



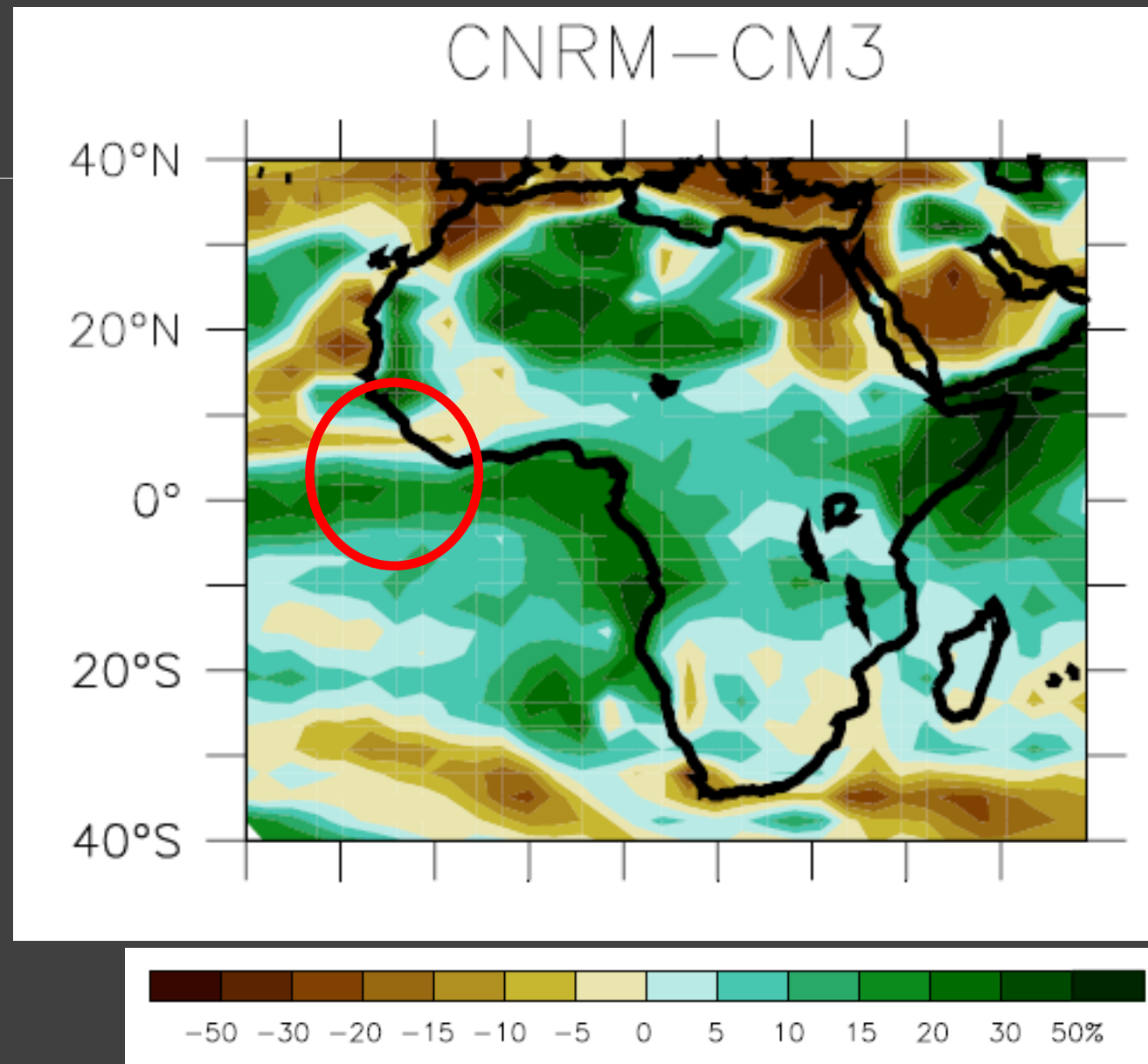
RESILIENCE = ROBUSTNESS + FLEXIBILITY

MAINSTREAMING NEW & EMERGING TECHNICAL INSIGHTS

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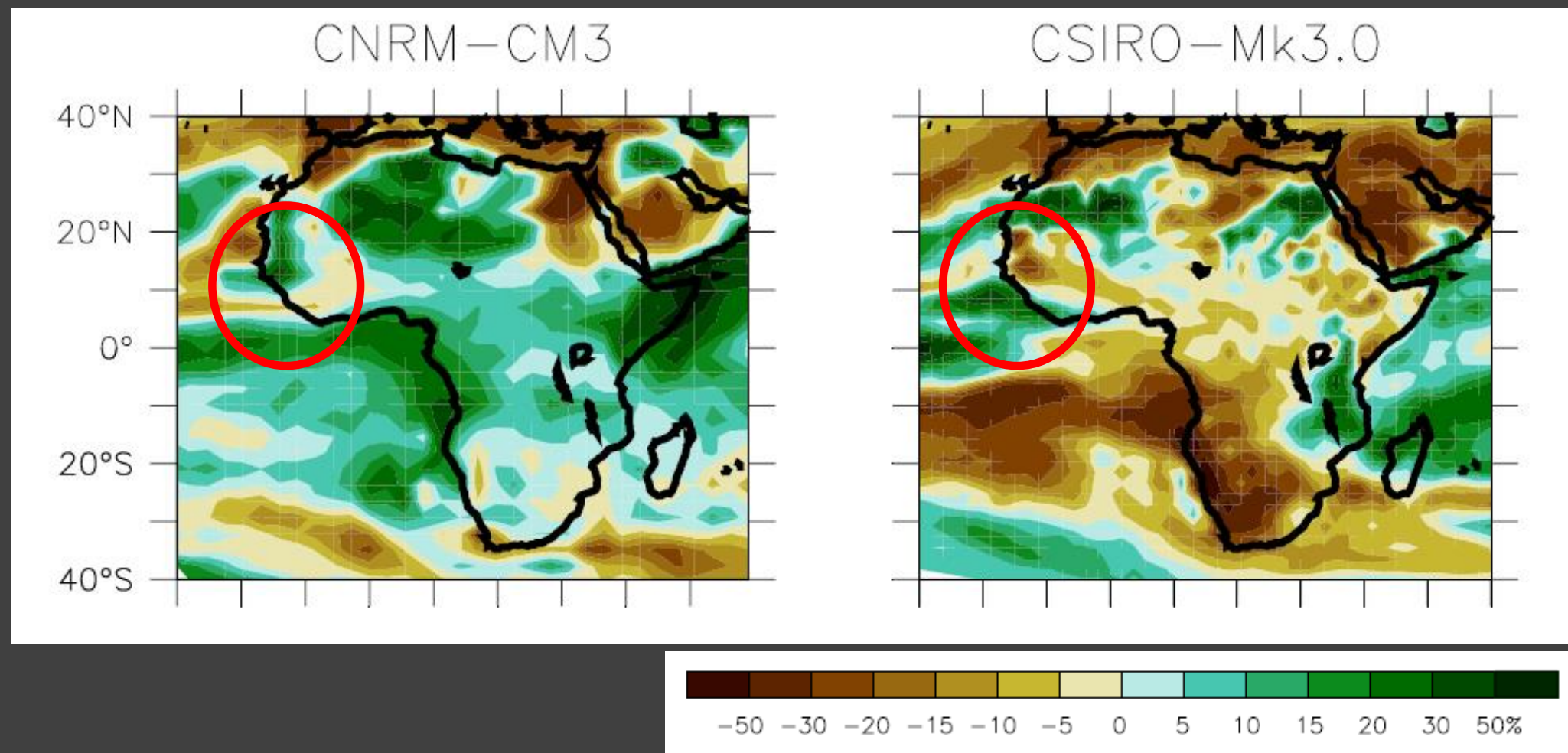
Climate models project future climates



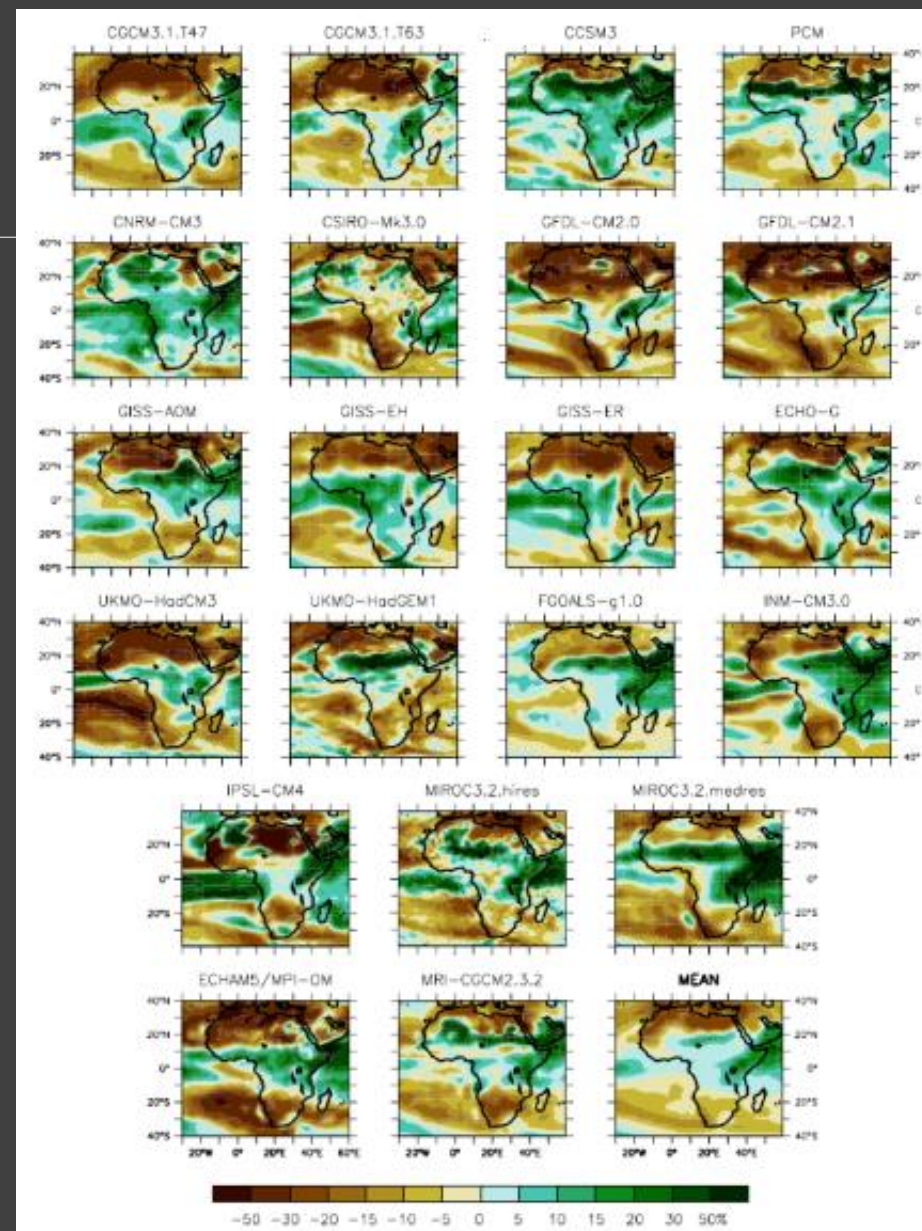
from S. Hallegatte
Source: Brown Stockholm water week presentation (Sept 2, 2013)

The Meteo-France model, from IPCC

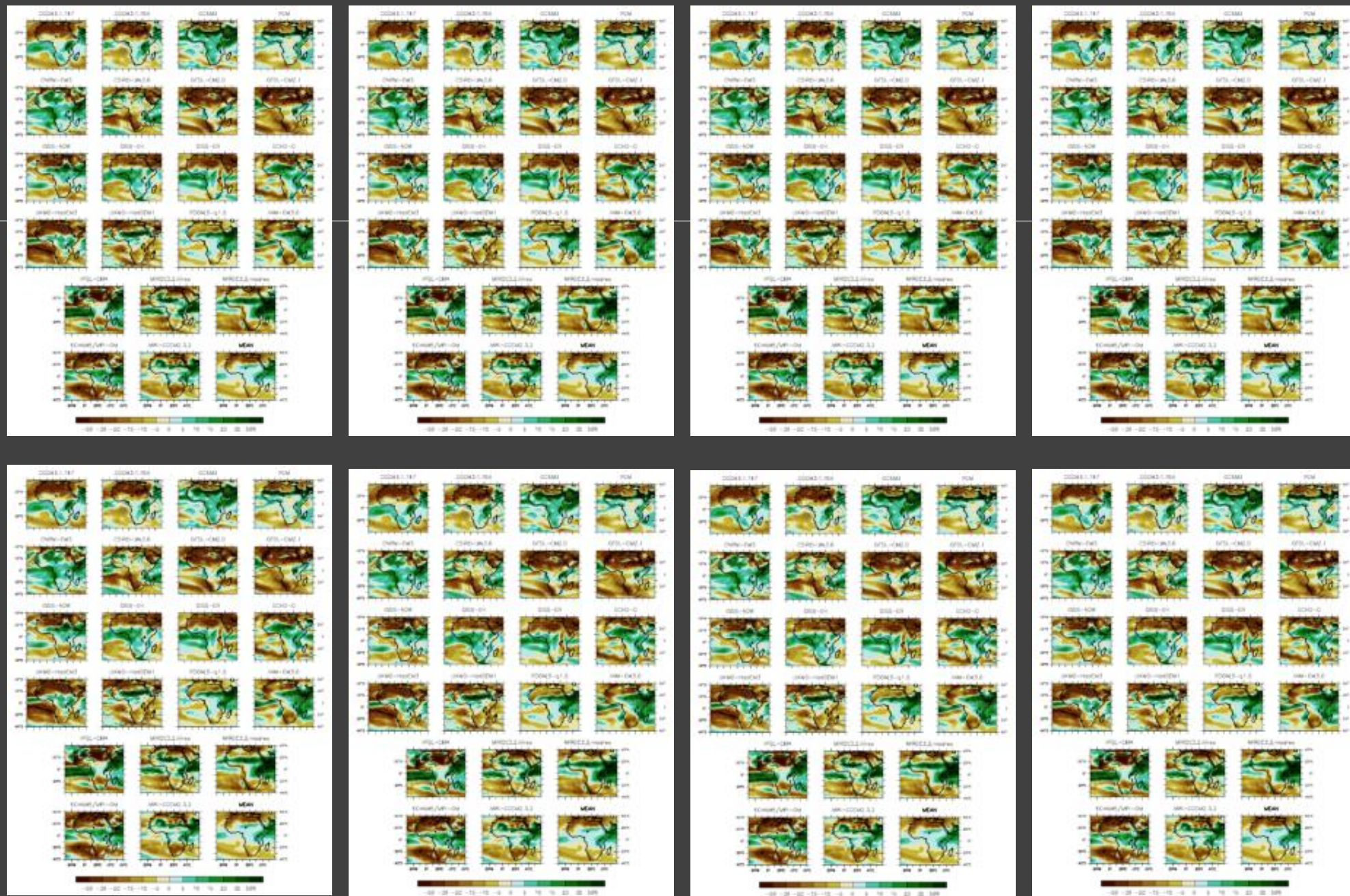
But they disagree with each other



... and we have a lot of models...



... and future climates depend on future climate policies and socio-economic trends...



Source: Brown Stockholm water week presentation (Sept 2, 2013)

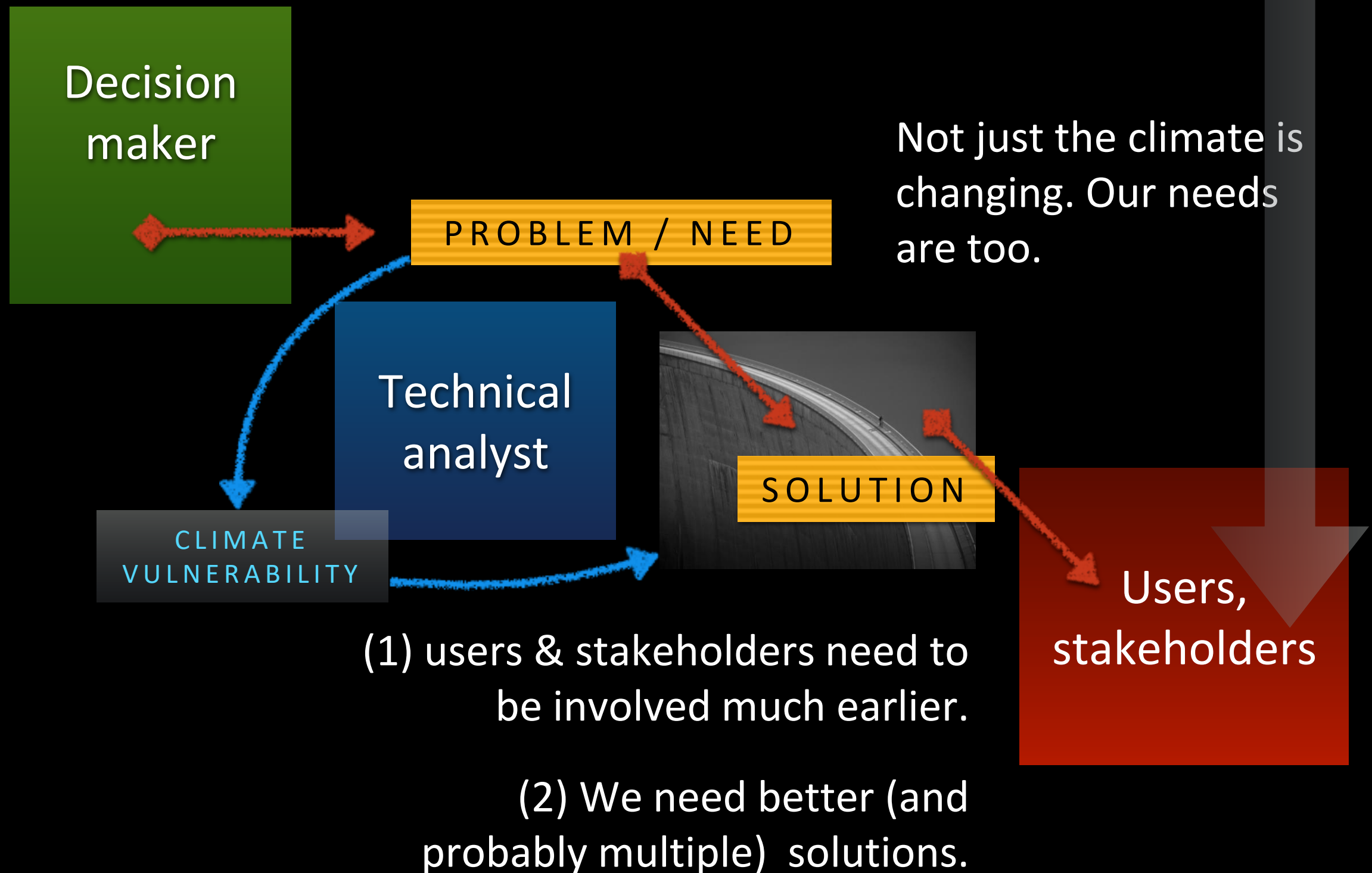
Uncertainty vs confidence

- More data does not mean more confidence
- Adaptation is about reevaluating tradeoff options; this requires more voices, not less
- 1 solution = 1 vision of the future
- If we have low confidence, then we need a more robust and/or flexible decision

These conditions are true for any kind of long-lived asset or investment, including ecosystems

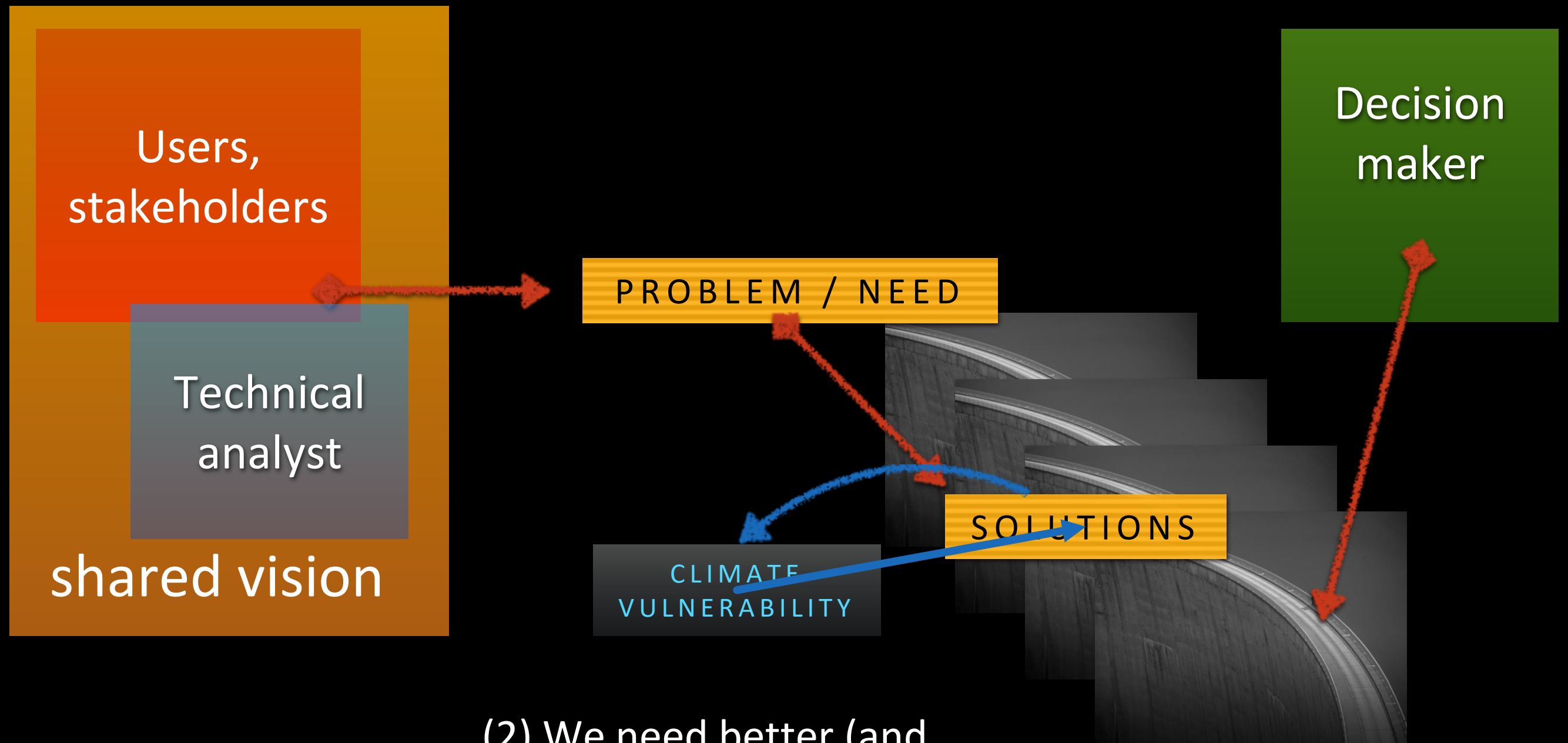
- Does your **decision making process** make best use of your **resilience tools**?

HOW WE USUALLY MAKE LONG-TERM WATER DECISIONS: OPTIMIZING FOR A SINGLE FUTURE



DECISION MAKING IN THE POST-OPTIMIZATION ERA

(1) users & stakeholders need to be involved much earlier.



(2) We need better (and probably multiple) solutions.

HOW WE DEFINE VULNERABILITY DEFINES OUR SOLUTIONS

TOP-DOWN ASSESSMENT

1. Use GCMs to define the water risks
2. Inform stakeholders of GCM output
3. Hope the GCMs are correct

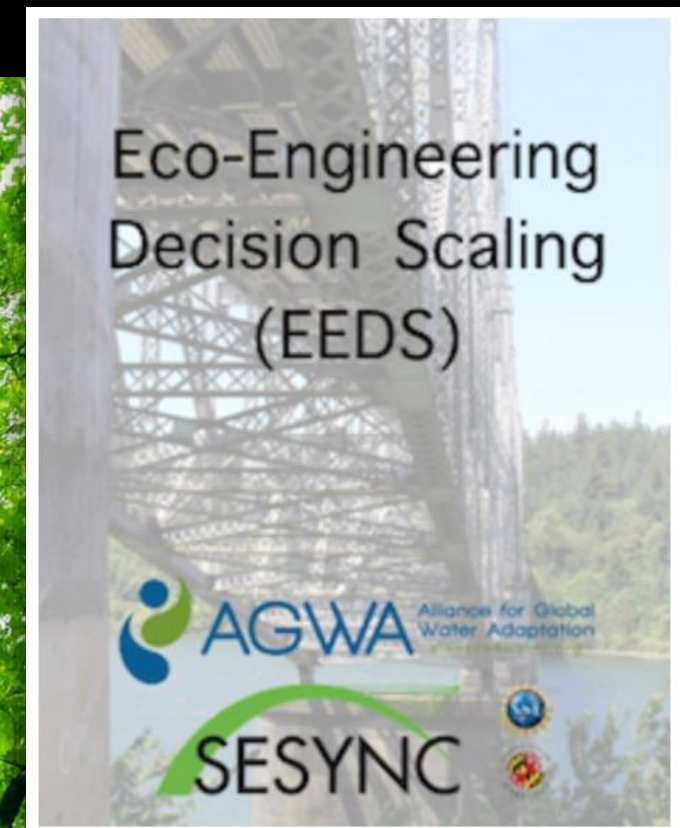
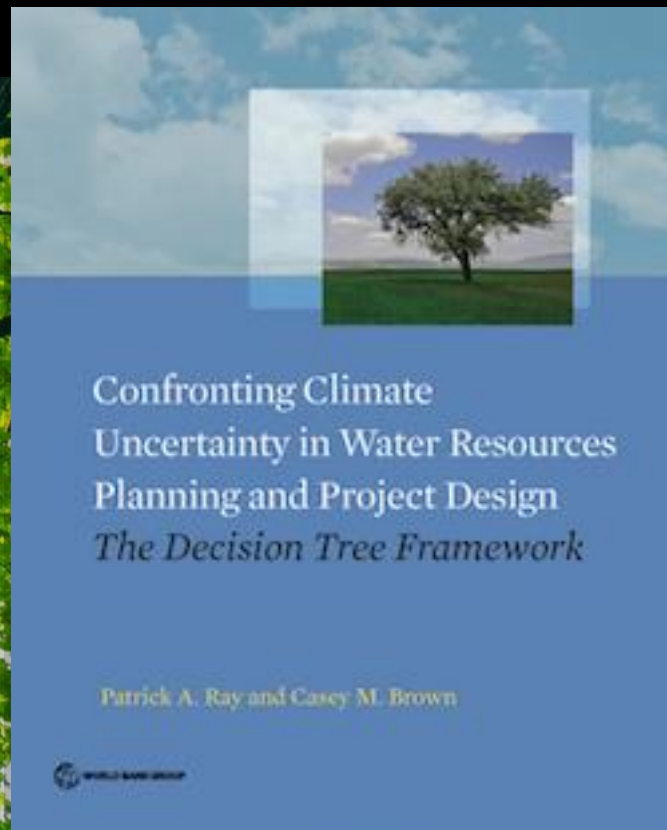
MOST ADAPTATION
SINCE ~1995

4. Test & compare alternate solutions, pathways
3. Develop robust, flexible solutions
2. Use GCMs and other climate data to explore risk tolerance
1. Have stakeholders, decision makers define problem

SINCE ~2010

BOTTOM-UP ASSESSMENT

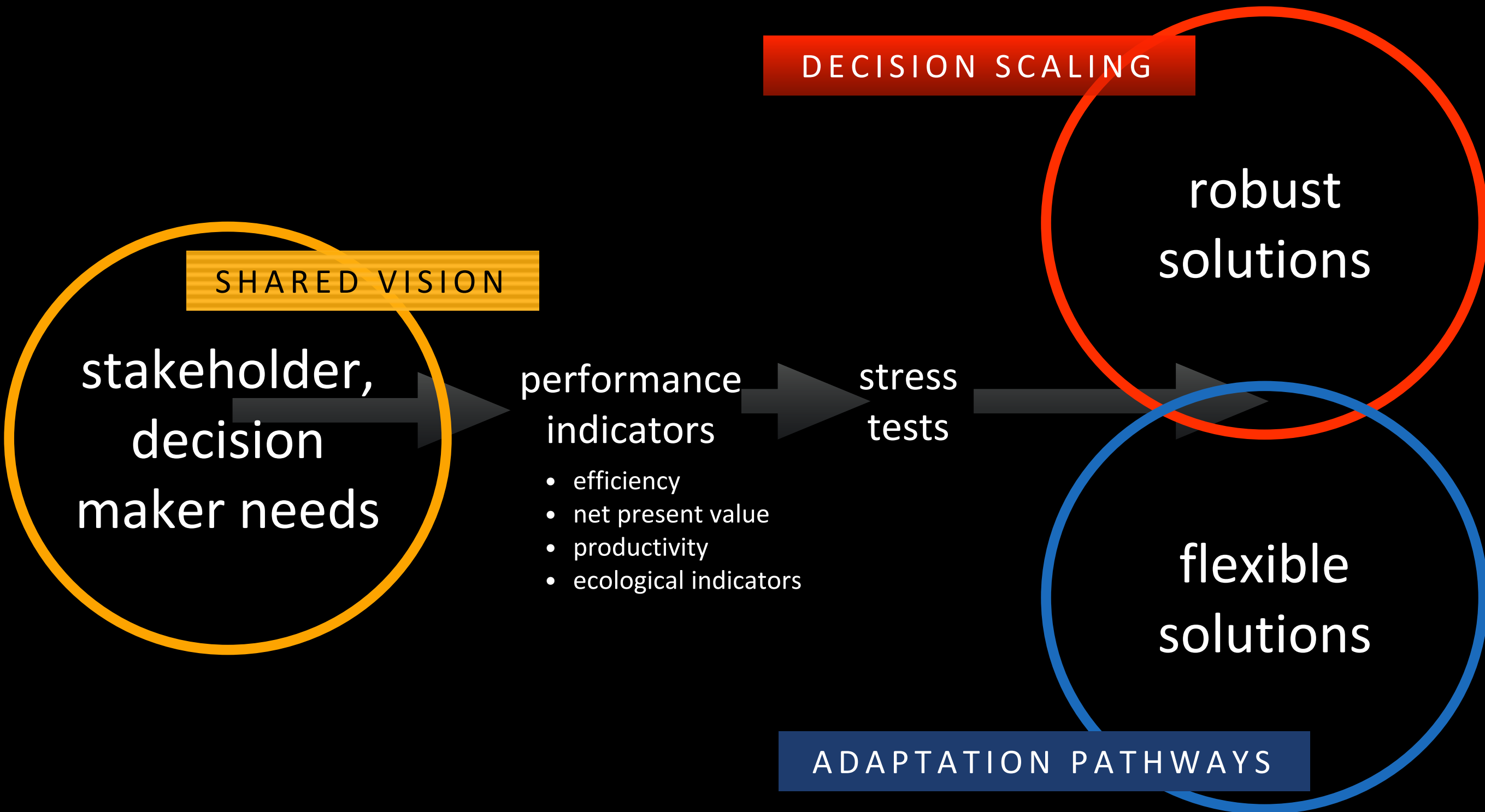
THREE METHODOLOGIES, ONE CORE APPROACH



*Publishing 1 March 2018: US Army
Corps of Engineers, Rijkswaterstaat
(NL), Deltares, University of
Massachusetts @ Amherst*

<http://AGWAGuide.org/>





PROBLEM STATEMENT

- Useful: We see increasing frequencies of flooding and worsening impacts from flooding
- Not useful: We need more flood control levies because of climate change

OBJECTIVES

- Reduce flood damage and social disruption from extreme and nuisance flooding and protect environmental assets under climate change

PERFORMANCE INDICATORS

- Flood losses
- Habitat quality
- Economic growth
- Water delivery per capita
- Water use efficiency

Knowledge Platform *for* Bottom-Up Approaches *to* Resilient Water Management

<http://AGWAGuide.org/>

Welcome to the Knowledge Platform on Bottom-up Approaches to Climate Adaptation

The time has come for a paradigm shift. The Knowledge Platform features a new generation of methodologies to assess and address climate risk and other uncertainties in water resources management. These “bottom-up approaches” work with complex stakeholder needs, build confidence for policymakers, and integrate into existing decision-making processes to achieve quantitative solutions that are both robust and flexible. The Knowledge Platform seeks to engage with researchers, practitioners, and decision makers by providing the information and resources necessary to more effectively address water management issues in the long-term.



Problem statement, project strategy (10 min)

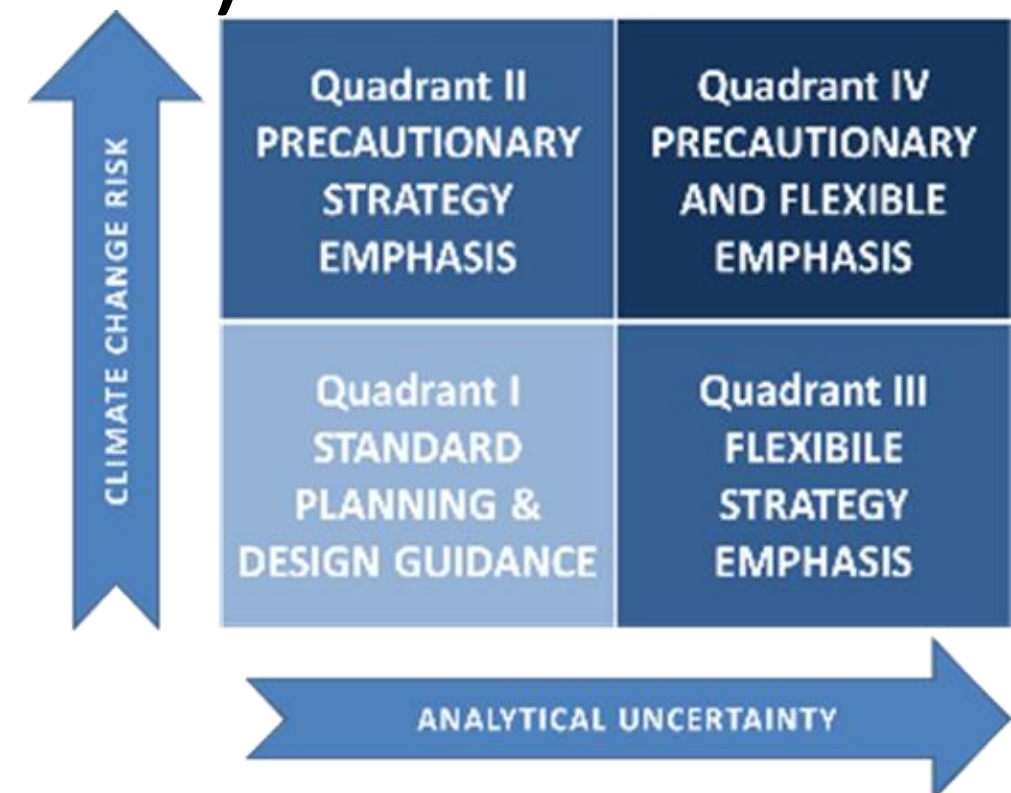
Within your group: pick an urban planning problem

- What are 1 or 2 main objectives?
- What are 2 to 3 useful performance indicators for this problem?
- What are the main stressors (specific climate or socio-economic variables) that drive the problem?
- What is the appropriate spatial scale of analysis and action?

Choosing a strategic direction (10 min)

Given how you value the hazard level and the uncertainty of the evidence, should you:

- Build for current or future climate?
- Need for flexibility? Large investments now or later? No regret measures available? Wait and monitor?



Staged, flexible planning (10 minutes)

- What decisions are necessary for the short term?
- What options do you need to keep open for the long term?
- What decisions might limit future decisions / lead to a strong path dependency?

