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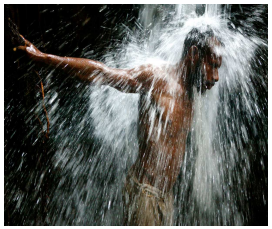
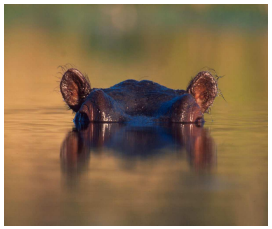
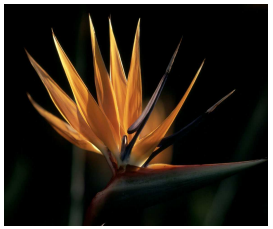
Increasing ecosystem resilience as a measure to adapt to climate change

Water and climate change: How to develop adaptation strategies in transboundary basins, Geneva, 11 May 2010






Climate adaptation – a new issue?

- People and nature have been adapting to changing climate conditions for millennia and beyond

What is different?

- Rate of change
- Type of change
- The world has changed!
  - Limited habitat
  - Limited connectivity
  - Limited (water) resources

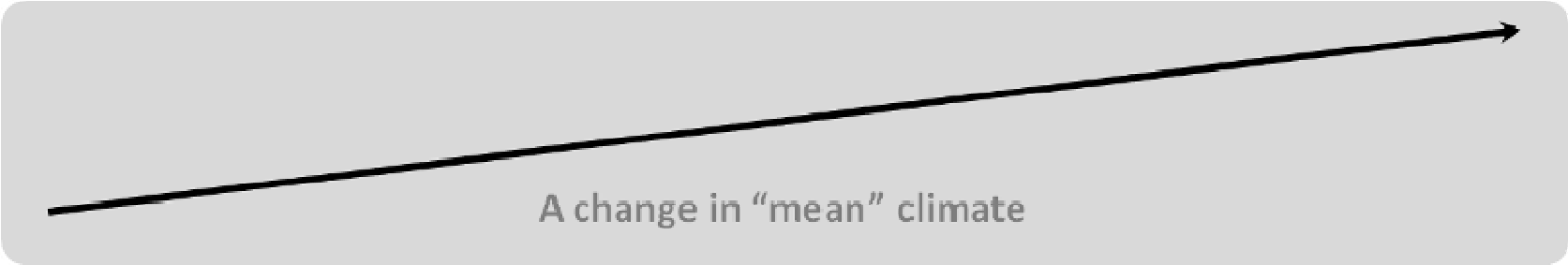
Mongolian Gazelle, Daurian Steppe

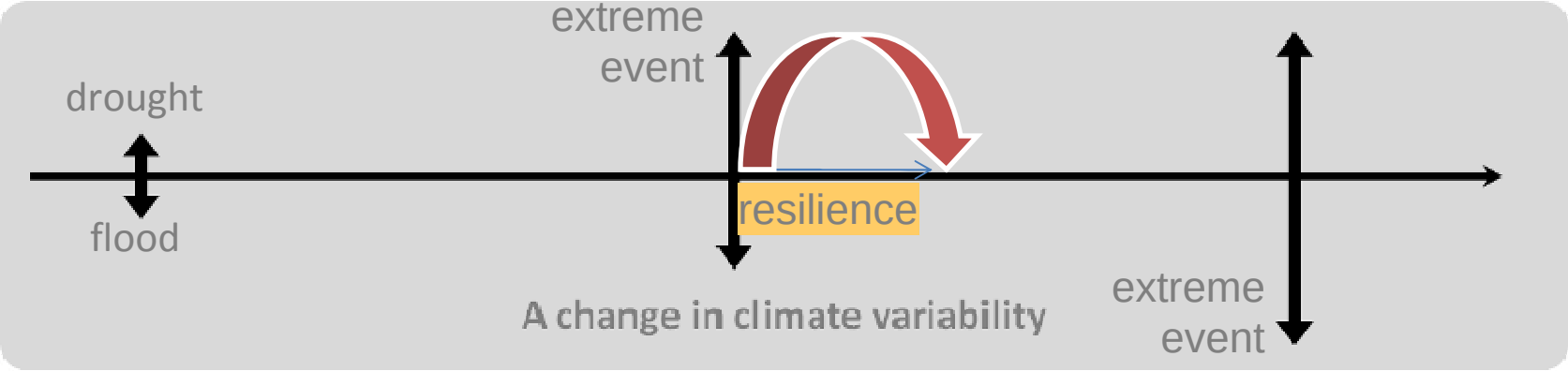
Adaptation is ultimately an *uncertainty* problem

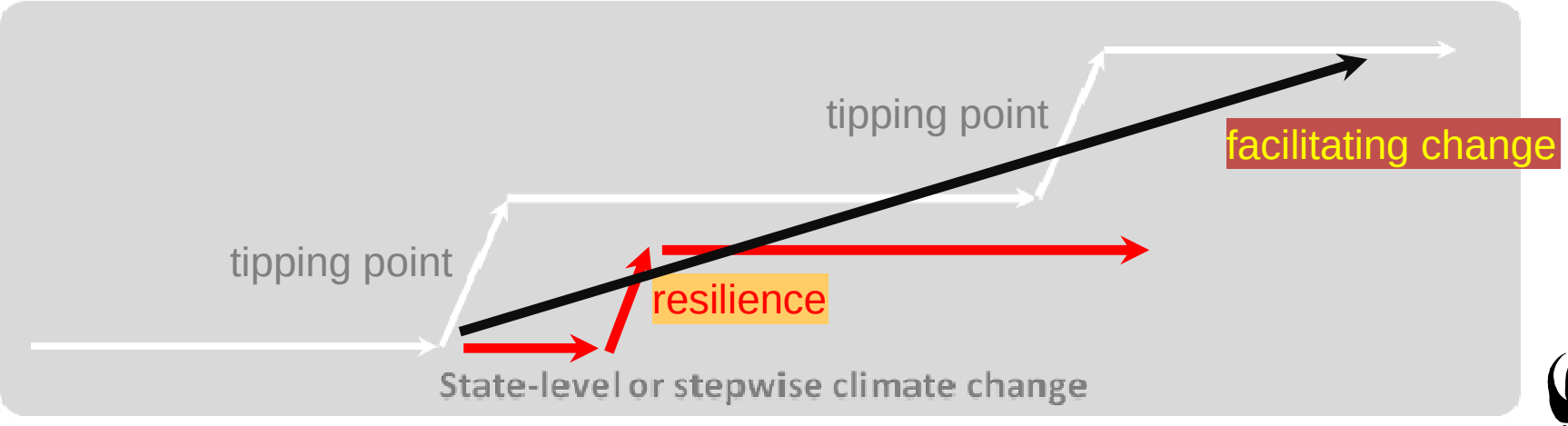
- **Stationarity** — the assumption that the past is a good guide to the future (Milly et al., *Science,* 2008)
- Our policies, institutions, conservation, and even water infrastructure design and management largely assume ***climate*** stationarity
- We are not able to easily adjust to shifting or emerging climate conditions

Blue Mosque, Istanbul, Turkey

Change? What change?







Solutions

- Assess vulnerability & resilience
- Explore adaptation options
- Monitor

- 80% of the solution is in our hands
  - Conservation Agriculture
  - IRBM -> IRBM +?
  - Environmental flows
  - EIA/SEAs

Climate-adaptive people

Slow, occurs once, quantitative, deterministic

Impacts thinking

"Current climate change adaptation practice places great faith in the ability of climate models to predict specific impacts.'"

vulnerability | adaptation

Quick & dirty, open ended, continuous or iterative, semi-quantitative, focused

Adaptation thinking

"Ecosystems are dynamic entities ... Adaptation thinking emphasizes the **shifting** relationship between institutions and ecosystems."

vulnerability | adaptation

Matthews & Wickel, "Embracing Uncertainty," *Climate & Development*, 2009

“Soft” is the new “hard” infrastructure

- Natural, wild freshwater ecosystems often have the ability to adapt to changing climate conditions by themselves
- They have high natural resilience, can resist extreme events, and transition into new ecological conditions
- “Hard” water infrastructure usually restricts or eliminates some of this natural resilience
- Soft or “green” infrastructure to manage water can help combine control of water resources, restore flow regimes, and rebuild natural climate resilience

Lower Danube River

- **Extensive floodplain loss**
- **2000 agreement for 9,000 km2, 2,236 km2 restoration**
- **Big floods in 2005 & 2006**
- **469 km2 floodplain restoration at 2008 (14.4%)**
- **E 500/ha/yr ecosystem services**
- **Full restoration cost = E 183 M vs E 396 M damages from 2005 flood and E 85.6 M in benefits per year**

Lower Danube River

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Large floodplain areas with high potential for flood risk mitigation and restoration for the Danube and selected tributaries

Graphics © WWF DCPO

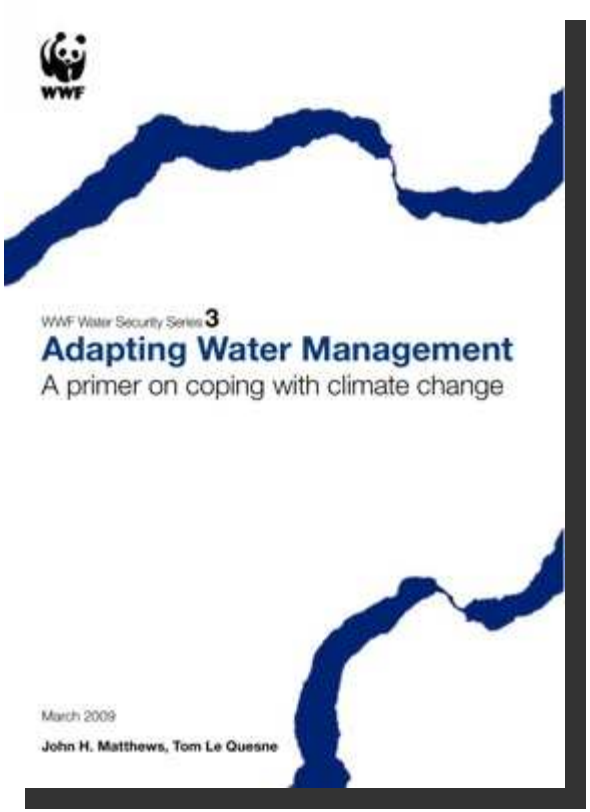
Retaining ecological integrity

- Secure ecosystems as the ultimate stakeholder in a basin
- Develop multiple “water futures” based on a range of possible qualitatively defined eco-hydrological conditions; use as the basis for flexible, low/no-regrets planning
- Vulnerability assessments should focus on both climatic and non-climate elements and flow regime and should be conducted iteratively
- Use tactical, active monitoring to trigger ecosystems & livelihoods resilience management (droughts, floods)
- Strategic, regular reevaluation of usage, flow, and climate data to determine which water future is evolving (facilitate state-level change)
- Maintain maximum natural connectivity

Policy challenges

- Develop institutional capacity
- Create flexible allocation systems and agreements
- Reduce external non-climate pressures
- Help species, human communities and economies move their range
- Paradigm shift in infrastructure planning and management
- Promote mainstreaming of climate change adaptation into sectoral policies
- Institute sustainable flood risk policies
- Support climate aware planning
- Improve monitoring and responsiveness capacity

Adaptation guidance



ClimatePrep.org
AdaptationPortal.org
ClimateChangeWater.org