



## Developing Actionable Approaches for Resolving Complex Water Problems

In our highly interconnected world, water is an integral part of any discussion on agriculture, energy, public health, transportation, environment and the future. While innovation in science and technology can expand the availability of quantity and quality of water, it can't solve water problems that intersect with the value-laden needs of individuals, industries or ecosystems. To address these complex water problems - while ensuring equity and sustainability - an approach that goes beyond applications of technology or implementation of management policies is needed.

Many of our current and emerging water problems are interconnected and cross boundaries, domains, scales, and sectors. These boundary crossing water problems are dynamic, non-linear and are often interconnected with other problems. The solution space for these complex problems – involving interdependent variables, processes, actors, and institutions – can't be pre-stated. Consequently, we can't know what will or can happen with any reasonable certainty. To address these persistent water problems, we need to start by acknowledging the limits of what we can know and the role of contingency and adaptation in our actions. We need to recognize the disconnect among *values*, *interests*, and *tools* as well as *problems*, *policies*, and *politics*. Scientific and technological solutions are desired for efficiency and reliability, but need to be politically feasible and actionable. Governing and managing complex water problems require difficult tradeoffs in exploring and sharing benefits and burdens through carefully crafted negotiation processes. The water diplomacy framework, a pragmatic approach rooted in the principles of equity and sustainability, is a step in that direction.

### **Water Diplomacy Framework acknowledges and addresses interconnectedness among natural, societal and political domains**

Water Diplomacy – rooted in ideas of complexity science and multi-party negotiation – provides a framework to govern and manage water issues as a network of interactions and relationships among natural, societal and political variables, processes, actors, and institutions. The Water Diplomacy Framework (WDF) is based on three key assumptions: 1) Water is a flexible resource, where fixed quantities can be expanded through appropriate application of technology, management, and policy interventions; 2) Water networks are open and cannot be viewed as closed systems with hard boundaries; 3) Resolution of complex water problems needs to be designed to achieve mutual-gains outcomes.

### **Complex problems cannot be solved using either by science and technology or management and policy interventions**

Solutions for many water problems demand integration of scientific learning with the political reality of real-world problem solving. Water professionals cannot easily translate solutions born out of scientific findings into the messy context of the real world. We need to bridge this divide between theory and practice and resolve complex water management problems that cross multiple boundaries and interact in unpredictable ways. Water Diplomacy, initiated by experts at Tufts, MIT, and Harvard and continuously refined by a world-wide network of reflective water professionals, seeks to address these issues through a theory and practice of contingent understanding and contextual applications to resolve complex water issues.

### **A framework for more equitable and sustainable governance and management of water**

Water diplomacy is a pragmatic framework to govern and manage water by building on the principles of equity and sustainability. The pragmatism of the approach rests on drawing from theory and practice of complexity science and consensus building in a contingent way. To address persistent water problems, we need to start by acknowledging the limits of what we can know and the contingent nature of our actions. Adaptive capacity, participatory processes that can develop a shared understanding and support continuous learning must be added to our toolboxes for addressing water problems.

### **Water Diplomacy: A synthesis of theory and practice that can produce actionable and tangible outcomes**

While "diplomacy" is often thought of as pertaining to negotiations between the highest level of governments, water diplomacy targets a wider audience and highlights the role of technical experts, affected stakeholders and informed members of civil society through formal and informal processes that explore consensus building, creative option generation and contingent adaptive actions to resolve complex water problems. We think of diplomacy as the process of collaboratively defining and resolving water issues at every level – from the design of a small-scale sanitation system in a village, to the development of a contested hydroelectric facility in one region of a country, to formal treaty negotiations among different nations.

The WDF transforms zero-sum negotiations into value-creation opportunities by blending science, policy, and politics in innovative and contextually relevant ways. We focus on activities that are pragmatic and actionable to (a) identify and characterize a water problem; (b) seek politically feasible and socially acceptable intervention points; and (c) implement technologically appropriate and contextually relevant equitable and sustainable solutions with measurable outcomes. Reflective water professionals from all relevant disciplines and sectors need to master effective problem solving skills that highlight engagement of stakeholders, participation of skilled mediators, reliance on scientifically objective joint fact finding, and collaborative monitoring to enhance public understanding and implementation of water governance and management alternatives.

A GLOBAL NETWORK OF REFLECTIVE WATER PROFESSIONALS

# WATER DIPLOMACY

**What is Water Diplomacy?** A theory and practice of contingent water governance and management to address complex water issues initiated by experts at Tufts, MIT, and Harvard in collaboration with reflective researchers and practitioners from around the world. Water diplomacy is a pragmatic framework to manage and govern water by building on the principles of equity and sustainability. The pragmatism of the approach rests on drawing from theory and practice of complexity science and consensus building in a contingent way. The Water Diplomacy approach diagnoses water problems, evaluates intervention points, and facilitates the creation of adaptive and contingent pathways for resolution that are sensitive to diverse viewpoints and values, ambiguity and uncertainty as well as changing and competing needs.

**Why do we need Water Diplomacy?** Complex water problems require negotiated resolutions. Water Diplomacy Framework provides the skills and tools to transform a fixed quantity of water into a flexible and sustainably shared resource. Water security concerns create contentious arguments over water allocation for human needs, agricultural use, and development. Water Diplomacy shifts the discussion from zero-sum to mutual gains by creating opportunities for building consensus and developing creative options for resolution that incorporate shared values of equity and sustainability.

**How does the Water Diplomacy approach work?** Water Diplomacy is built on four activities that address complex water problems at multiple scales through ongoing research, educating future leaders and scholars, and training senior water management professionals from around the world to build trust in the knowledge we create and solutions we seek for chronic and emerging water problems.

- The NSF supported **Water Diplomacy Research Coordination Network (RCN)** links experts in the natural, social and political sciences, engineering, and advanced computing who address some of the most pressing water challenges of our time.
- The NSF supported **Water Diplomacy PhD** program at Tufts University educates the next generation of interdisciplinary water professionals to think across boundaries, integrate explicit and tacit knowledge and take action to resolve water issues.
- The **Water Diplomacy Workshop** is an annual “train-the-trainer” event that builds the capacity of reflective water professionals. This interactive short-course helps participants master important water network management tools and gain the skills needed to teach these tools to others.
- The **Water Diplomacy Case Study Database (AquaPedia)** is being compiled and continuously refined to provide water professionals with a broad and open source public knowledge data base of water issues and conflicts.

**Who is a water diplomat?** A water diplomat is an interdisciplinary professional who facilitates the process of resolving water conflicts by finding creative sustainable options that improve mutual gains. A water diplomat contributes to the resolution of complex water problems that include: (i) multiple stakeholders with conflicting or divergent interests and (ii) sources of uncertainty in either or both the scientific or sociopolitical domain. Water diplomats facilitate sustainable water solutions by problem-solving with a mutual gains negotiation approach and synthesizing information across disciplinary boundaries and sociopolitical perspectives. Water diplomats are literate in multiple water-related academic and applied fields.

**How do I learn more and contact the people involved with Water Diplomacy?** Visit <http://waterdiplomacy.org>

**Water problems** at local, regional, and global scales **are complex** because of interconnections and competing needs. Complex problems require negotiated solutions **and cannot be resolved with only science and technology;** both **scientific knowledge and trust** between stakeholders and institutions **are required in mutual-gain negotiations** to find successful resolution for water conflicts.

We are building a global human network that connects contextual knowledge to scientific expertise, helps foster trust and assists the water management community in the process of resolving complex problems.

The 4 Water Diplomacy initiatives prepare researchers and practitioners to better analyze and manage complexity in water problems to develop pragmatic, successful interventions for a more sustainable and equitable water future:

- Workshop**: Train practitioners to better manage the science, policy, and politics involved in complex water problems
- AquaPedia Case Study Database**: Share information, expertise, and contextual knowledge between domains, disciplines and sectors
- Research Coordination Network (RCN)**: Coordinate and inspire research efforts between domains, disciplines, and sectors
- PhD Program**