

17.181/17.182
SUSTAINABLE DEVELOPMENT
Week 8 Outline
Climate Change & Sustainable Development

- 1. THE CONTEXT**
- 2. ASPECTS of CLIMATE CHANGE**
- 3. POLICY ISSUES GOVERNANCE ANALYSIS**

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The Context

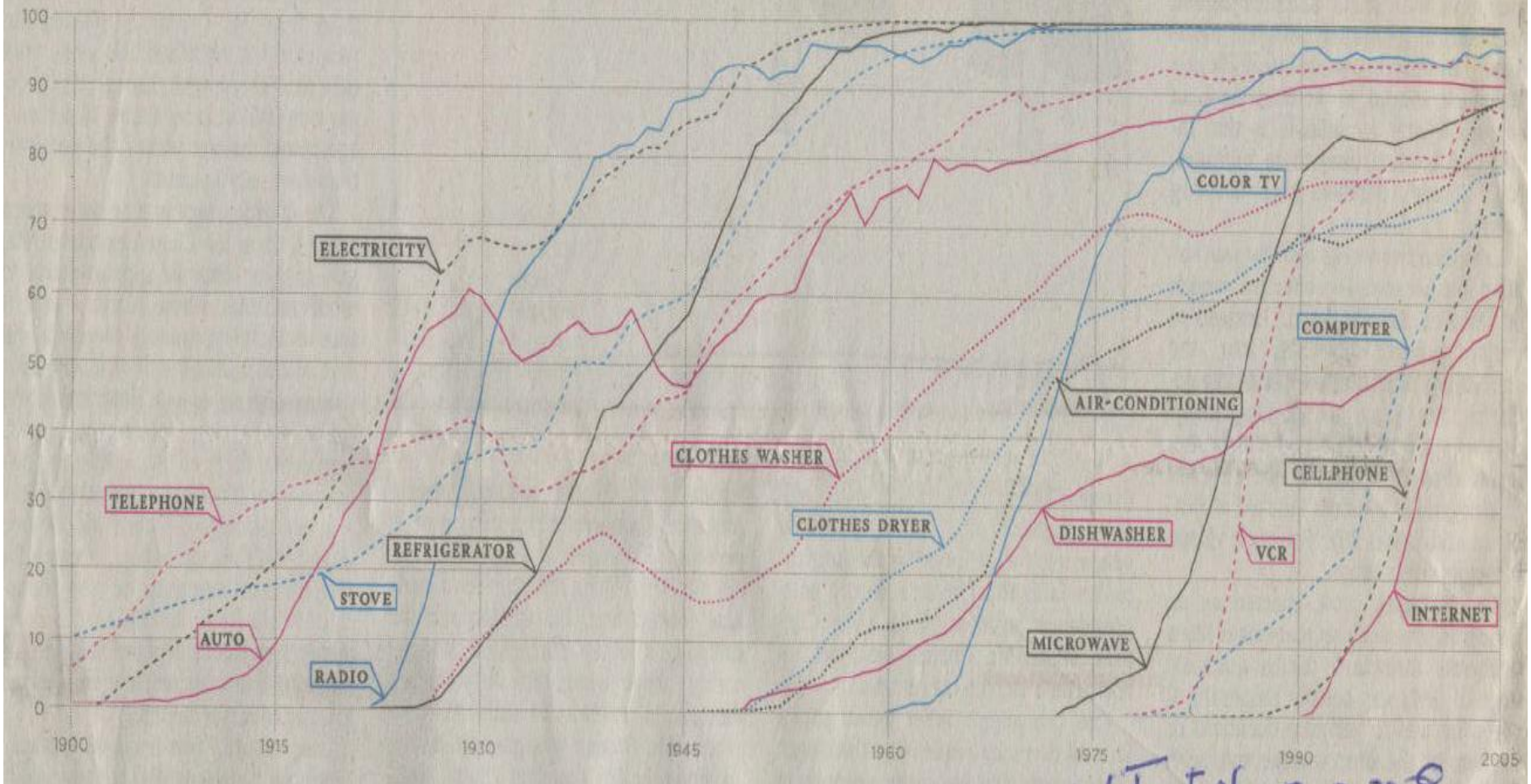
- State sustainability in various parts of the world is a source of threat to national security
 - Every case is unique; but there are common processes
- The global system is increasingly volatile
 - There are more actors, agents, countries, firms, institutions, opportunities, challenges ... and greater interdependence
- This new global volatility creates greater interdependence
 - more mutual sensitivity and mutual vulnerability
 - more potentials for loss of control
 - but more opportunities
- Need for better preparedness, some examples:
 - "We learned that the institutions chartered with protecting ...national security did not understand how grave this threat can be, and did not adjust their policies, plans, and practices to deter or defeat it" [9/11 Commission Report]

Some Legacies of 20th C.

- More People
- More Countries
- More IGO's and NGO's
- More Trade
- More Technology
- More Energy Use
- CO₂ – GHGs - Pollution

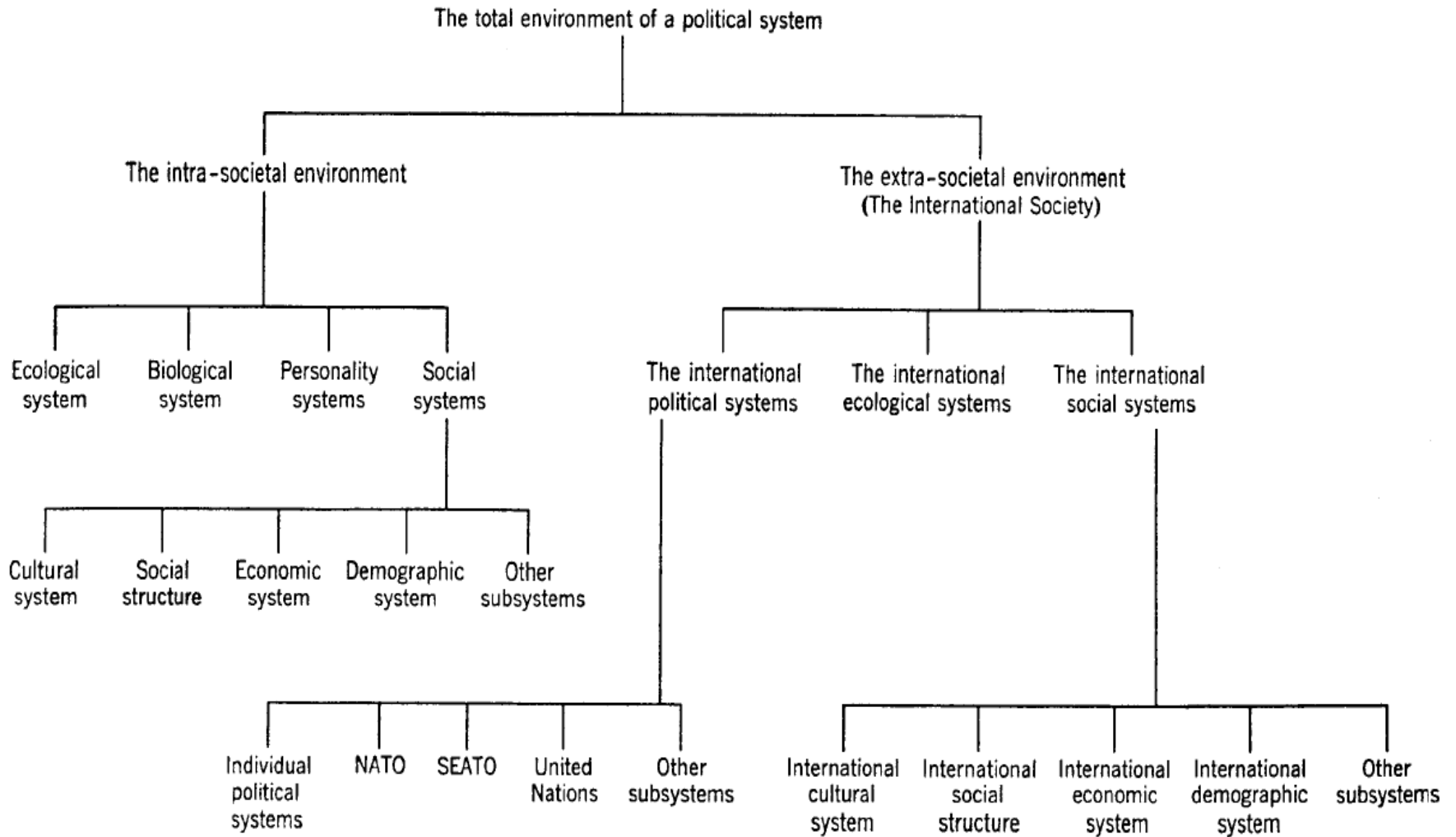
PERCENT OF
U.S. HOUSEHOLDS

CONSUMPTION SPREADS FASTER TODAY



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TABLE I COMPONENTS OF THE TOTAL ENVIRONMENT OF A POLITICAL SYSTEM



Easton, David. *A System of Analysis of Political Life*. John Wiley & Sons, Ltd, 1965. © John Wiley & Sons, Ltd. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

State Sustainability

- **The sustainability of a state is a process**
States can be at different **stages of ‘sustainability’** – depending on the measures of performance reflecting the ratio of loads to capacity. Various variables combine to generate loads & reflect capacity.
- **‘Good’ state changes & ‘Bad’ state changes**
‘Bad’ changes include Somalia, Rwanda, Burundi.
‘Good’ changes include Czechoslovakia and USSR
- **Multiple modes of fragility, different paths and ‘end points’**
We need a strategy to model complex state stability in policy relevant terms

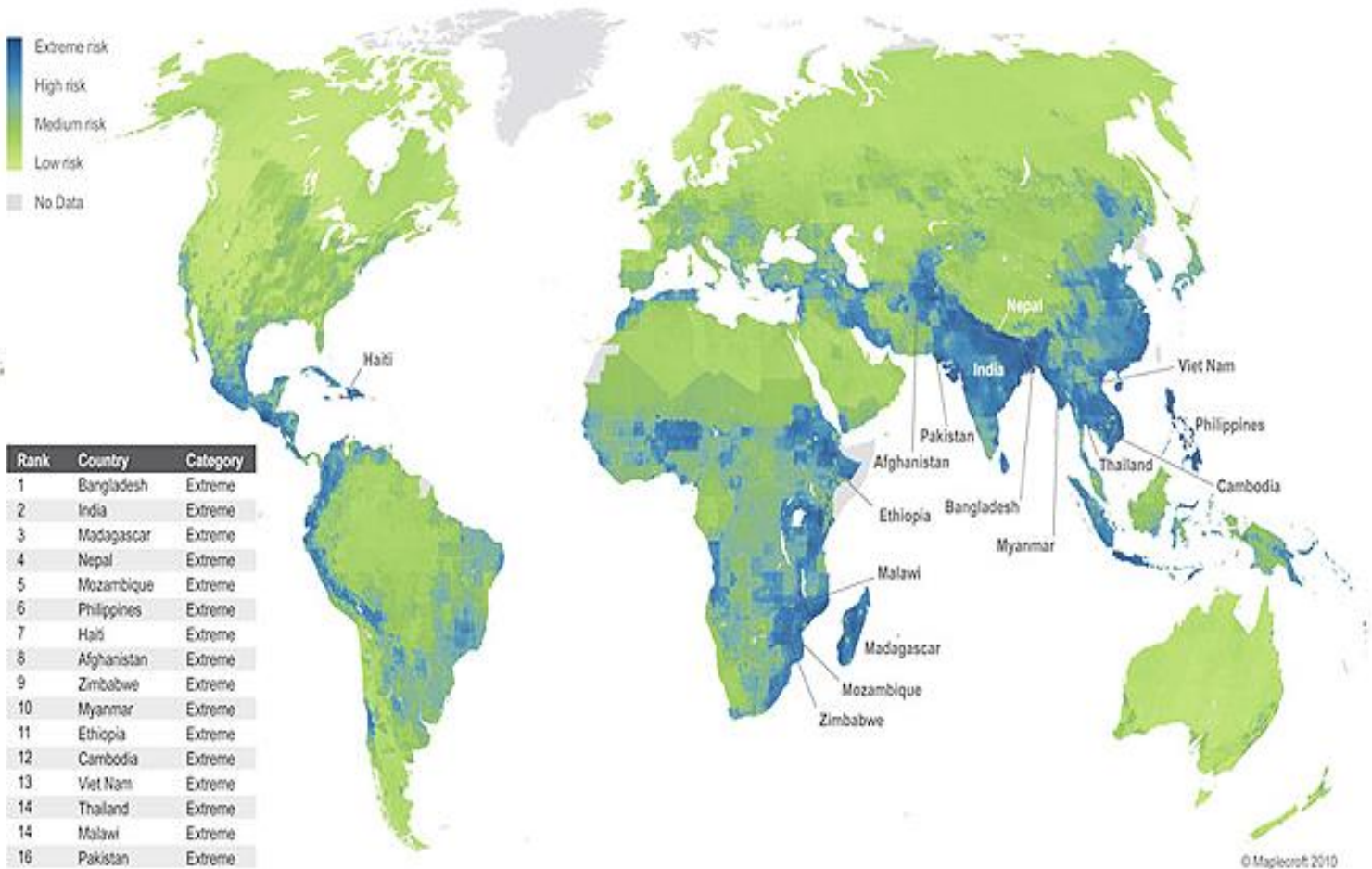
The Extended Enterprise

- **By Definition:**
 - Operates cross boundaries and cross jurisdictions
 - Functions at various levels of economic and political organization
 - Encounters uncertainties and unanticipated conditions
- **By Choice:**
 - Prefers to reduce uncertainty
 - Seeks certain stability in business environment
 - Remains hostage to the realities of host states
- **By Necessity:**
 - Requires good assessments of exposure to potential risk
 - Calculates risks to global volatility and host state stability
 - Needs robust and reliable estimates of stability conditions

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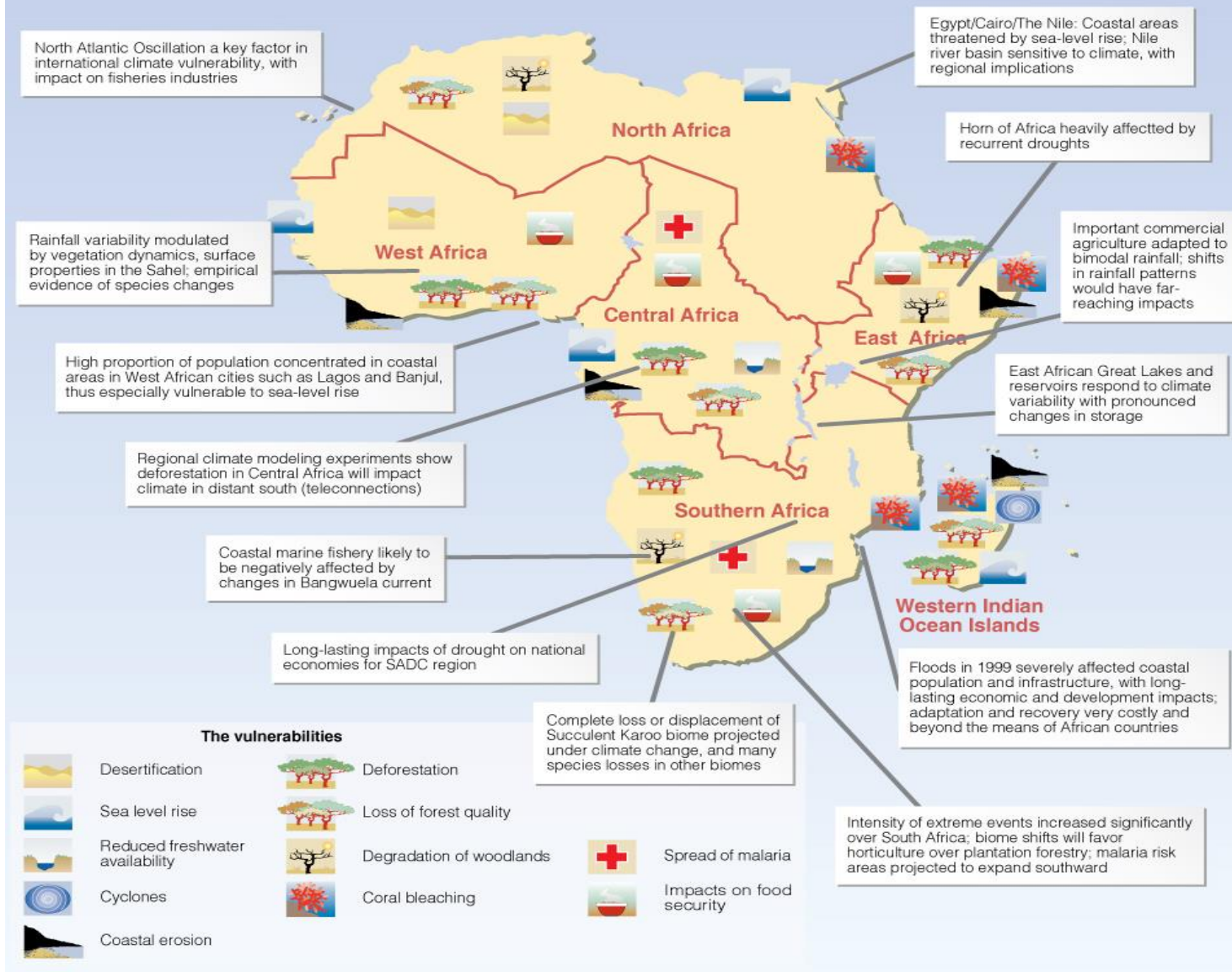
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Climate Change Vulnerability Index 2011



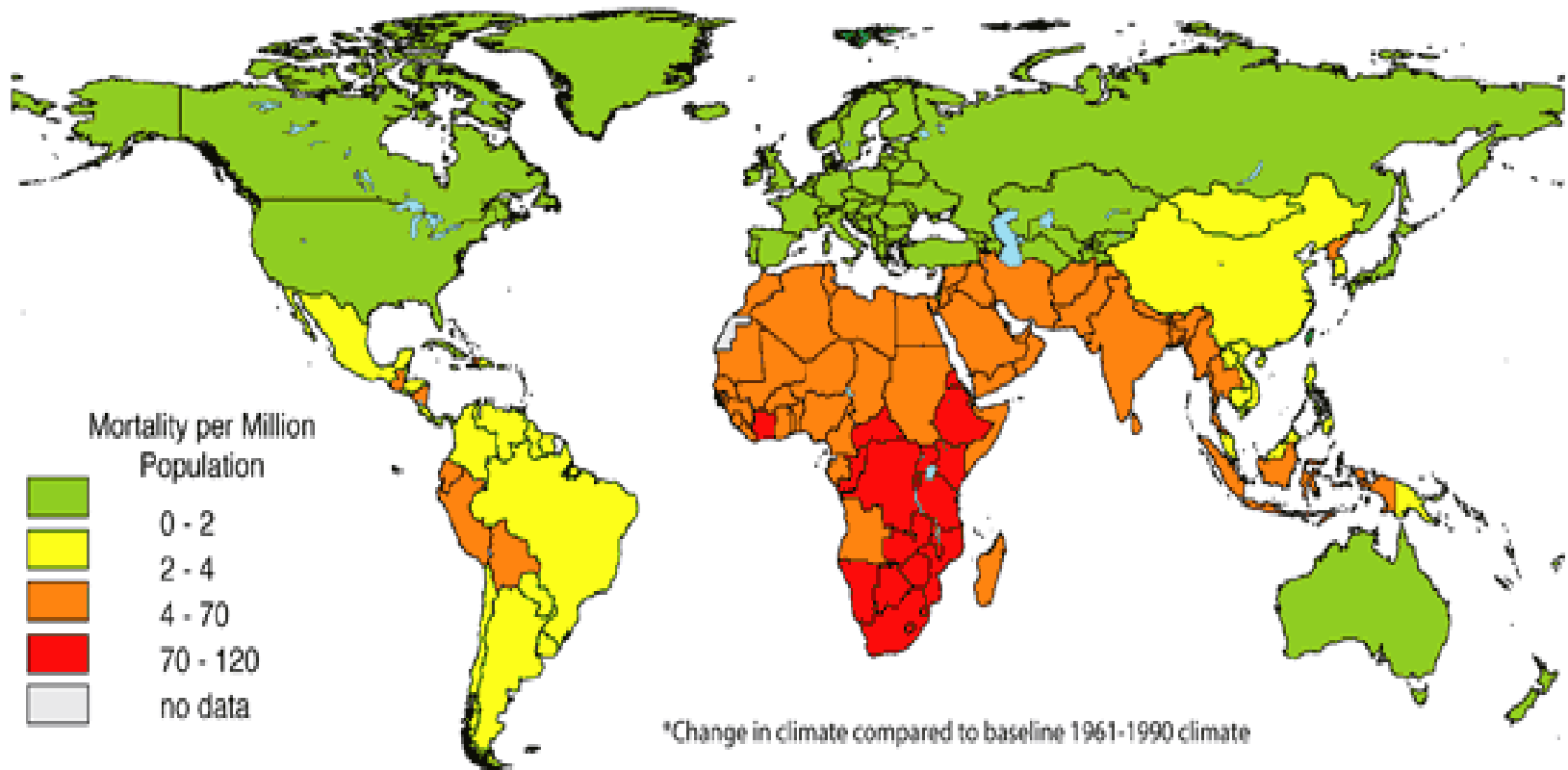
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Climate Change Vulnerability in Africa



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Estimated Deaths Attributed to Climate Change in the Year 2000, by Subregion*



Data Source:

McMichael, J.J., Campbell-Lendrum D, Kovats RS, et al. Global Climate Change. In Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors. M. Ezzati, Lopez, AD, Rodgers A., Murray CJL. Geneva, World Health Organization, 2004



Maps produced by the Center for Sustainability and the Global Environment (SAGE)

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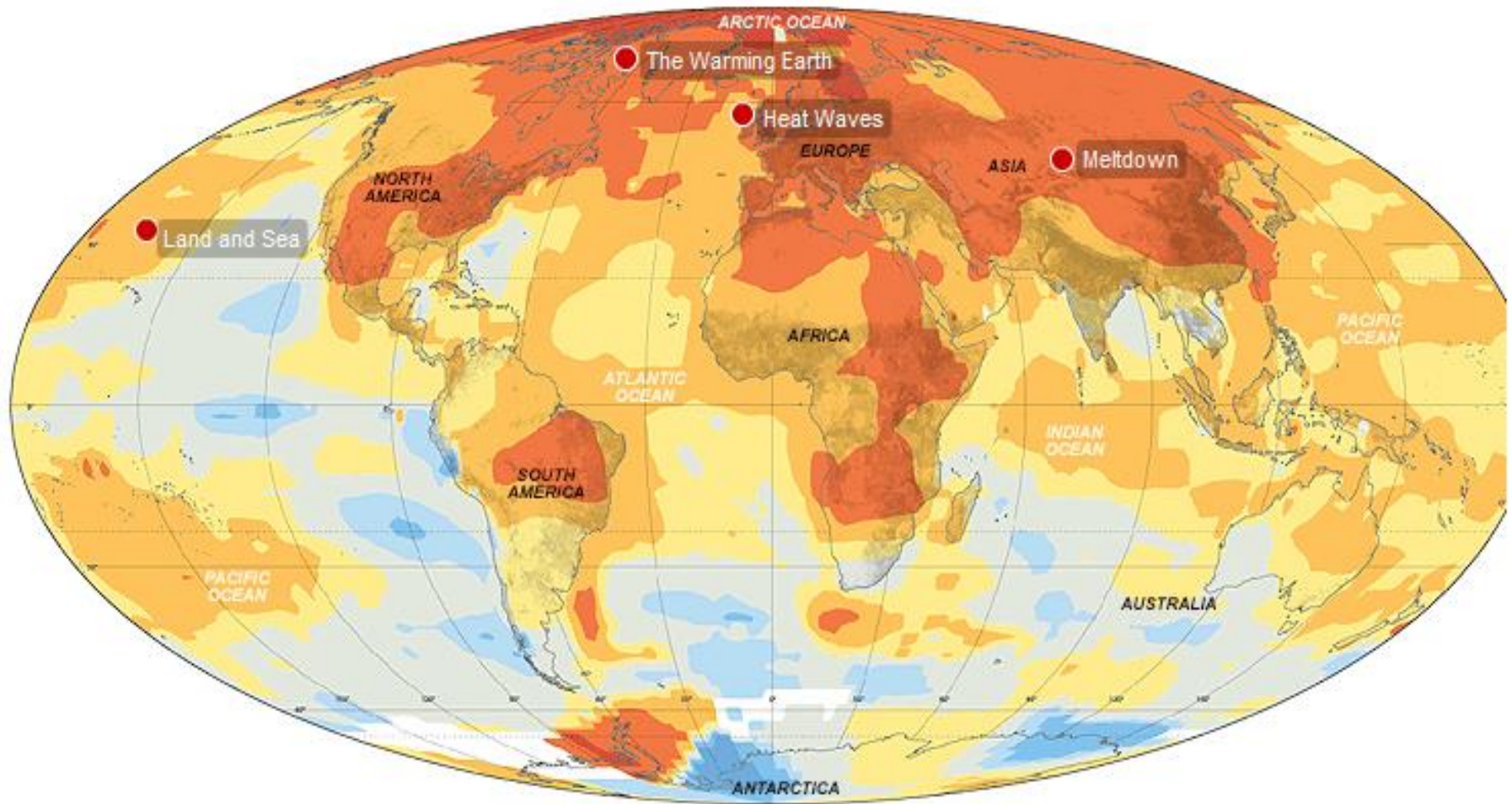
Matrix of Possible Climate Change/Security Interactions over Time- Strong Interactions

	Direct impact	Indirect Consequences					Slow-onset
	Water	Food	Health	Mega-projects	Disasters	Bio-fuel	Sea level
Short term (2007-2020)	Local conflict over water	Failure to meet MDGs	Failure to meet MDGs	Long history of development-induced displacement from 1950s	Nation states begin to lose credibility due to inability to prevent large disasters	Isolated food – fuel competition & price spikes	Small number of displacements
Medium term (2021-2050)	Increased local & some international conflict over water	Significant displacement due to famine	Interacts with food production problems	Displacement of rural poor due to CDM & large scale dams & other state based mitigation & adaptation projects	Significant political unrest due to failure of DRR & inadequate recovery in many countries	Food-fuel competition increases & biodiversity erosion	Increasing displacement & national/international tension
Long term (2051-2100)	Major international conflict over water	Major displacement & political upheaval	Major displacement due to epidemics	Major urban upheaval and other political fallout from mega-project displacement	Major upheaval with international implications due to unattended weather catastrophes	Major discontent due to food-fuel competition	Major international tensions due to population displacement

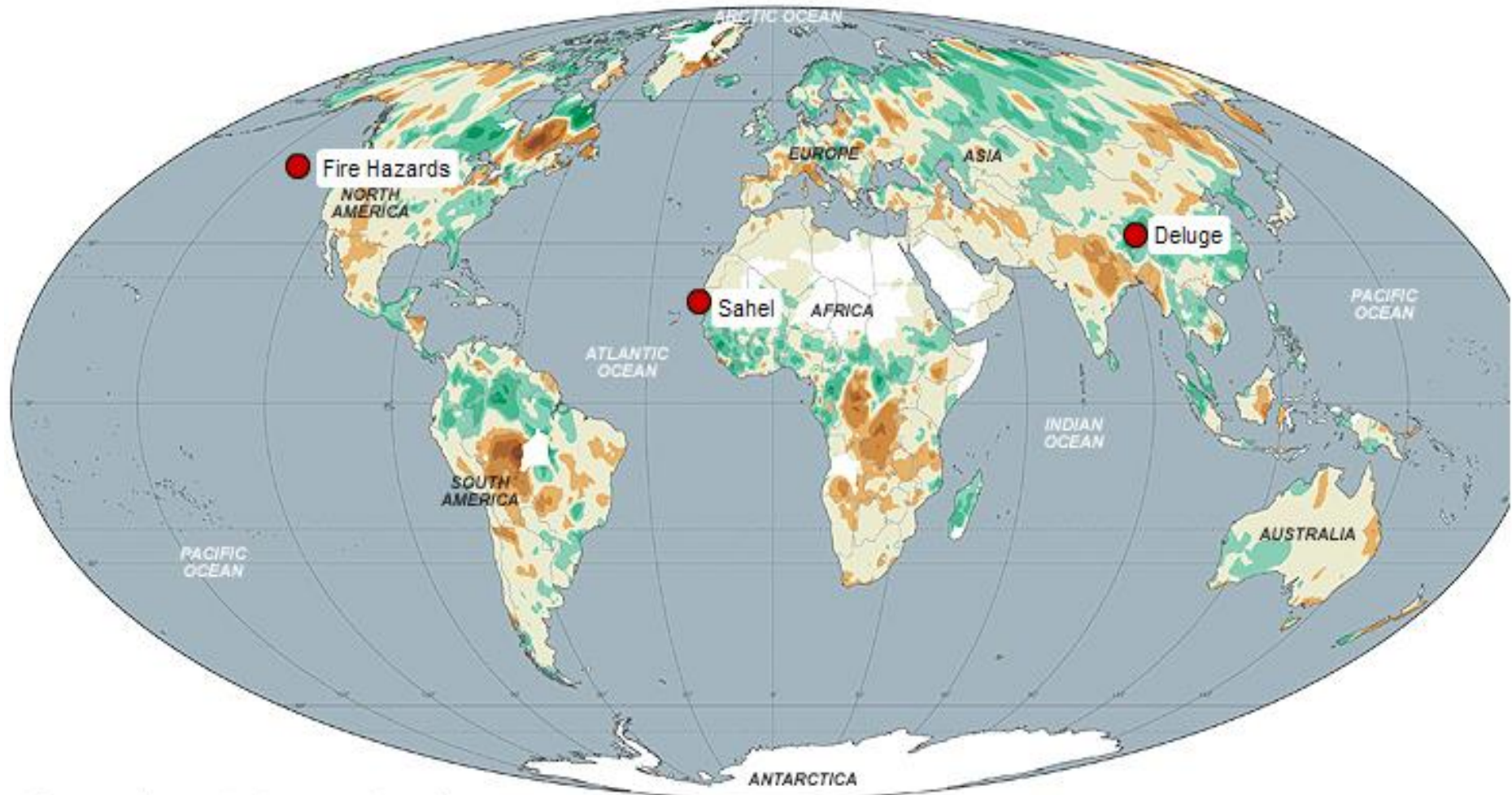
Table 2.1
Comparing scientific conclusions

Organization	Range ¹	Year	CO ₂ vs. other
National Research Council, 1979	3 ± 1.5	By 2050 ²	
Department of Energy, 1979	2–3	By 2050 ³	
National Research Council, 1983	1.5–4.5	By 2050 ⁴	Will contribute ⁵
Environmental Protection Agency, 1983	3 ± 1.5	By 2050 ⁶	May contribute ⁷
Department of Energy, 1985 “State of the Art” Reports	1.5–4.5	By 2075 ⁸	May contribute ⁹
SCOPE/Villach, 1985	1.5–5.5	2050–2100 ¹⁰ 2030 ¹¹	Can contribute
Environmental Protection Agency, 1989	1.5–4.5	By 2030 ¹²	Can contribute
Intergovernmental Panel on Climate Change	1.5–4.5		

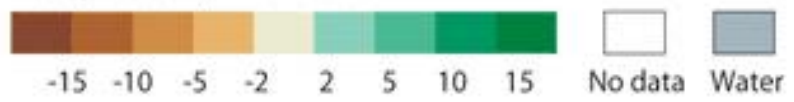
Torrance, Wendy E. F. "Science or Salience: Building an Agenda for Climate Change." In *Global Environmental Assessments: Information and Influence*. Edited by Ronald B. Mitchell, William C. Clark, et al. © MIT Press. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.




"Changing Climate." *National Geographic*, October 2007. © National Geographic Partners. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.



Percent Change in Average Annual Precipitation, 1976-2005



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Climate Change – Potential Effects

- Differential impacts within & across countries
 - **more burdens on the poor everywhere**
 - **more social cleavages**
- Erosion of governance & institutions
 - **Loss of law and order**
 - **Growth of individual ‘self-help’ actions**

Climate Change Index (CCI)

for 189 countries

- The 10 countries of highest overall risk account for 2% of GHG Emission

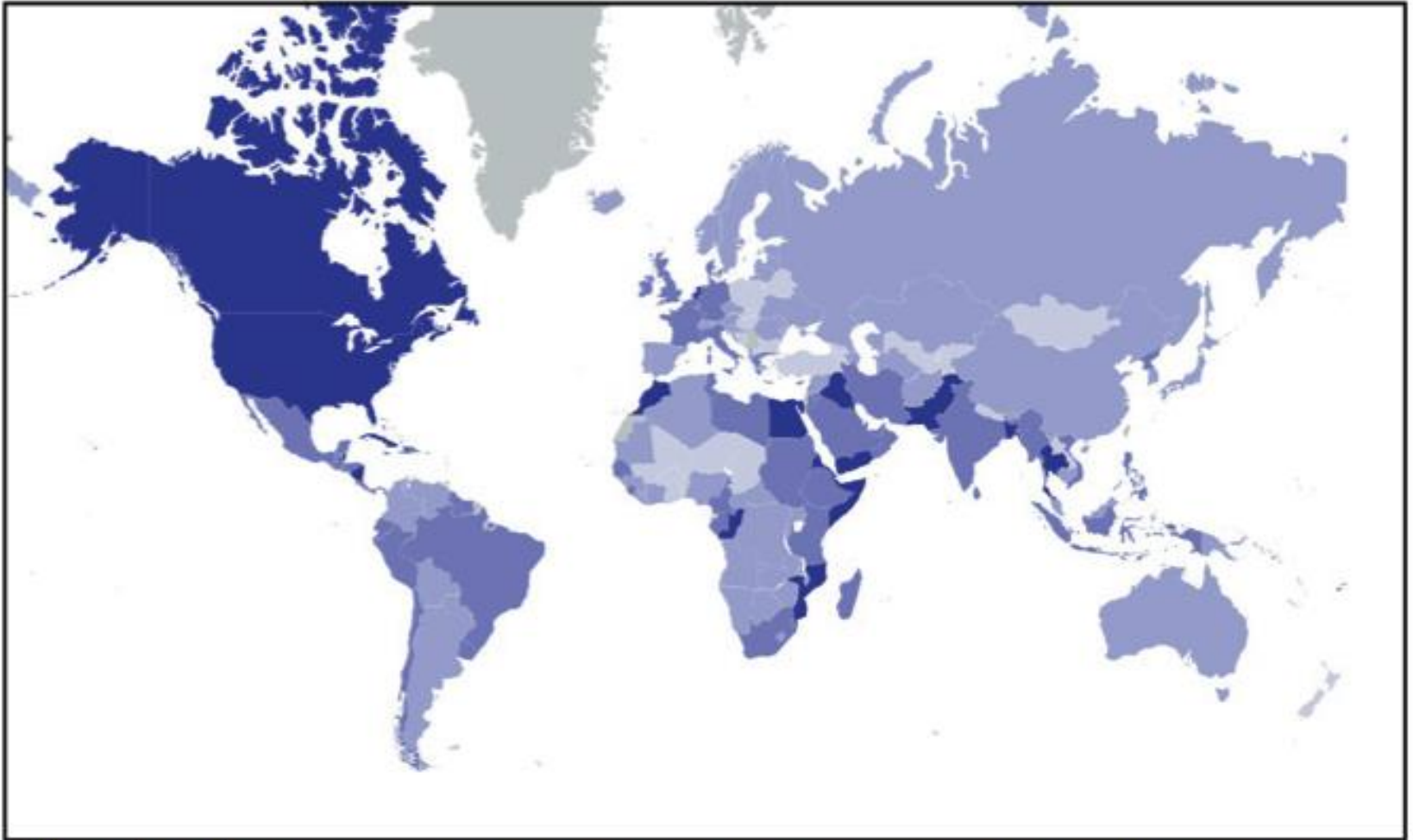
Djibouti, Egypt, Pakistan, Cuba, Iraq, Morocco, Dominica, Antigua and Barbuda, Mozambique and Somalia.

- Of the 31 countries with extreme risk, only 3 are industrial

Netherlands, Canada & USA

The index consists of 3 equal components; (i) Coastal exposure; (ii) Inland exposure (iii) Health exposure. Socio-economic or other impacts not covered/. Source: Mapplecroft Maps

Distribution of CCI Impacts



Climate change - levels of exposure to the impacts of climate change.
Darker shades represent higher levels of exposure.

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Some Potential Dangers

Global sea levels rise as oceans warm & sea ice melts

- uninhabitable conditions

Increase in rainfall intensity will increase tropical storms

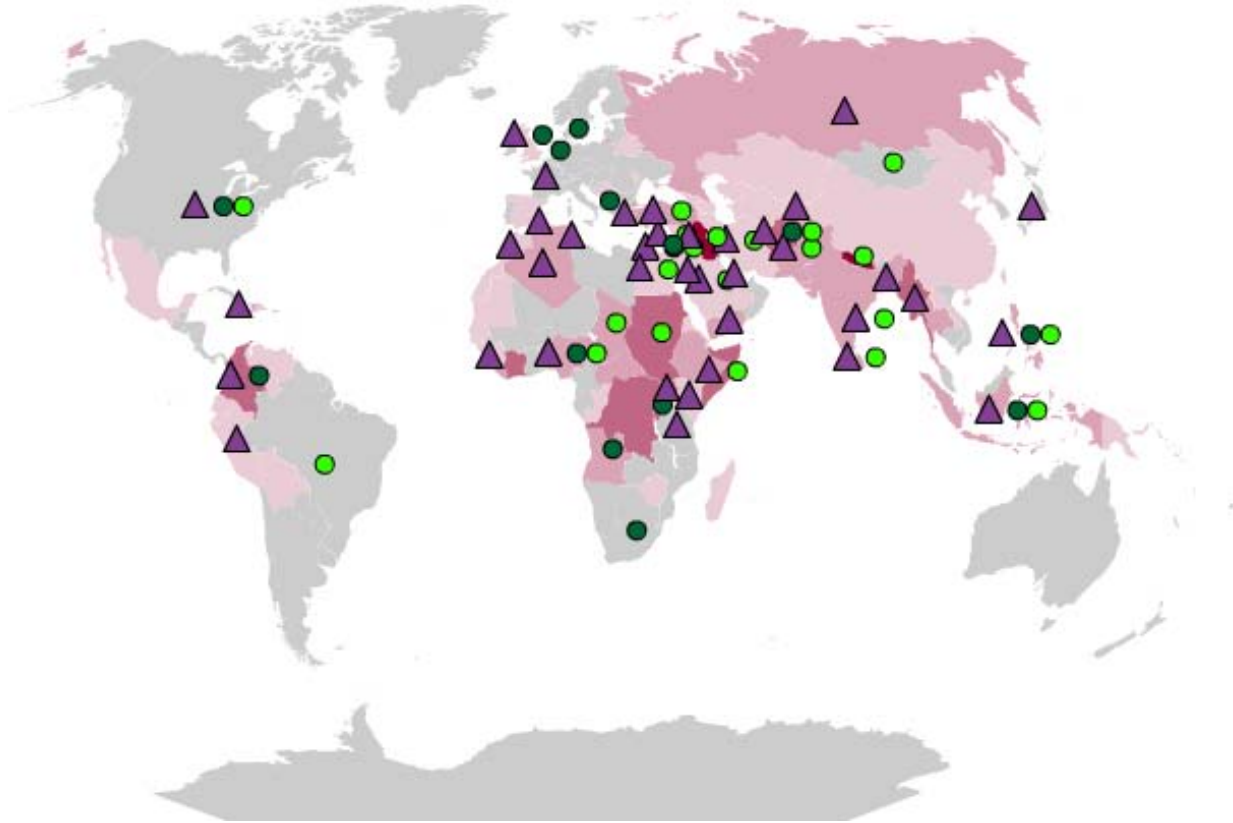
- more risk of weather-related disasters
- Infectious disease

Infrastructure must adapt to these changes

- more social & economic pressures
- more stresses on resources

The Dark Side: Countries at Risk of Conflict - 2005

Global map of conflict risk



Colors: High-Intermediate-Low
Triangle: Significant terrorist risk

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New Global Agenda

- Salience of Environment –
Growth in Environmental Treaties
- Framing New Objectives
“Sustainable Development”
- Re-Visiting the Fundamentals
Equity Matters– not only efficiency
- Addressing New Realities
Connecting Climate Change &
Sustainability Issues

ONCE MORE:

Requisites for Sustainable Development

**DE-MASSIFICATION
DE-SPACIALIZATION
DE-CENTRALIZATION
DIS-AGGREGATION
DE-NATIONALIZATION
DIS-INTERMEDIATION**

Brown, John Seely, and Paul Duguid. *The Social Life of Information*. Harvard Business Review Press, 2017. © Harvard Business Review Press. All rights reserved. This content is excluded from our Creative Commons license. For more information, see <https://ocw.mit.edu/help/faq-fair-use/>.

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