AGWA and the DSS

Integrating Climate Adaptation into Water Management Decisions through the AGWA Decision Support System (DSS)

UNECE Water Convention • Geneva, Switzerland

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AGWA: A Brief Overview

- The **Alliance for Global Water Adaptation** is a group of regional and global development banks, aid agencies and governments, a diverse set of non-governmental organizations (NGOs), and the private sector focused on how to **manage water resources** in way that is **sustainable** even as **climate change** alters the global hydrological cycle.
- Focused on how to help practitioners, investors, and water planners and managers make systematic, consistent, and resilient decisions

What's vulnerable?

- Not all parts of the water cycle are **equally** vulnerable to climate shifts
- *Long-lived* entities are extremely vulnerable: infrastructure, ecosystems, and institutions
- They represent a balance between risks and optimizing between options
- AGWA has targeted the decision-making **process** for water management as the key vulnerability to focus our efforts

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The AGWA Decision Support System (DSS)

- The DSS is a “meta-tool” that incorporates existing tools, research, and data-products into decision-making processes
- Currently in active development — methodology being tested at seven sights globally
- Current projects include urban management, ecosystems, hydropower, extractive industries
- Expert feedback process at World Water Week (September 2013); full launch in 2014
- **Looking for more**

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“tools need process &

The DSS process

Three linked teams:

1. Decision content
2. Software development
3. Implementing partners/pilots

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Decision content itself has four teams:

- Hydrology and Climate Science
- Economics and Finance
- Engineering and Ecology
- Governance

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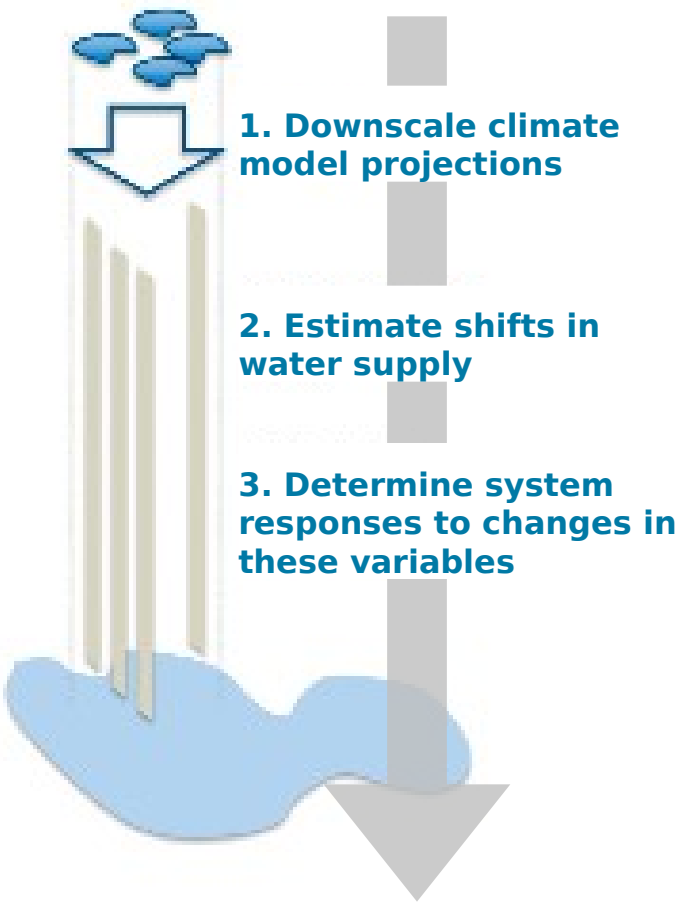
The current standard of adaptive WRM

- Use one or more climate models (GCMs)
- Generally use more than one scenario
- A few key air temperature, precipitation variables
- “Test” for vulnerability based on the constraints of the original GCMs

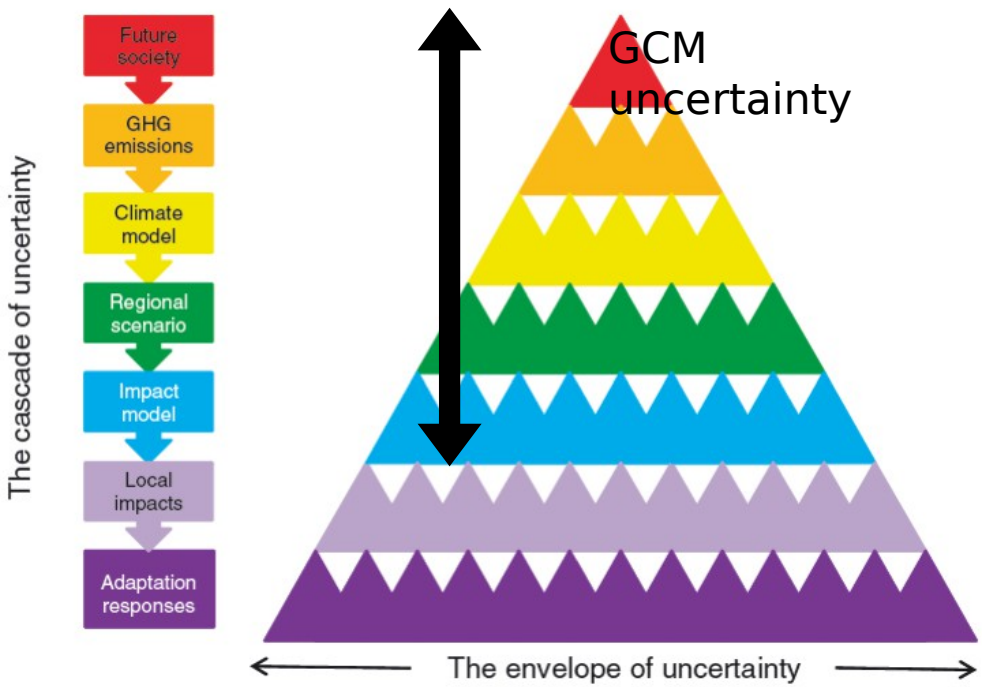
Surprise!

Climate scientists are not eco-hydrologists, farmers, or water managers



Weaver et al., 2012, *WIREs Climate Change*

Does it work?



Source: Wilby & Dessai, 2010, *Weather*

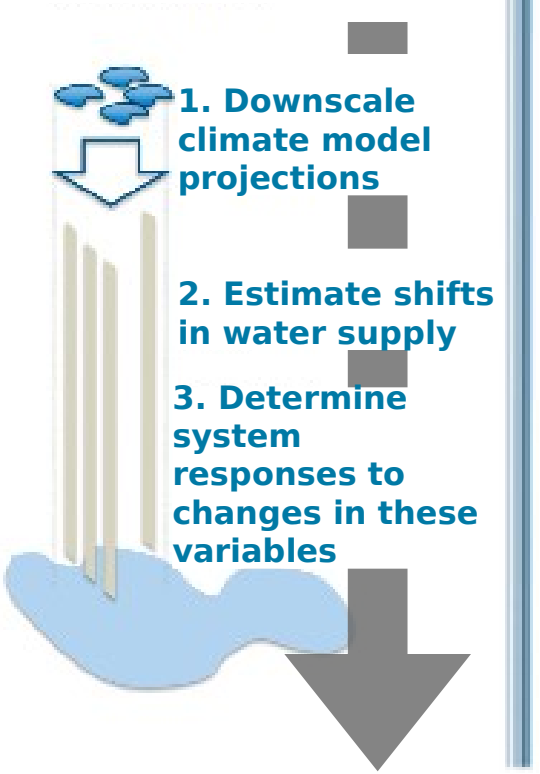
traditional approaches to assessing risk and developing robust strategies **amplify** or **hide** uncertainty

- "Not ready for primetime" for water managers: Kundzewicz & Stahkiv (2010)
- Low confidence, especially for quantitative purposes
- Little agreement across models, scenarios
- Models not developed for adaptation purposes but mitigation, climate science hypotheses
- Climate itself is defined very narrowly — direct impacts from a handful of variables
- Often result in a series of "no regret" options
- Stakeholders often feel disempowered by process, which is often experienced as deterministic

Source: AGWA, "Caveat Adaptor," 2013

bottom-up vs top-down approaches

top-down approaches to risk assessment

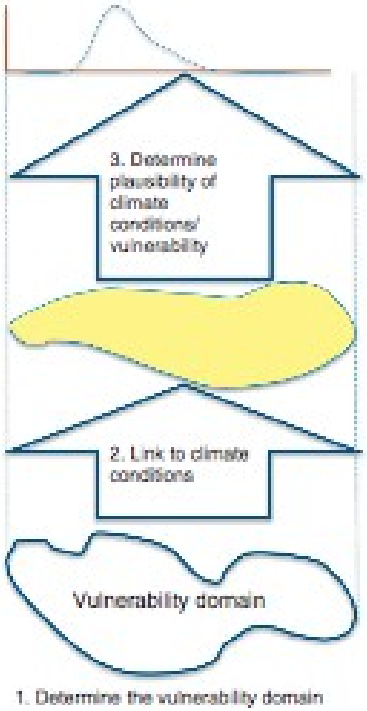


1. Downscale climate model projections

2. Estimate shifts in water supply

3. Determine system responses to changes in these variables

decision-scaling risk assessment



3. Assess plausibility and test vulnerability

2. Assemble multiple climate data sources and link to breaking points

1. Define your system's breaking points

Weaver et al., 2012, *WIREs Climate Change*

engineering: accurate, *precise*, quantitative, predictive

ecology: accurate, quantitative/*qualitative,* explanatory

evaluate confidence

- GCMs
- Paleo data
- Trend analysis
- Spatial, hydro models

estimate decision "lifespan"

small engineering gap: more permanent solutions

larger engineering gap: staged, multiple operating regimes

ecology: typically large gaps

uncertainty is constrained; *confidence* is **accrued** and **built**

decision makers need confidence to manage water over long timescales

New contexts for Engineered Resilience

	20th century approaches	**Resilient approaches**
Design lifetime	100 – 500 years	10 – 50 years?
Design constraints	hard-wired for a single climate future	robust to multiple futures
Management style	Rigid, limited flexibility	Modular, extensible, multiple operating regimes
Environmental focus	Mitigate, restore, retrospective data	Mitigate, restore, retrospective data
Siting considerations	Single site	Single site, basin, network, portfolio

Mekong, Qinghai, China

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Many Thanks

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