How do we help engineers think about ecosystems?

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ccg | ci
27 april 2012

AGWA Alliance for Global Water Adaptation alliance4water.org

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Can we make *better* dams?

a better dam would

- be ecologically viable over its operational lifetime (or longer)
- provide its designed services without empoverishing economies
- be managed flexibly, for shifting ecological and economic conditions

for dams, four “boxes” of technical policy are important for **long-term** sustainability

hydrology & climate science

finance and economics

ecology and engineering

governance/flexible operations

how do we enable better decisions?

- Climate is integral for long-lived elements of water management: infrastructure, institutions, & ecosystems

- Expertise is available but often fragmented and separated within silos, disciplines, and individuals

- Decisions are made every day that will resonate for decades

- Currently, resilience is more often an accident than systematic

- How can we bring together the policies and tools to support long-term resilience — soon?

hydrology & climate science

coordinated by the US Army Corps of Engineers

How do you integrate climate information into your design and planning processes?

finance and economics

coordinated by the OECD, World Bank, and European Investment Bank

How do you create finance mechanisms that mainstream long-term sustainability management?

Can the risks of uncertainty and delaying action be converted into cost curves?

engineering and ecology

coordinated by CI and the Inter-American Development Bank

How do you manage infrastructure and ecosystems for resilience?

Can you integrate “soft” ecosystems into “hard” infrastructure networks?

governance and flexible operations

coordinated by the US State department and
the Environmental Law Institute

How do you manage across institutional and political boundaries?

How do you help institutions learn to be flexible?

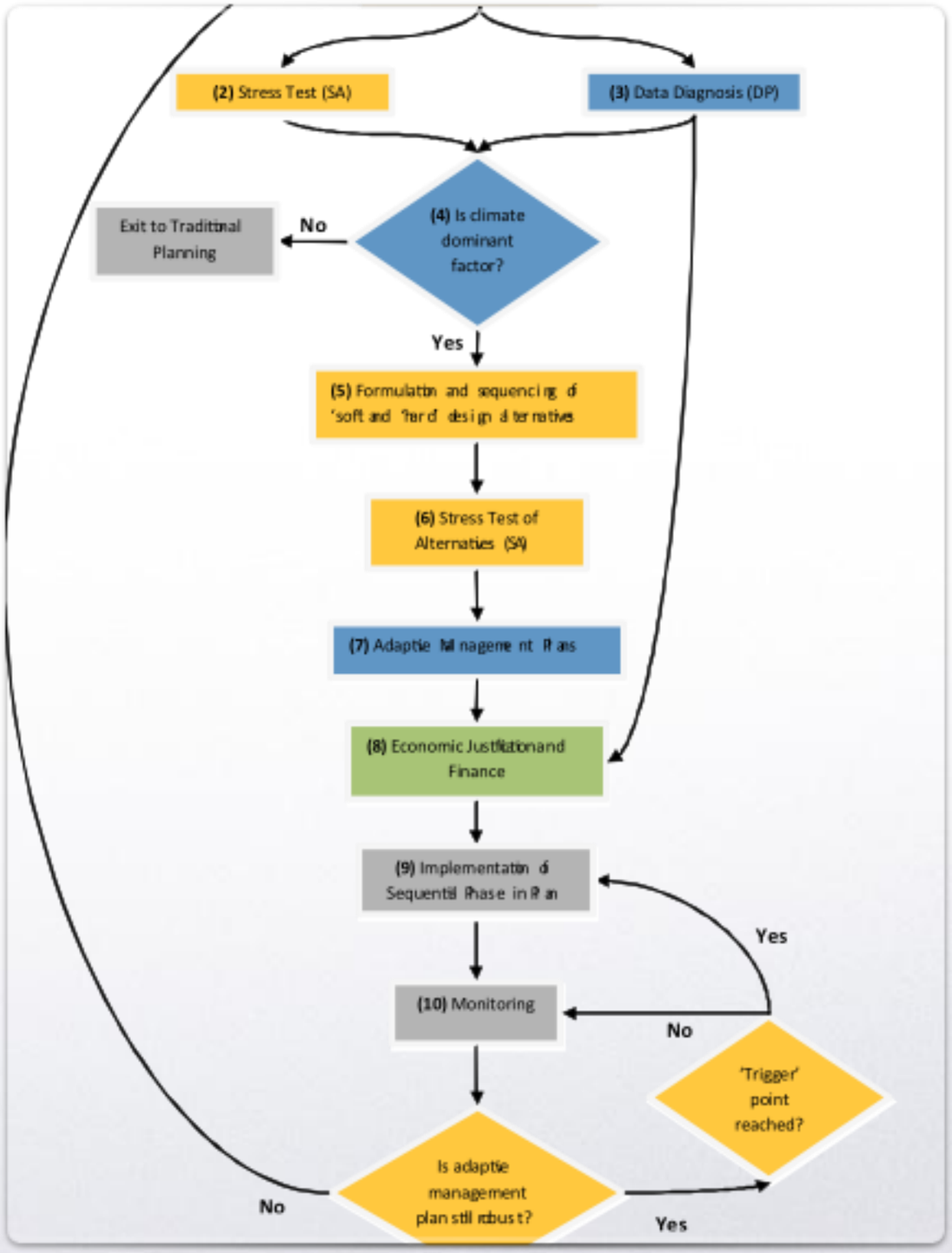
assumptions

- our audience is skeptical if not jaded; we must **show** how we arrived at our thinking via an *evidence*-based approach

- if possible and credible, quantitative methods are preferable

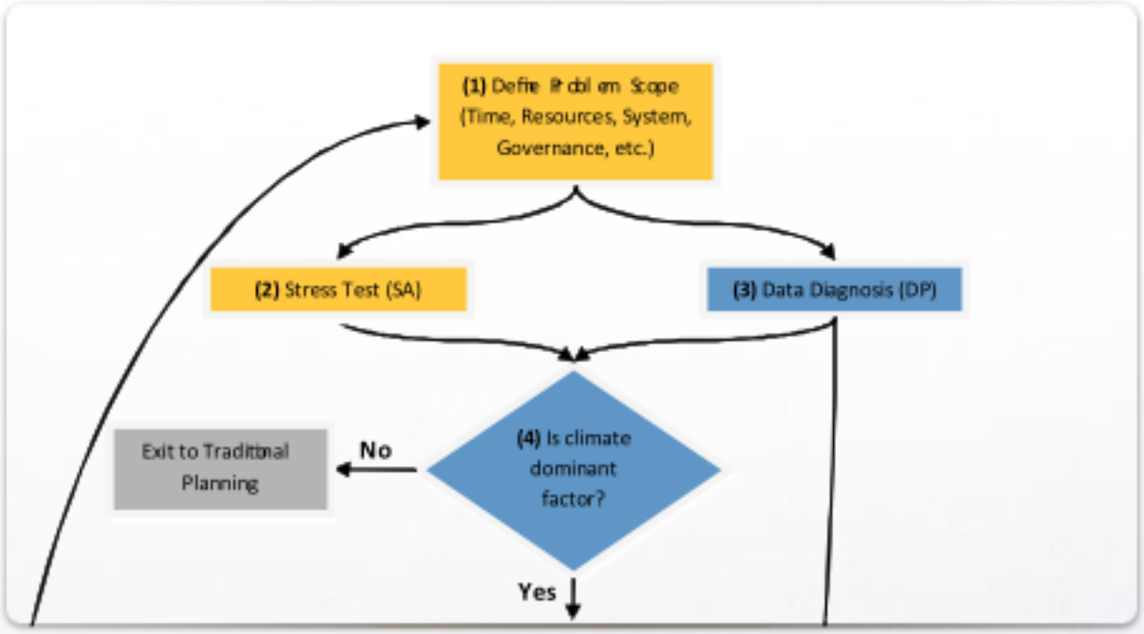
- we should look as similar to the traditional design process as possible

- we need a clear audience: project-level managers, planners — “Luis’s engineer”

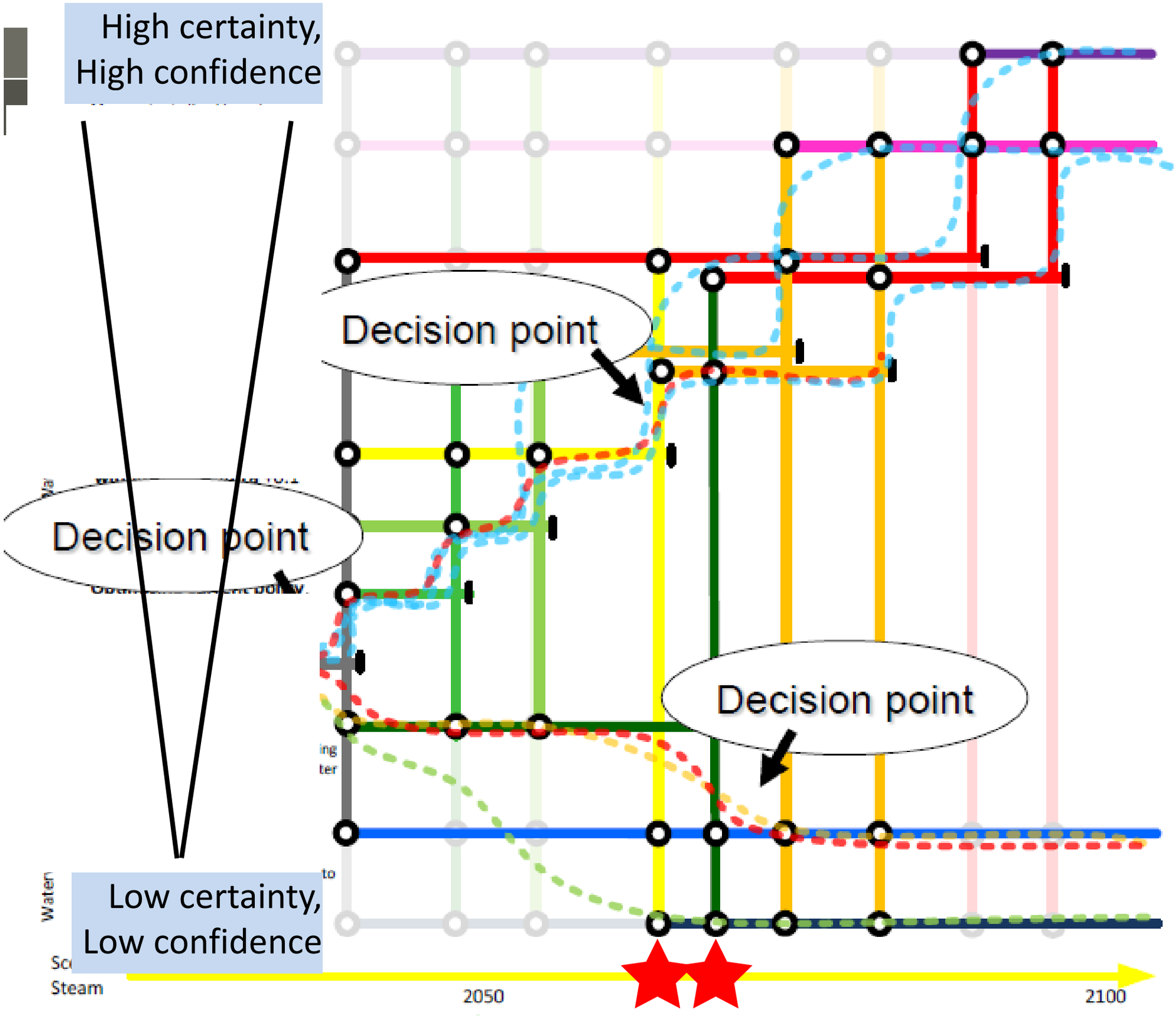


resilience & breaking points

- What causes a system to lose resilience and “break” into a new stasis point?
- Where are the linkages between hydrological, ecological, and infrastructure resilience?



Likelihood of reaching system breaking points	Confidence in data, future climate conditions		
	High	**Medium**	**Low**
High	Adaptive management plan with focus on ‘hard’ measures	Adaptive management plan with ‘soft’ and ‘hard’ measures	Adaptive management plan with focus on ‘soft’ measures
Medium	Adaptive management plan with ‘soft’ and ‘hard’ measures	Adaptive management plan with ‘soft’ and ‘hard’ with delayed investment	Adaptive management plan with focus on ‘soft’ measures and delayed investment
Low	***Exit to traditional planning***	Adaptive management plan with focus on ‘soft’ measures and delayed investment	Adaptive management plan with focus on ‘soft’ measures with delayed investment



Shifting costs of delaying action over time

The “Metro map” decision support process

Deltares

the AGWA network

alliance4water.org

Development banks and capacity-building groups.
The Asian Development Bank, European Investment Bank, KfW, the Inter-American Development Bank, GiZ, the Cooperative Programme on Water and Climate, and the World Bank.

Non-governmental Organizations
The Delta Alliance, International Water Association, the Swedish Environmental Institute (IVL), the Global Water Partnership, Deltares, Environmental Law Institute (ELI), Stockholm Environmental Institute (SEI), Organization for European Cooperation and Development (OECD), Stockholm International Water Institute, Wetlands International, IUCN, The Nature Conservancy, ICIMOD, WWF, Conservation International.

Governmental
CONAGUA, Seattle Public Utilities, US State department, NOAA, US Army Corps of Engineers, UN Water, UN Habitat, UNECE, Water Utilities Climate Alliance, WMO

The Private Sector
Ceres, UNEP FI, World Business Council for Sustainable Development

Key partners

Water & Climate Coalition, the Adaptation Partnership, the Global Environment Facility, Nairobi Work Programme

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questions?

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