16 JULY 2020 • JOHN H MATTHEWS •
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RESILIENT WATERS

INTEGRATING BOTTOM-UP CLIMATE RESILIENCE APPROACHES WITHIN WATER PLANNING, DESIGN & OPERATIONS

AGWA: Alliance for Global Water Adaptation
ClimateReady Podcast
@alliance4water.org
#ClimateIsWater

AGWA: ALLIANCE FOR GLOBAL WATER ADAPTATION

- 1900 global water and climate professionals, 10 years old
- Co-chaired by World Bank, SIWI
- Strong emphasis on best practices + global policy program

alliance4water.org
AGWAGuide.org
ClimateReady podcast

SIWI WORLD WATER WEEK

Rijkswaterstaat
Ministry of Infrastructure and the Environment

BMZ Federal Ministry for Economic Cooperation and Development

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

UNESCO United Nations Educational, Scientific and Cultural Organization

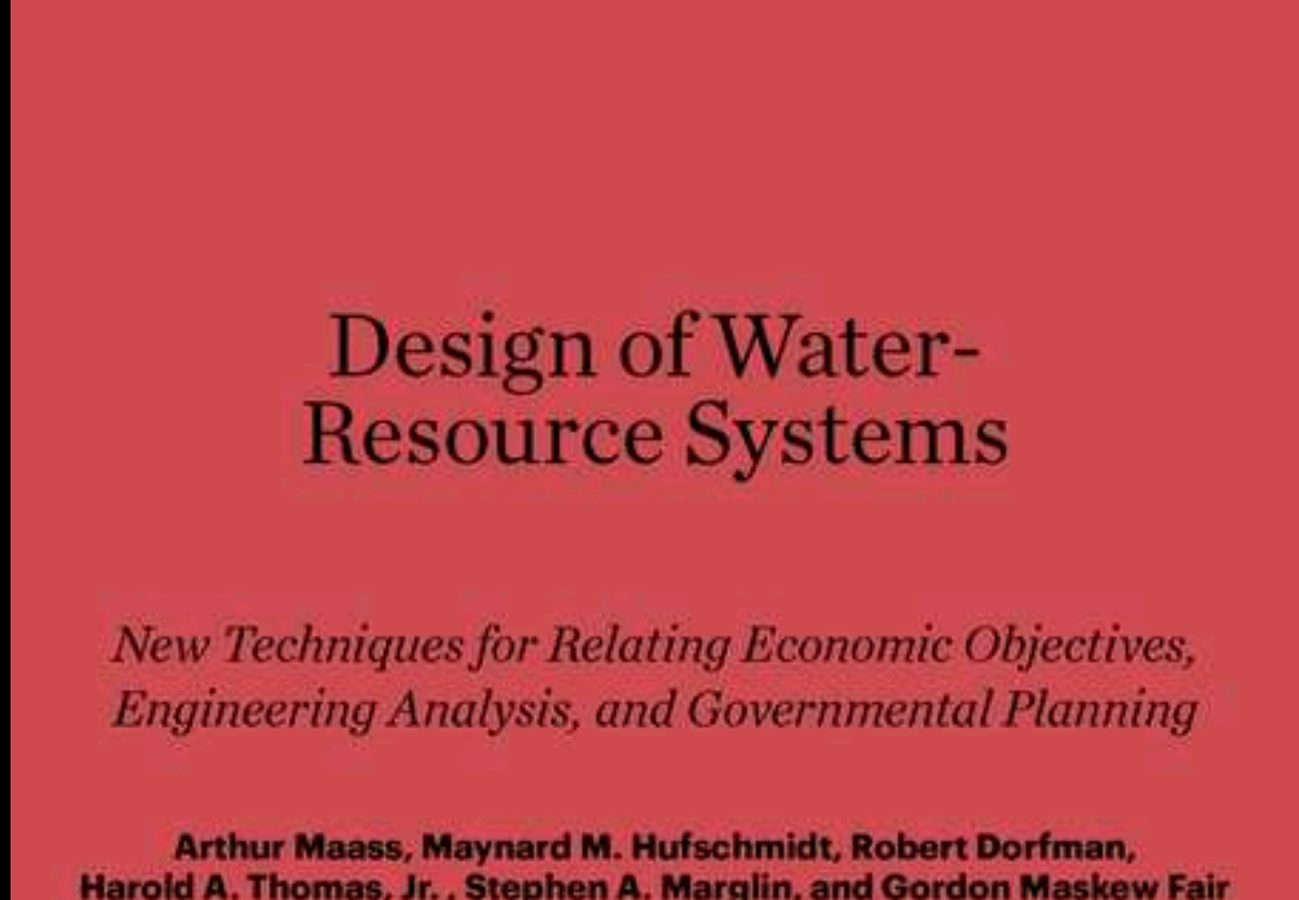
ICIWaRM International Center for Integrated Water Resources Management under the auspices of UNESCO

“WE BUILD THINGS THAT LAST 300 YEARS. WHY DON’T WE THINK ABOUT SUSTAINABILITY FOR THAT LONG?”

Senior manager, World Bank, February 2017

THE MODERN SYNTHESIS

- 1958–1962: engineering, hydrology, economics; academics + government
- basic decision making framework for the ***optimization*** of water resources, based on a joint evaluation
- first major sophisticated systems analysis
- **explicit assumption:** climate is stationary (Milly et al. 2008)



The purpose of this study, the product of the joint researches of the Harvard Water Program, is is to devise techniques of water-resource system design sufficiently sophisticated to permit identification of the one best design for any physical environment on the basis of specified objectives. With such a goal the book is aimed at an audience of "engineers, economists, and administrators,"

MUNGER, F. 1962. *AM POL SCI REV* 56(4), 1003-4.

THE PROBLEM

Water resources management is ***strongly quantitative*** in framing, implementation, decision making

Climate change increases uncertainties, ***reducing confidence*** in estimates of emerging patterns

Both ecosystems and infrastructure have low tolerance for failure

THE TOP-DOWN ERA OF OPTIMIZING WATER RESOURCES MANAGEMENT

many factors are now non-stationary:
climate
demography
urbanization
political systems

Decision maker

PROBLEM / NEED

Technical analyst

CLIMATE VULNERABILITY

SOLUTION

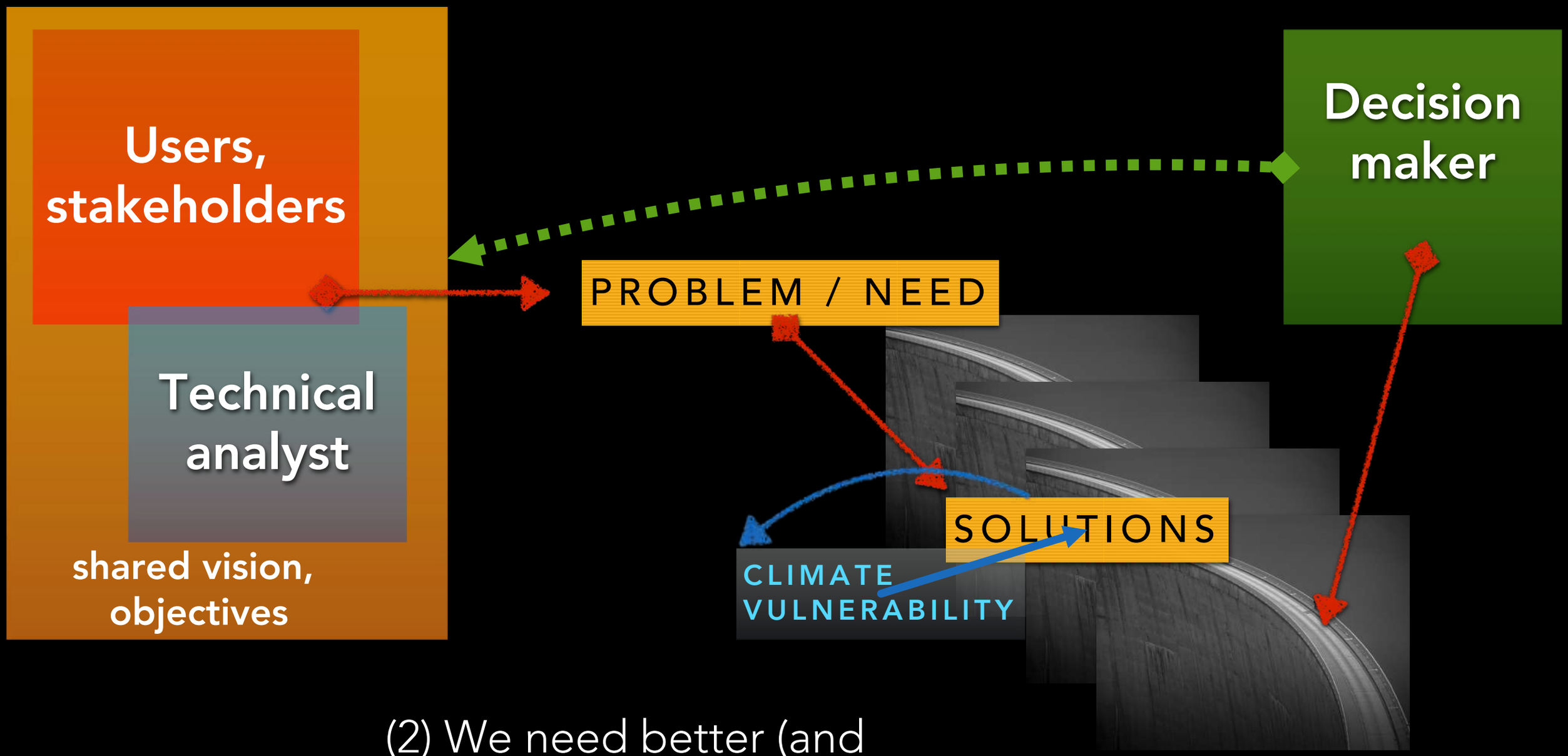
Users, stakeholders

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

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

BOTTOM-UP DECISION MAKING: THE POST-OPTIMIZATION ERA?

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



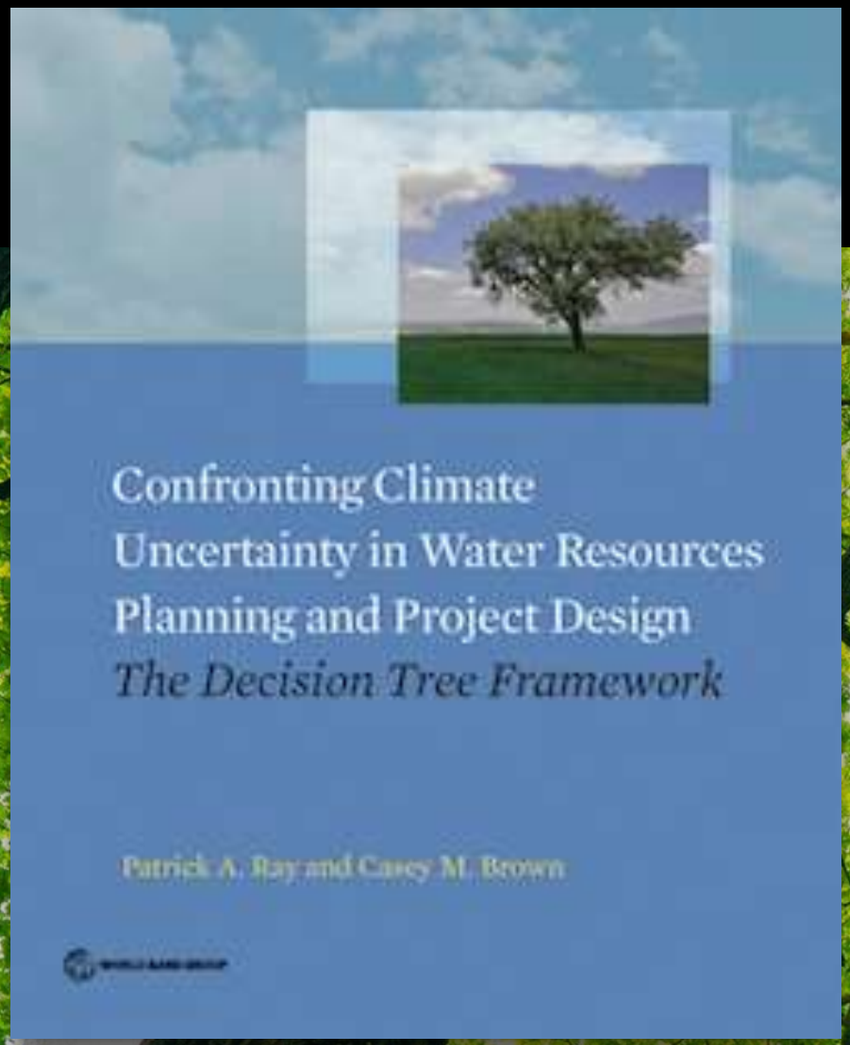
(2) We need better (and probably multiple) solutions.

THE OPPORTUNITY

Can we move from siloed problem definition, to weave together what we have traditionally seen as isolated problems into **holistic solutions?**

By engaging with diverse stakeholders, can we use water management decisions as an **aspirational tool** for envisioning a better future?

BOTTOM-UP DECISION SUPPORT



Climate Risk Informed Decision Analysis (CRIDA)

Collaborative Water Resources Planning in an Uncertain Future

AGWAguide.org/

STRUCTURED, UNCERTAINTY-TOLERANT DECISION MAKING

SHARED VISION

stakeholder, decision maker needs

performance indicators

stress tests

DECISION SCALING

robust solutions

ECOSYSTEMS

nature-based solutions

ADAPTATION PATHWAYS

flexible solutions

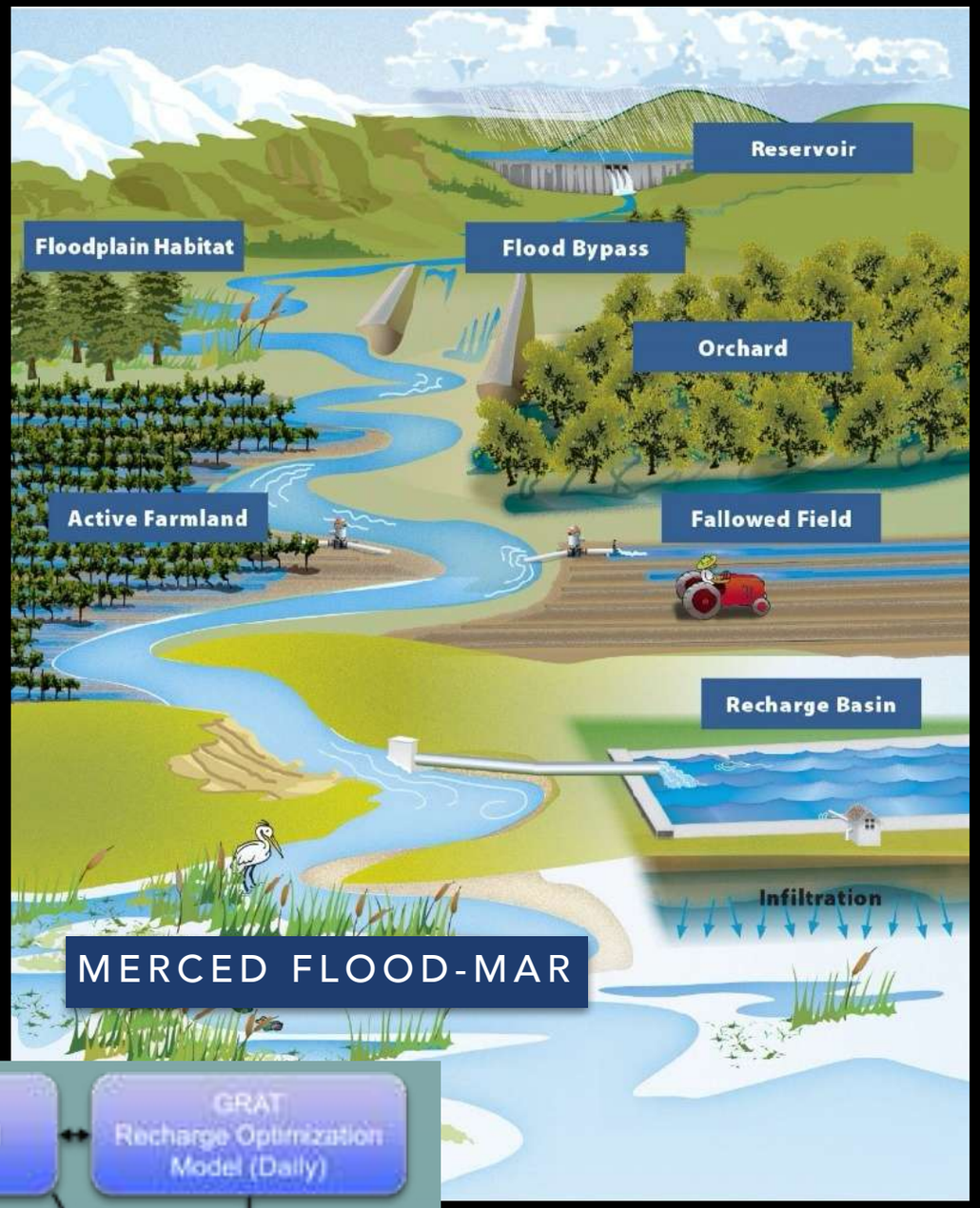
ZAMBIA / LUSAKA

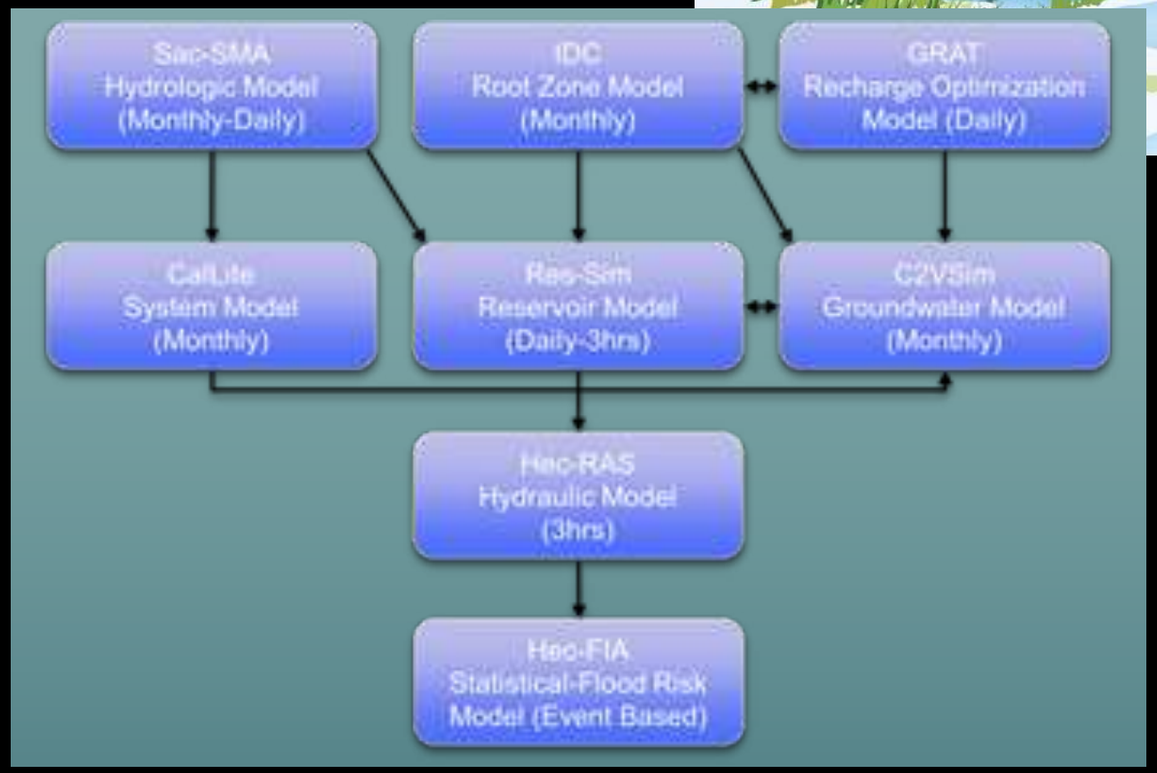
- **Lead:** Millennium Challenge Corporation
  www.mcc.gov/blog/entry/blog-031419-planning-in-uncertainty
- Risk analysis showed limiting factor: insufficient, irregular, diminishing energy for water treatment — *not* water supply
- Developed a modular, distributed, low cost alternative electrical supply system

IOLANDA WATER TREATMENT FACILITY

USA / CALIFORNIA

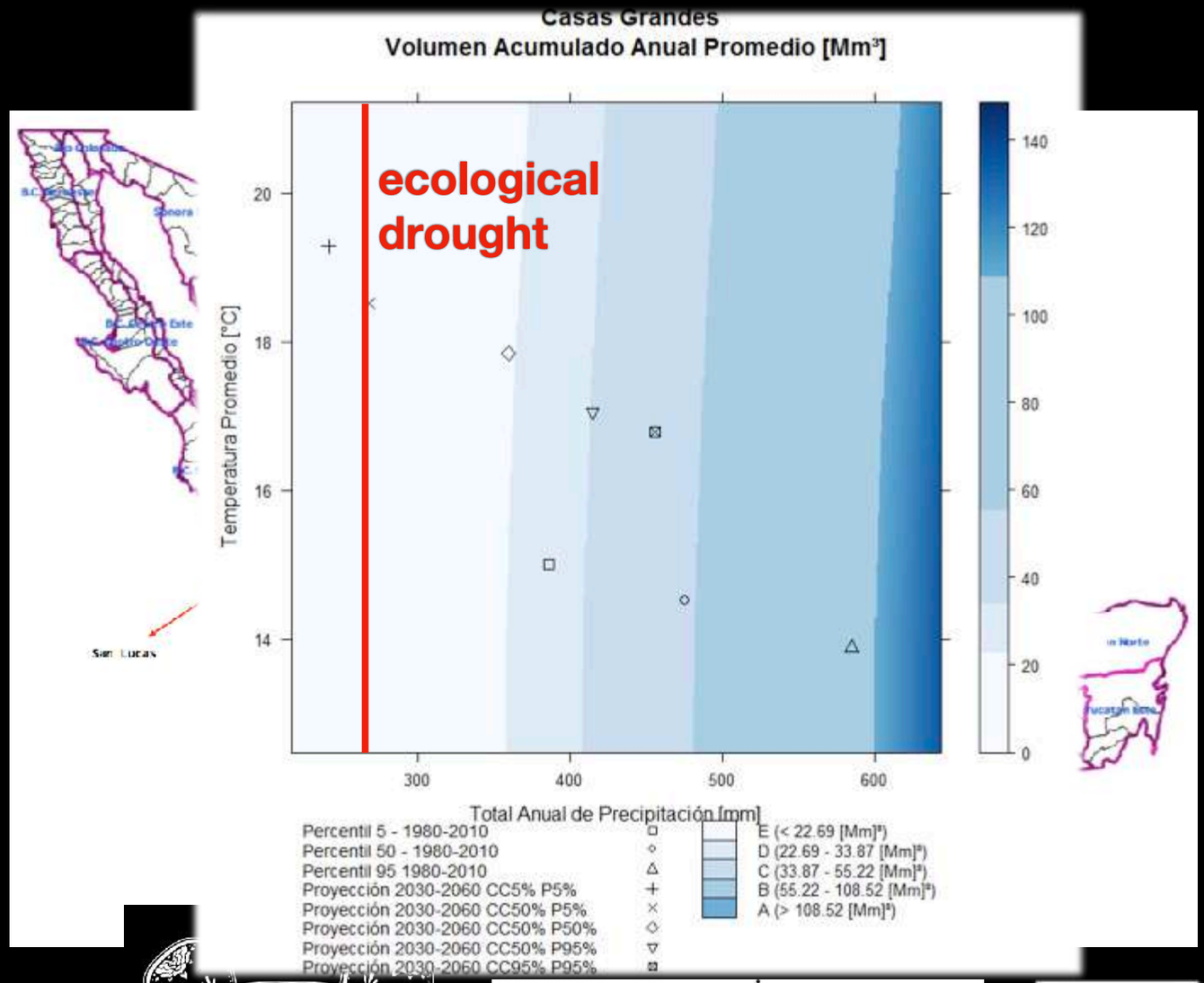
- **Lead:** Cal DWR
  - https://water.ca.gov/Programs/All-Programs/Flood-MAR
- "Flashy," highly seasonal system, with extreme droughts and high floods, runoff
- Voluntary system to capture flood and manage aquifer recharge (MAR)





ADAPTIVE FLOWS: **MEXICO'S WATER RESERVES**

- Developed resilient water management guidelines for 300 Mexican basins
- Partnering with Mexican National Water Commission (CONAGUA), WWF-Mexico, IADB, UNESCO
- Examination of water reserves scenarios, flood, and drought impact on e-flows



United Nations Educational, Scientific and Cultural Organization · International Hydrological Programme

http://www.wwf.org.mx/que_hacemos/programas/programa_agua/water_reserves.cfm

	**traditional approaches**	**resilience approaches**	**examples**
managing for variability	preserve environmental variation	adaptively manage, to support desired species/outcomes	Flow- and water-level variability, extremes, and seasonality
managing for heterogeneity	Preserving biodiversity “hotspots” and critical habitat threatened species	Managing for physical processes that support diverse life histories	physical habitat complexity
managing for connectivity	Preserving hydrologic connectivity within networks	Managing connectivity to promote fluxes of nutrients, sediments	integrated measures of river connectivity
managing at the basin scale	Basin-scale regulators	collaborative-stakeholder objective setting	Self-assessment tool for river basin organization performance

Grantham, Matthews, Bledsoe. 2019. Shifting currents: Managing freshwater systems for ecological resilience in a changing climate. *Water Security*

CREDITS

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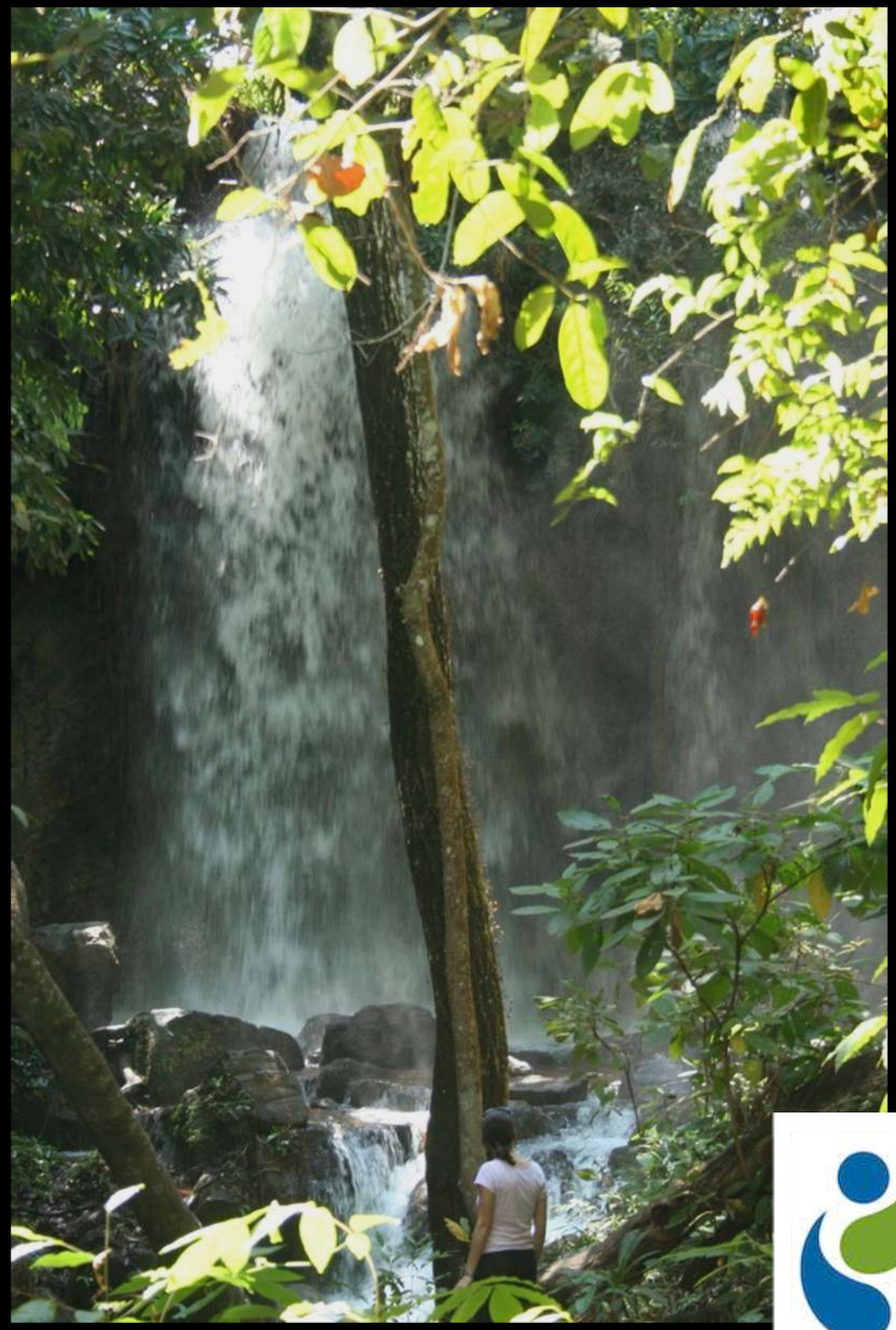

Join AGWA's *community* of practice

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THANKS

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