



## **A Dynamic Framework for Water Security**

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Water security is a multi-faceted problem, going beyond mere balancing of supply and demand. Conventional attempts to quantify water security starting rely on static indices at a particular place and point in time. While these are simple and scalable, they lack predictive or explanatory power. 1) Most static indices focus on specific spatial scales and largely ignore cross-scale feedbacks between human and water systems. 2) They fail to account for the increasing spatial specialization in the modern world - some regions are cities others are agricultural breadbaskets; so water security means different things in different places. Human adaptation to environmental change necessitates a dynamic view of water security. We present a framework that defines water security as an emergent outcome of a coupled socio-hydrologic system. Over the medium term (5-25 years), water security models might hold governance, culture and infrastructure constant, but allow humans to respond to changes and thus predict how water security would evolve. But over very long time-frames (25-100 years), a society's values, norms and beliefs themselves may themselves evolve; these in turn may prompt changes in policy, governance and infrastructure. Predictions of water security in the long term involve accounting for such regime shifts in the cultural and political context of a watershed by allowing the governing equations of the models to change.