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Water Diplomacy: Managing the science, policy, and politics of water networks through negotiation

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Water conflicts occur when natural, societal, and political forces interact. Together, these interactions generate what we call water networks. As population growth, economic development and climate change impose pressures on finite water resources, management of these water networks becomes crucial. Science alone is not sufficient; nor can policy-making that does not take science into account yield sustainable management solutions. Rather, sustainable solutions may only be found through a diplomatic or negotiated approach that simultaneously takes science, policy, and politics into account.

More formally, we argue that water problems should be understood as the product of competition, interconnection, and feedback among variables in the Natural and Societal Domains (NSDs). Within the natural domain: quantity (Q), quality (P), and ecosystem (E) constrain and define network dynamics. While in the societal domain, interactions among values and norms (V), economy (C), and governance structures (G) create complex contextual differences in the network. These six NSD variables constitute the nodes of a water network while interactions and feedback among natural, societal and political forces define the complexity of a network. The knowledge needed to resolve water conflicts and to manage water networks effectively must extend beyond scientific assessment that ignore societal variables (C, G, and V) or treat them as exogenous, and beyond policy analysis that does not consider the impact of natural variables (E, P, and Q) and the couplings among them.

Many water conflicts arise when NSD variables, and the networks they define, are mismanaged. These networks are open-ended systems that cross boundaries (physical, disciplinary, and jurisdictional) and change continuously; thus, efforts to manage them assuming that they have fixed boundaries , or can be optimized for competing objectives, are likely to fail. Once water conflicts are framed properly, the tools of joint fact-finding and collaborative problem-solving can be used to negotiate solutions that are both adaptive and enforceable. To illustrate the relationships among natural, societal, and political forces, and to portray the negotiation procedures vital to effective network management, we will use two examples: (a) the Apalachicola-Chattahoochee-Flint river basin shared by three states (Georgia, Florida and Alabama) in the United States and (b) the Ganges basin shared by three countries (Bangladesh, India and Nepal).