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Steven L. Stewart et al.

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Scenario Planning for Water Resources: Natural Hazards and Other Short-Fuse Events

Steven L. Stewart, University of Arizona, Tucson, AZ; Ximing Cai, University of Illinois, Urbana-Champaign, Urbana, IL; Katie Hirschboeck, University of Arizona, Tucson, AZ; Molly Macauley, Resources for the Future, Washington, DC

ABSTRACT

Although there has been much written about the use of scenario analysis for long-term planning, particularly with respect to the decisions facing firms, the extant literature has few examples of scenarios explicitly applied to water resource issues. Fewer still have considered short-fuse events such as floods and failure of water retention and conveyance structures in the context of longer-term scenarios for water resources planning. We report progress on an effort to develop a unified framework for constructing scenarios for water resource management. We place particular emphasis on semi-arid environments and forces external to the traditional water management process such as high-impact weather and climate events or unforeseen changes in government institutions that may drive unanticipated change in environmental systems. Most water resource scenarios are typically based on high, medium and low projections of demographics (gpcd), climate (precipitation, temperature), and perhaps institutional variables (conveyance infrastructure, legal issues). We discuss the relative merits of this with other approaches including: probabilistic scenarios, which explicitly weight the likelihood of different outcomes; anticipatory scenarios, which consider how to achieve or avoid some subjective future state; strategic scenarios, which seeks to identify the inconsistencies between disciplines in the way the environmental models are constructed. Modeling approaches In addition, we explore the interface between traditional long-term scenario planning in water resources, and the episodic events that characterize scenario work in the natural hazards literature. In particular, we discuss how the probability of the occurrence of natural hazards vs. time scale of the scenario can be introduced. Of particular importance is how the occurrence of extreme events may alter the specification of scenario variables ex post.

Author Contact Information:

Steven Stewart

sstewart@hwr.arizona.edu