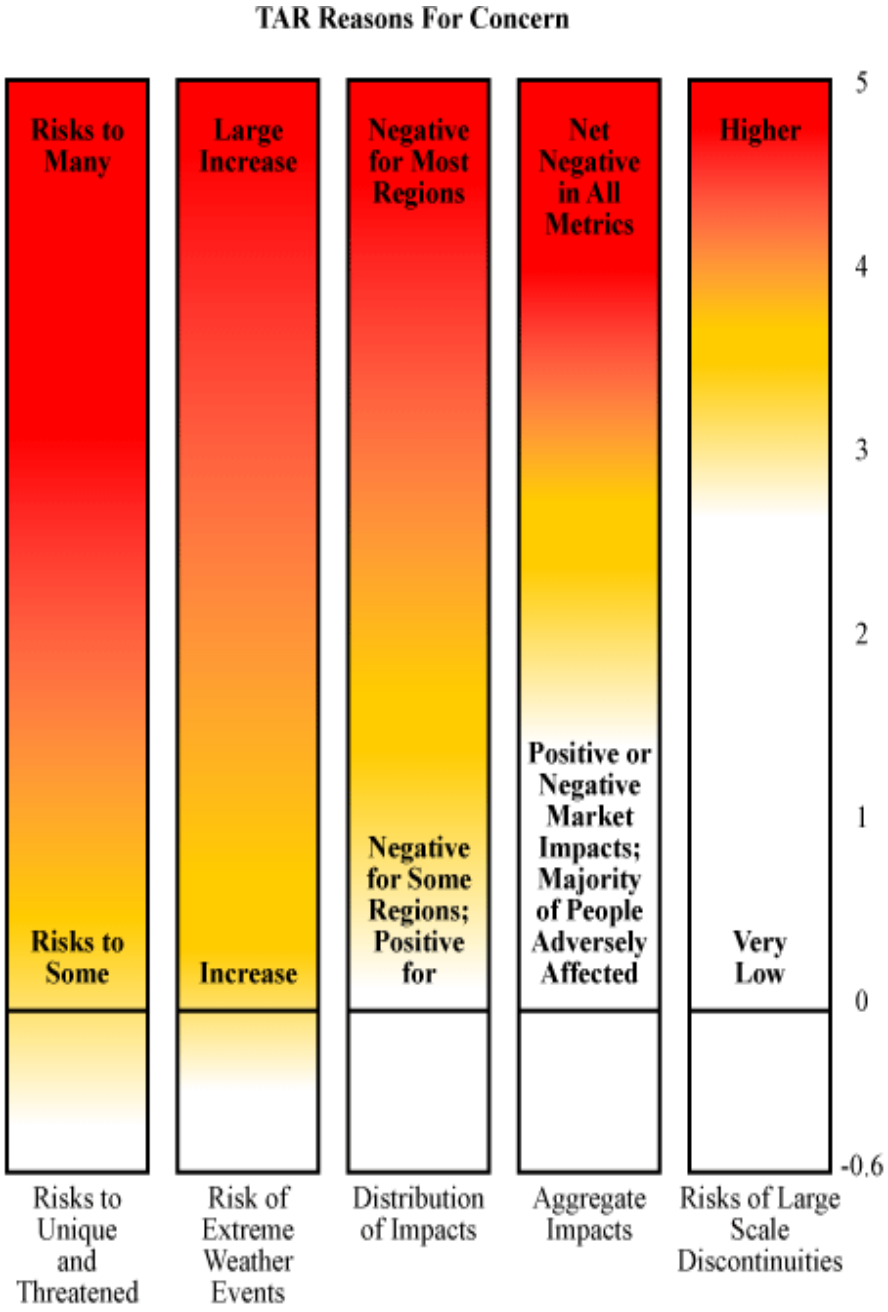
‡ Based on average rate of sea level rise of 4.2 mm/year f

Adaptation will be necessary to address unavoidable impacts

IPCC 2001 (TAR):

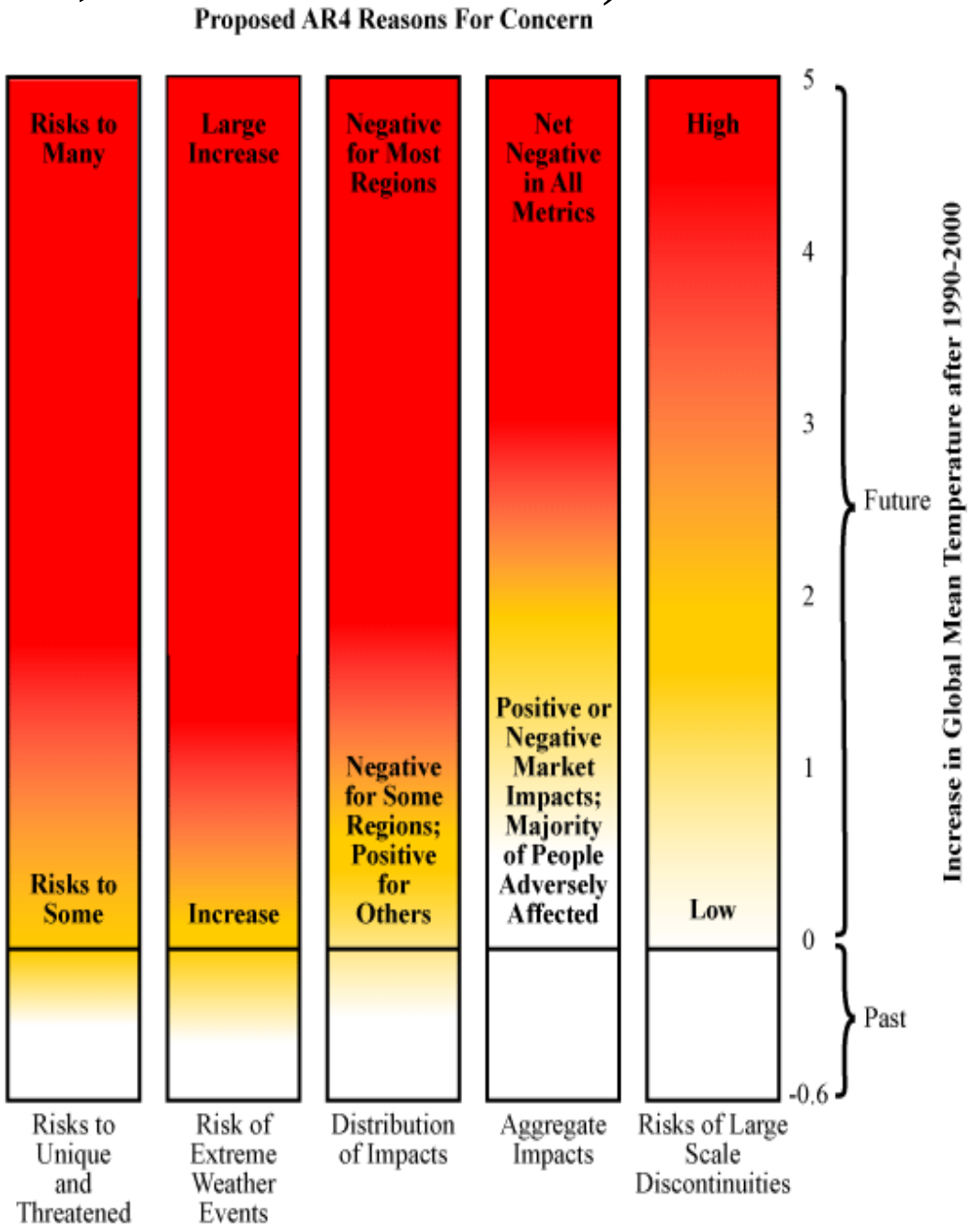


2001:



0= 1990 temp

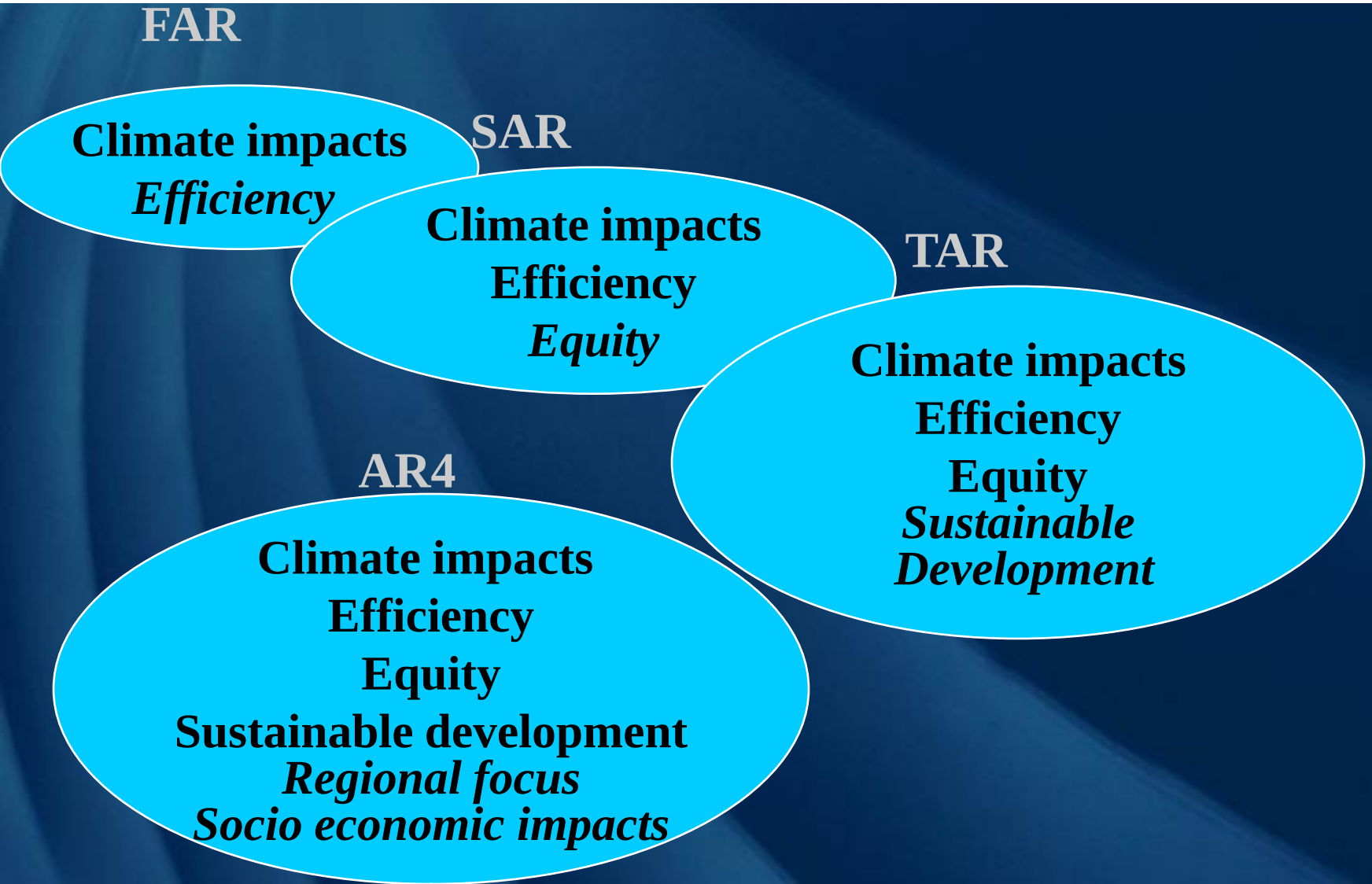
(PNAS, 2009, Based on IPCC AR4)



Inertia & need for short-term action

- IPCC, 2007 – « Due to the inertia of both climate and socio-economic systems, the benefits of mitigation actions initiated now may result in significant avoided climate change only after several decades. This means that mitigation actions need to start in the short-term in order to have a medium- and longer-term benefits and to avoid lock-in of carbon-intensive technologies. »

The evolving perspective - IPCC Assessments



IPCC WGII AR5

- Move from “it’s real” (AR4) to “here is the information you need to make good decisions for your stakeholders” (AR5)
  - Risk management framing
  - Multiple stresses framing
  - Full partnership for adaptation

Major WGII themes for AR5

- Building from the structure of the AR4
- Better integration of climate science with climate impacts
- Broader range of assessed impacts
- Climate change in the context of other stresses
- Better treatment of extremes and disasters
- Framing to support good decisions, including information on risk
- Expanded treatment of adaptation
- Better integration of adaptation, mitigation, and development
- More comprehensive treatment of regional aspects of climate change (separate Part)

Conclusion

- **Climate is changing fast due to GHG**
- **Impacts are assessed in AR4 to be severe at lower global temperature increase than assessed in 2001**
- **Adaptation is essential to cope with the unavoidable**
- **Mitigation is essential to prevent the avoidable**
- **The more integrated mitigation and adaptation are in all policies, the more efficient and cheap they will be**
- **AR4 is very policy-relevant: see www.ipcc.ch**
- **Special report on Extremes and Disasters: available in 2011**
- **AR5-WGII contribution, available in 2014**

John Holdren, then President of the American Association for the Advancement of Science, now President Obama science adviser:

- *'We basically have three choices – mitigation, adaptation, and suffering.*
- *We're going to do some of each. The question is what the mix is going to be.*
- *The more mitigation we do, the less adaptation will be required, and the less suffering there will be.'*

Jean-Pascal van Ypersele
(vanypersele@astr.ucl.ac.be)