Method 3
Collaborative Adaptive Management

Summary of method

Collaborative Adaptive Management (CAM) is a structured/flexible, stepwise, transparent approach that includes the iteration of knowledge synthesis, most often using collaborative methodologies, such as participatory scenario building, joint fact-finding and/or multi-criteria analysis. New knowledge is then generated, through the selection, application and monitoring of policies or management strategies.

CAM differs from other knowledge synthesis methods in a key aspect. Instead of aiming to identify single, broadly-applicable, optimal solutions, it aims to identify flexible solutions that are resilient to errors and uncertainty. The initial phase of CAM represents a specific type of knowledge synthesis, but the overall approach goes beyond synthesis to locally or specifically relevant knowledge generation.

Key references

The following methodological tools and guidance are available to support and guide implementation of CAM.

Miradi: Adaptive Management Software for conservation projects. www.miradi.org

The NeWater project (European Comm. Contract No 511179) and the Global Water System Project provide an online course in Adaptive Management for water resources: http://www.newatereducation.nl/

Examples of application

The US Department of Interior used CAM to carry out its responsibilities under the Grand Canyon Protection Act of 1992 to monitor the operation of the Glen Canyon Dam and mitigate any significant environmental impacts. There is not agreement over whether this landmark example of CAM was a success, or achieved its environmental objectives. Susskind *et al.* (2012) argue that it was not a success, because the process was flawed and best practice was not followed. Specifically, they argue that joint fact-finding should be used as part of CAM, to deal with scientific uncertainty.

Other examples of CAM used to improve the governance of water resources management and wetland conservation are presented in Méndez *et al.* (2012) and Kallis *et al* (2009).

Useful reviews of the utility and practical implementation of Collaborative Adaptive Management are provided by Westgate *et al.* (2013), Scarlett (2013) and Susskind *et al.*, (2012).

Kallis G, Kiparsky M and Norgaard R (2009). Collaborative governance and adaptive management: Lessons from California's CALFED Water Program. *Environmental Science & Policy 12*(6), 631-643.

Méndez PF et al (2012) Facilitating transitional processes in rigid institutional regimes for water management and wetland conservation: experience from the Guadalquivir Estuary. *Ecology and Society* 17(1)

Scarlett L (2013). Collaborative adaptive management: challenges and opportunities. *Ecology and Society* 18(3).

Susskind L, Camacho AE and Schenk T (2012). A Critical Assessment of Collaborative Adaptive Management in Practice. *Journal of Applied Ecology* 49(1), 47-51.

Susskind L, Camacho AE and Schenk T (2010). Collaborative Planning and Adaptive Management in Glen Canyon: A Cautionary Tale. *Columbia Journal of Environmental Law* 35(1), 1-54.

Westgate MJ, Likens GE and Lindenmayer DB (2013) Adaptive management of biological systems: A review. *Biological Conservation* 158, 128-139.

Collaborative Adaptive Management	
Cost	Staff (3-12 months FTE if restricted to diagnosis and planning; 12-48 months FTE including a first learning-by-doing cycle), travel and subsistence (for workshops and, if necessary, to interview stakeholders), software (for complex issues requiring knowledge-mapping visualization and/or dynamic modelling tools), expert (facilitation of collaborative knowledge mapping or collaborative modelling, incl. visualization tools) Affected by: available evidence; knowledge gaps and uncertainties; need for specialist expertise; complexity of the question; Capacity for conflicts among agencies and/or stakeholders
Time required	3-12 months if restricted to diagnosis and planning 24-60 months including a first learning-by-doing cycle Affected by: number and scale of interventions/actions, complexity of socio-natural system, availability of staff, response time
Repeatability	High (if done and recorded, and archived properly)

Transparency	High (if properly done). CAM is specifically designed to ensure transparency, legitimacy and trust among stakeholders Risk: In the absence of adequate design and implementation of collaborative work, AM may be used to obscure rather than address underlying conflicts - thus reducing transparency
Risk of bias	Low (if done well and with enough time/resources). CAM acknowledges bias as inherent to knowledge and designs learning-by-doing strategies to evaluate inherent assumptions, thus reducing the risk of failure
Scale (or level of detail)	Independent of scale (any)
Capacity for participation	Very high (if done well). All key stakeholders involved in collaborative modelling and decision-making. Several opportunities for open consultation and/or participation along the diagnostic phase and learning cycle
Data demand	Low in the initial phase, though it should aim to include all relevant information, know-how and expertise available. High in the implementation (learning-by-doing) phase
Types of knowledge	All
Types of output	Collaborative knowledge maps, identification of uncertainties and knowledge gaps, adaptive management strategy, policy briefs These outputs can be presented user-friendly written reports, interactive website of narrative evidence, short documentary films and/or other communication materials
Specific expertise required	CAM specialist (incl. interviewing and facilitation), topic expert, modelling specialist

Strengths	Weaknesses
Stakeholders are involved in a proactive, structured way High transparency and participation	Depends on trust and willingness to participate, as all stakeholders must be involved Implementation of learning-by-doing cycle depends on sufficient top-down and bottom-up support

Allows for a way forward when insufficient evidence precludes the identification of an optimal solution

Designed to accommodate to counterintuitive effects, uncertainty and evolving circumstances

Designed to handle differing views and facilitate conflict resolution, though it might be challenging in wicked problems and longstanding socio-environmental conflicts

Needs agreement on an overarching goal and how to measure progress towards it