# Regional climate information needs for assessing impacts and risk

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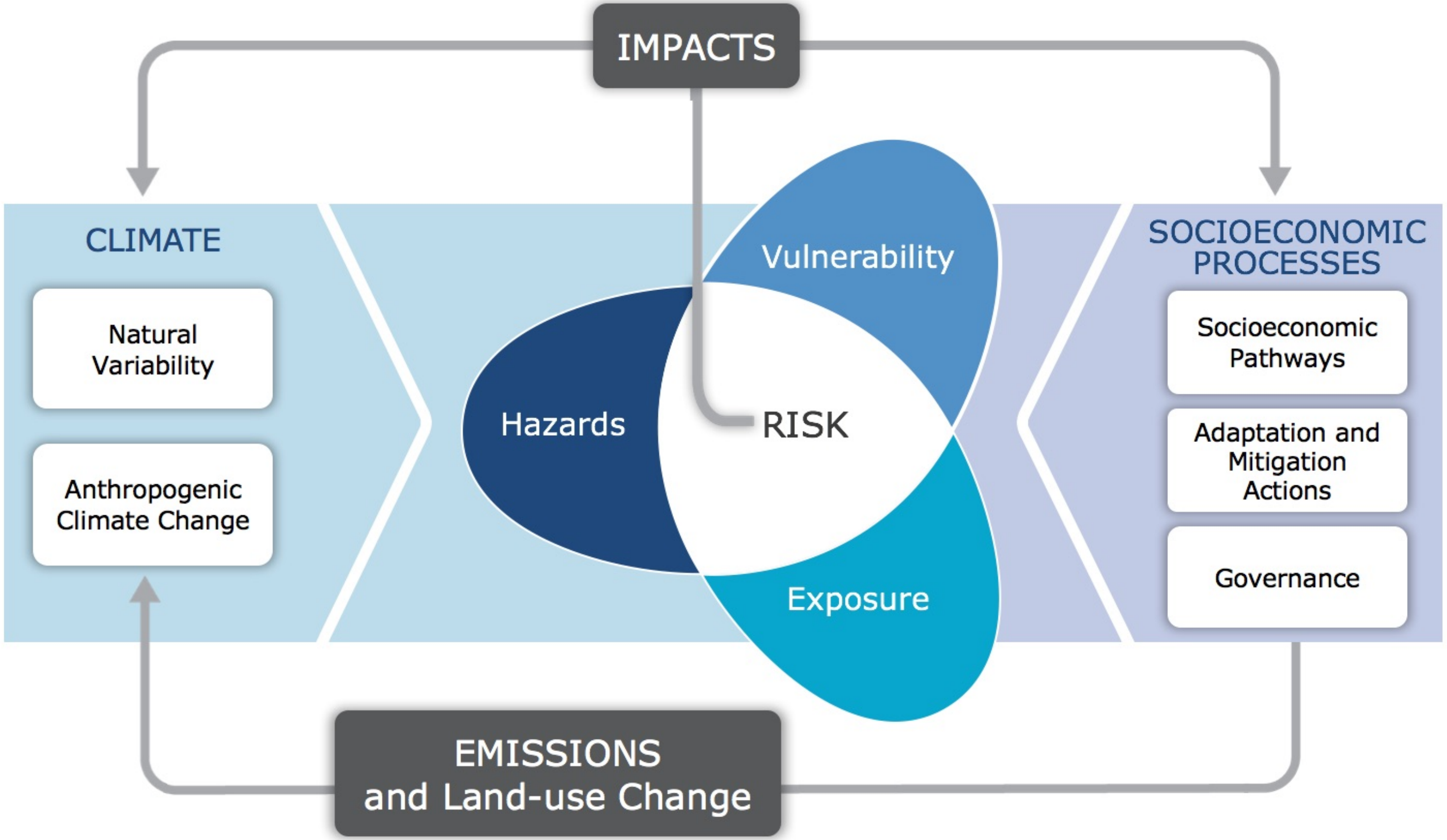
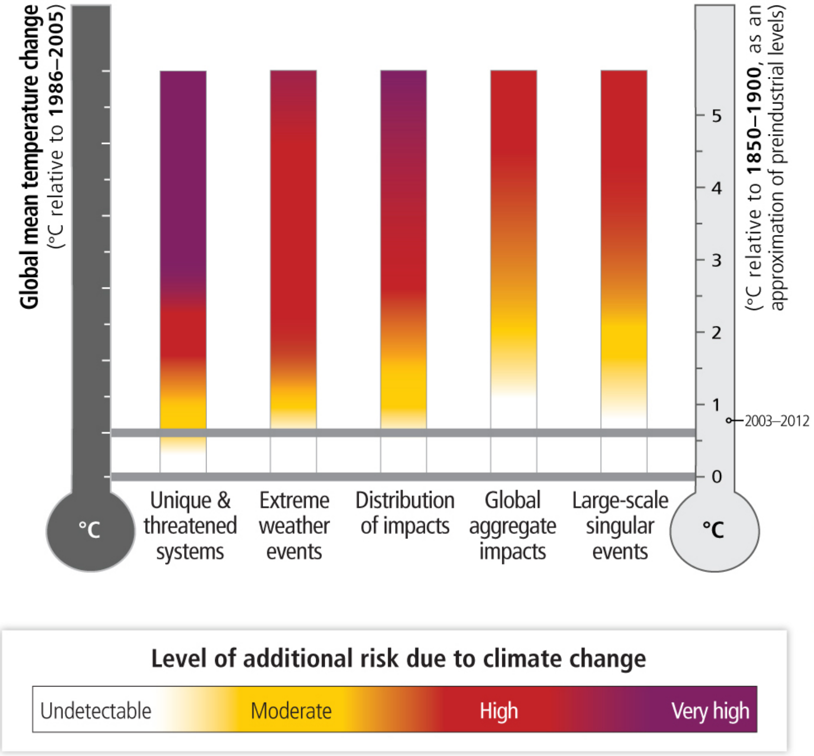
# Risk management framework






**Climate-related drivers of impacts**

Warming trend · Extreme temperature · Drying trend · Extreme precipitation · Precipitation · Snow cover · Damaging cyclone · Sea level · Ocean acidification · Carbon dioxide fertilization

**Level of risk & potential for adaptation**

Potential for additional adaptation to reduce risk

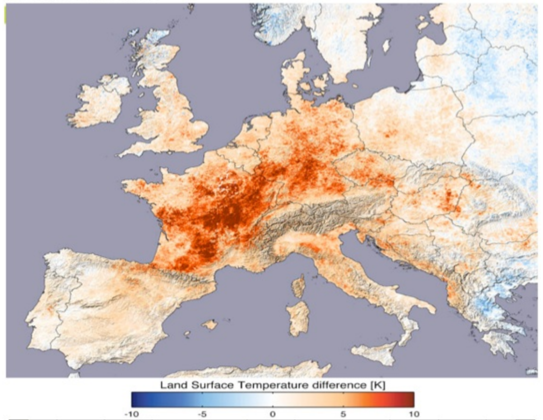
Risk level with **high** adaptation · Risk level with **current** adaptation

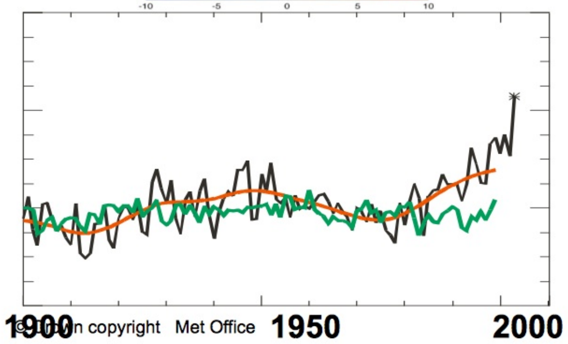
## Africa

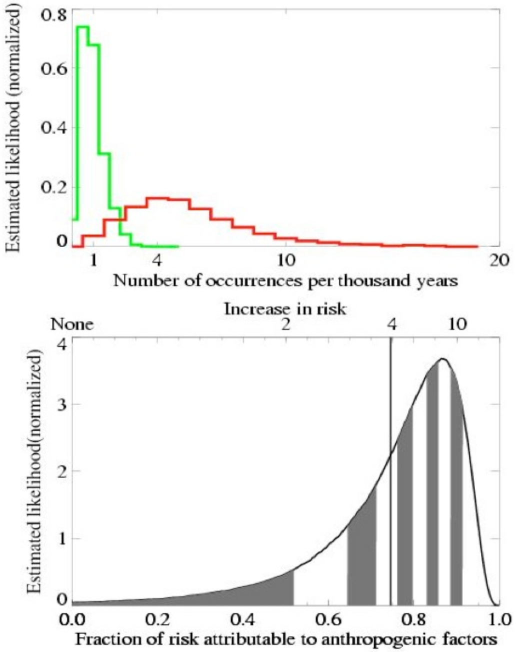
| Key risk | Adaptation issues & prospects | Climatic drivers | Timeframe | Risk & potential for adaptation |
|---|---|---|---|---|
| Compounded stress on water resources facing significant strain from overexploitation and degradation at present and increased demand in the future, with drought stress exacerbated in drought-prone regions of Africa (*high confidence*) [22.3-4] | • Reducing non-climate stressors on water resources<br>• Strengthening institutional capacities for demand management, groundwater assessment, integrated water-wastewater planning, and integrated land and water governance<br>• Sustainable urban development | | Present<br>Near term (2030–2040)<br>Long term (2080–2100) 2°C / 4°C | Very low · Medium · Very high |
| Reduced crop productivity associated with heat and drought stress, with strong adverse effects on regional, national, and household livelihood and food security, also given increased pest and disease damage and flood impacts on food system infrastructure (*high confidence*) [22.3-4] | • Technological adaptation responses (e.g., stress-tolerant crop varieties, irrigation, enhanced observation systems)<br>• Enhancing smallholder access to credit and other critical production resources; Diversifying livelihoods<br>• Strengthening institutions at local, national, and regional levels to support agriculture (including early warning systems) and gender-oriented policy<br>• Agronomic adaptation responses (e.g., agroforestry, conservation agriculture) | | Present<br>Near term (2030–2040)<br>Long term (2080–2100) 2°C / 4°C | Very low · Medium · Very high |
| Changes in the incidence and geographic range of vector- and water-borne diseases due to changes in the mean and variability of temperature and precipitation, particularly along the edges of their distribution (*medium confidence*) [22.3] | • Achieving development goals, particularly improved access to safe water and improved sanitation, and enhancement of public health functions such as surveillance<br>• Vulnerability mapping and early warning systems<br>• Coordination across sectors<br>• Sustainable urban development | | Present<br>Near term (2030–2040)<br>Long term (2080–2100) 2°C / 4°C | Very low · Medium · Very high |

Human influence has very likely at least doubled the probability of European summer temperatures as hot as 2003

Met Office

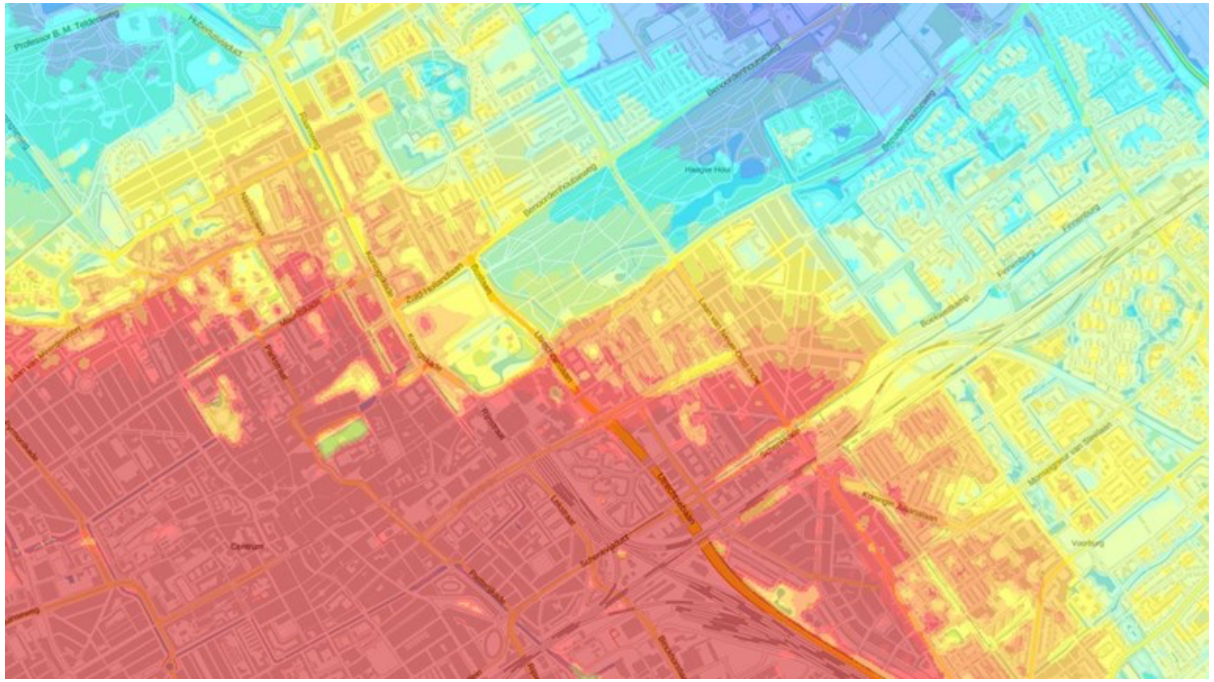


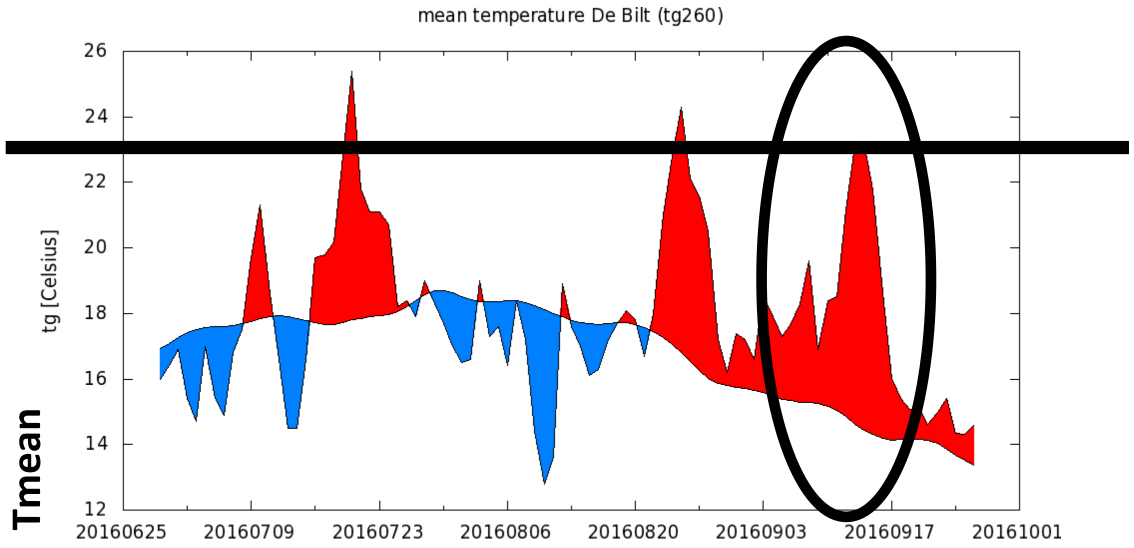

**Stott, Stone, Allen, Nature 2004**

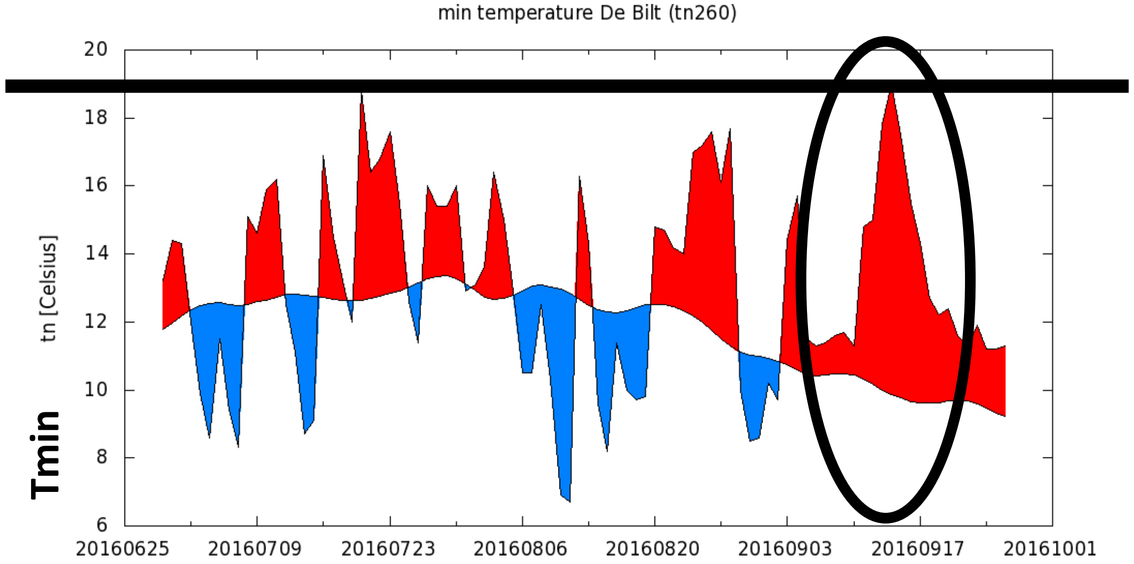
# Do we really mean regional, or often also local?



The Hague heat map (Delft University of Technology 2018)

# and how we manage changing risk….



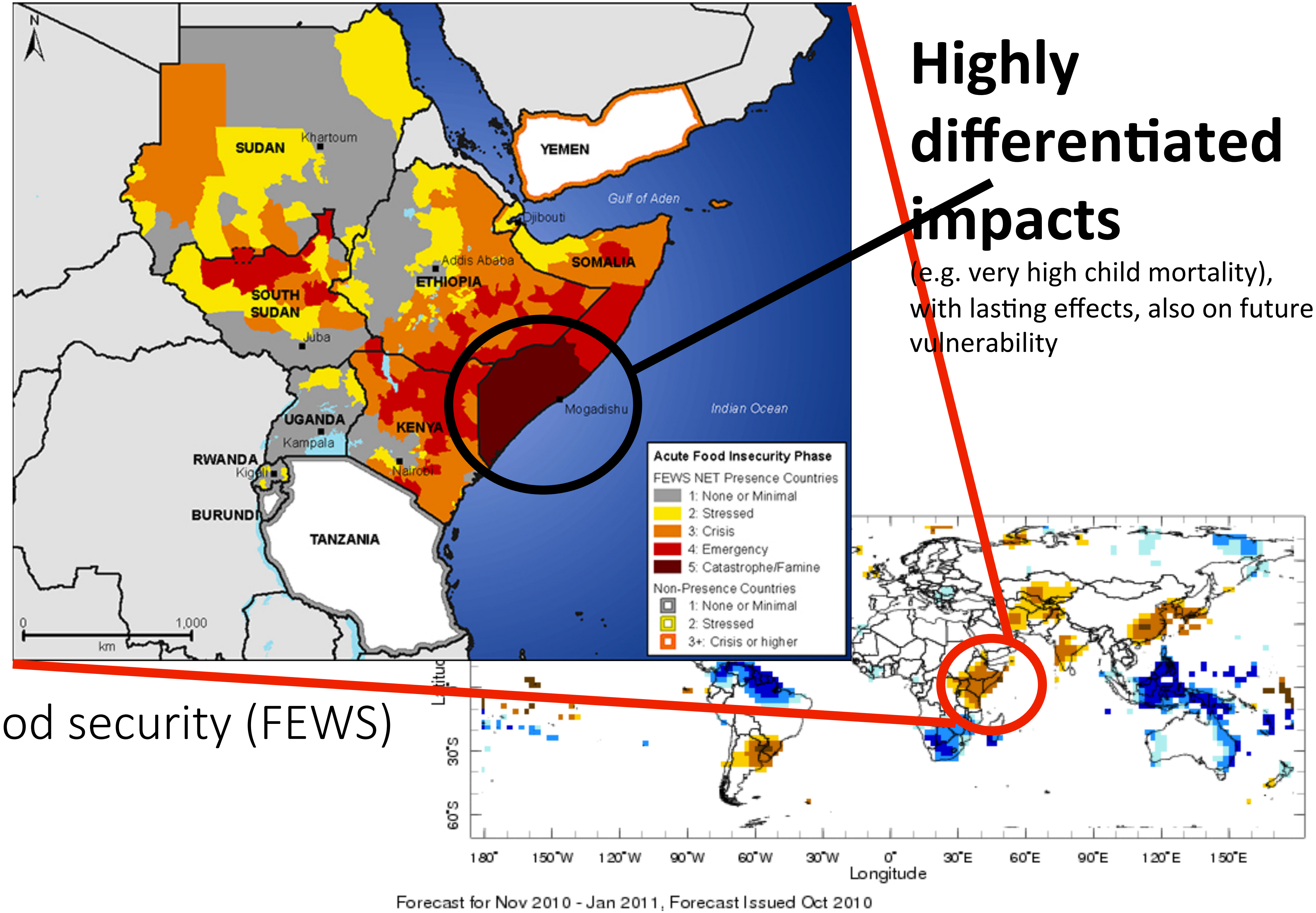




**Netherlands heatwave September 2016**: no public warning despite high temperatures, ***under the (false) assumption that nights would be cooler in September***…

Source: KNMI climate explorer, using ECMWF forecast data

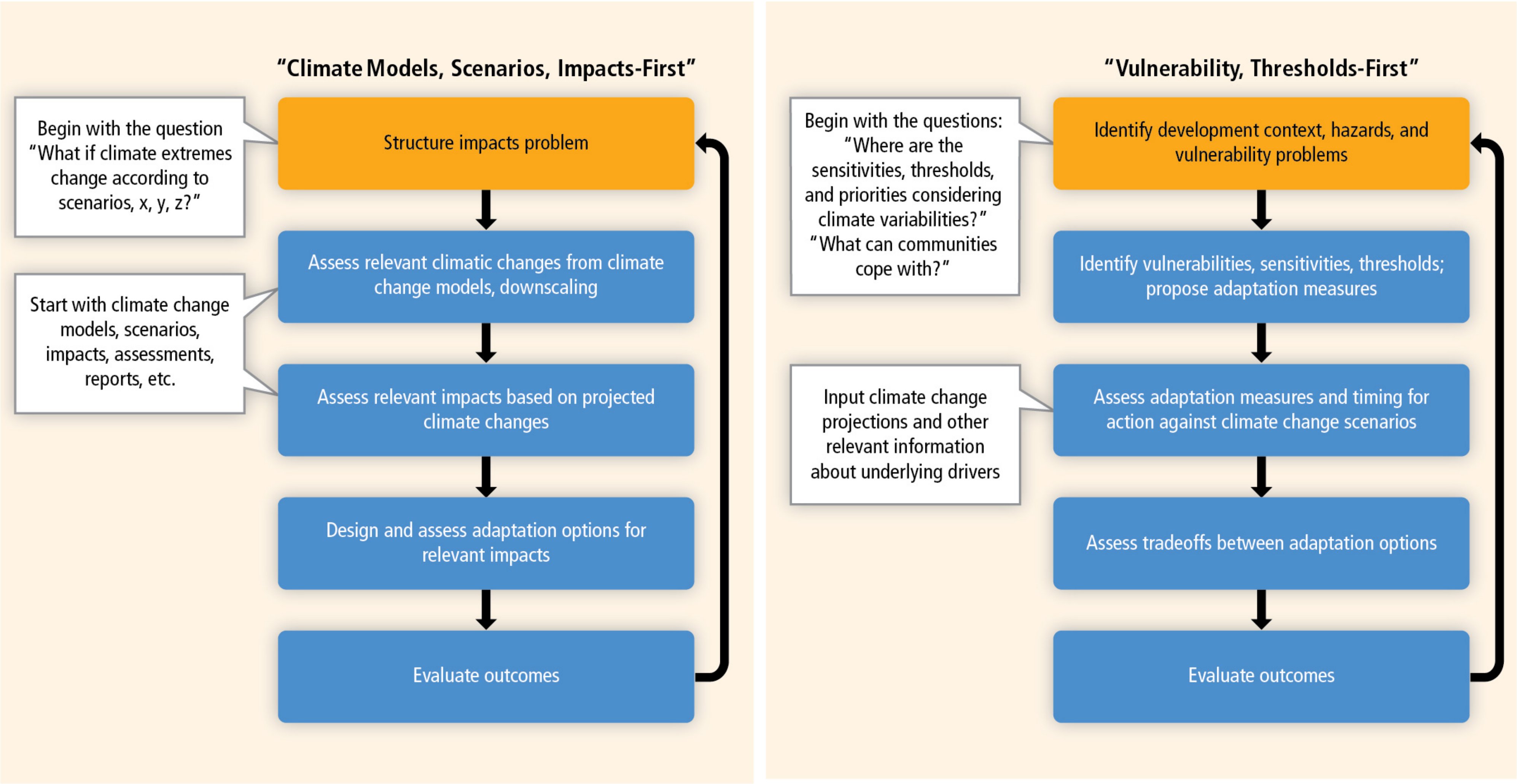
# Highly differentiated impacts

(e.g. very high child mortality), with lasting effects, also on future vulnerability



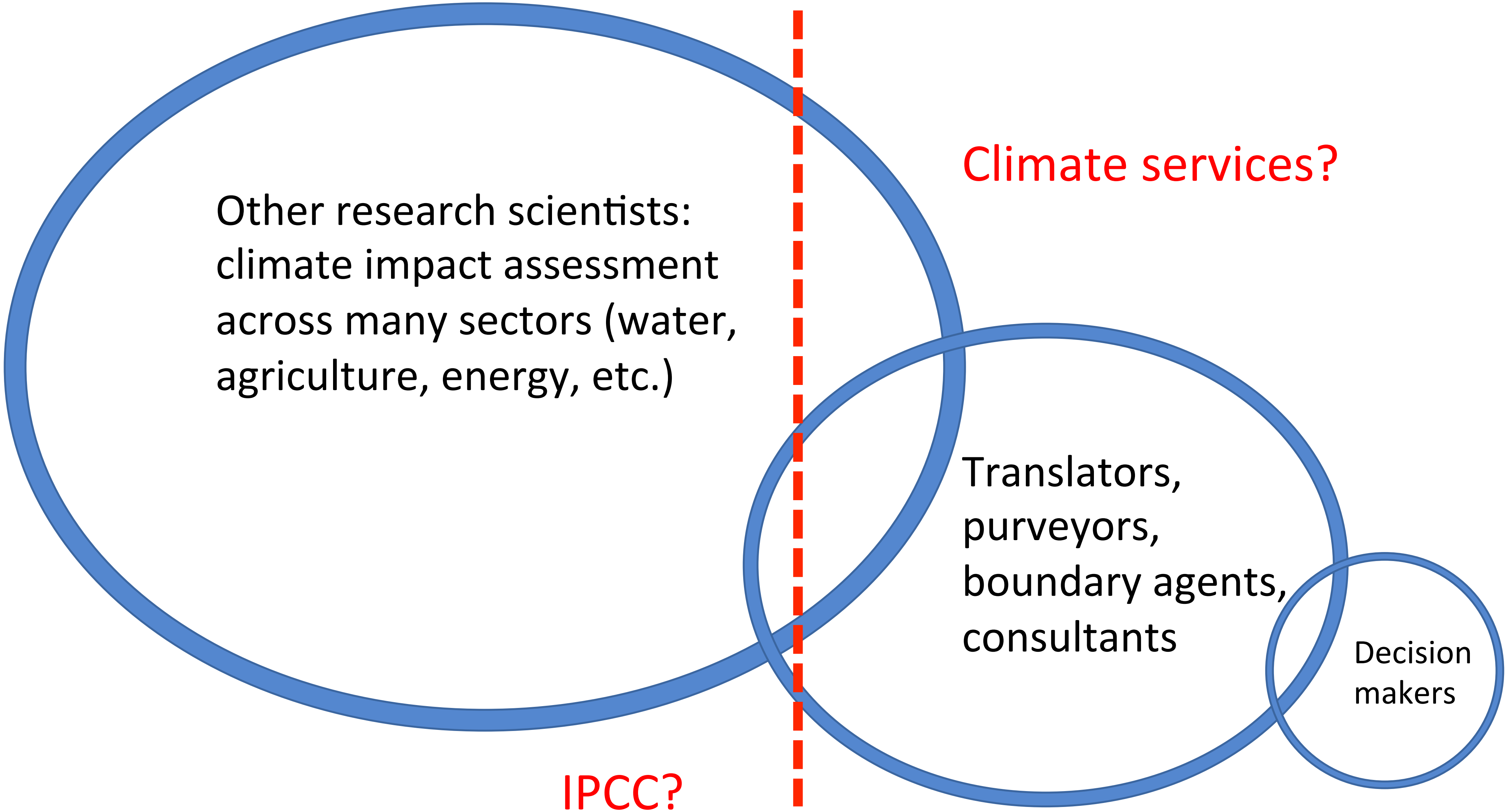

Food security (FEWS)

# Framing of risk analysis determines climate information needs



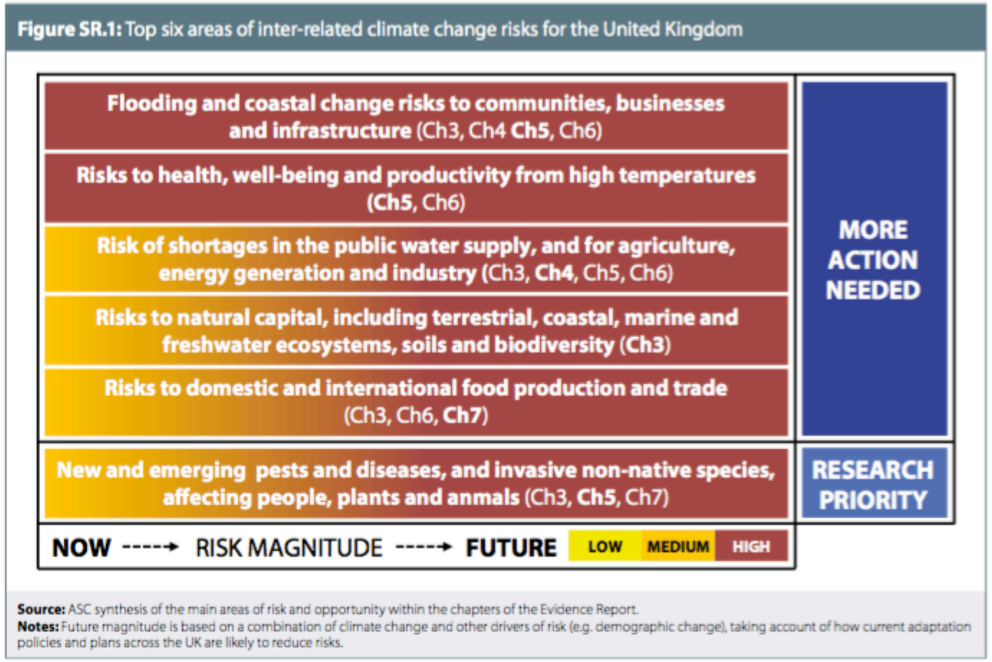

Top-down scenario, impacts-first approach (left panel) and bottom-up vulnerability, thresholds-first approach (right panel) – comparison of stages involved in identifying and evaluating adaptation options under changing climate conditions (IPCC SREX, 2012).

# The diverse needs of WGII: vulnerability, impacts and adaptation



# Demand for climate information

- Research needs: advancement of scientific knowledge
- Legislation: UK climate change act 2008 – period Climate Change Risk Assessment; Adaptation Reporting Power
- Soft standards: Task Force on Climate-related Financial Disclosures (TCFD) – physical climate risk and opportunities on business and investment
- Self-interest from organizations, cities, etc.

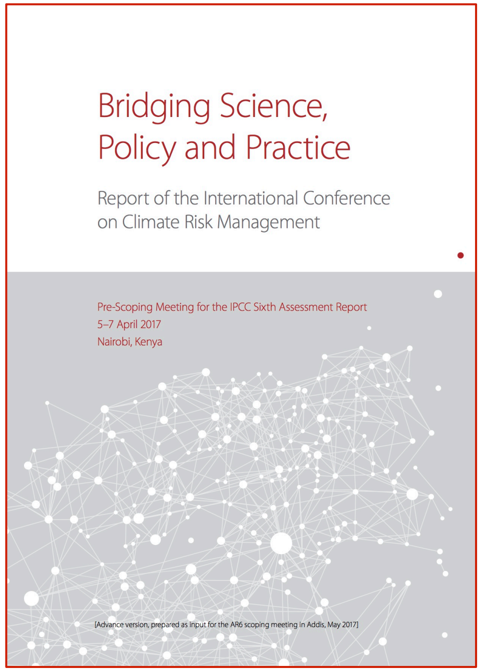



# The use of climate information in adaptation decision-making

- Europe (Bruno Soares et al. 2018 – survey n = 462; interviews n=80)
  - diversity of needs and requirements across sectors
  - Opportunity: interest in the near-term timescale (decadal prediction)
  - Barriers and enablers: the format of the information provided, the need for compatibility with existing in-house systems, and the perceived credibility and trust of information providers
- Africa and India (Singh et al. 2017)
  - successful examples predominantly use daily, weekly and seasonal climate information for decision-making over short time horizons
  - very few clear examples of long-term climate information being used to inform decisions at subnational scales
  - Barriers: uncertainty, risk averseness and constraints in justifying funding allocations on prospective risks

# Priorities

- Risk information for **decision-making under uncertainty**
    - Past present and future
    - Including uncertainties (and highlighting potential surprises)
- **Better insight in system dynamics**
    - Compound impacts
    - Thresholds (not just defined by physical systems)
    - Note: choices (adaptation) affect current and future risks (observed adaptation)




- Clarifying the interface with climate services

# To consider…

- Testing products and iterating with prospective users
- Interface with climate services