

A behavioral approach to understanding human-water interactions under hydrological variability

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One approach recently proposed for studying the interactions between hydrology and the social components is the use of an interactive interface that allows observations of human decision-making in response to simulated hydrologic events. However, despite its potential to generate empirical data on human-water interactions, such an interactive method involving actual people has been rarely used in the study of socio-hydrology. We suggest that laboratory behavioral experiments, or experimental economics, can be a useful research method that can help bridge this gap. For example, in the field of socio-ecological systems research, behavioral experiments are increasingly being used to study human behavioral response to ecological dynamics. This study showcases a behavioral experiment designed to study human-water interactions in the context of irrigated agriculture. In this experiment, human-subjects are faced with a set of decision problems on collective management of shared irrigation infrastructure in the face of hydrological variability. We generate new hypotheses regarding how humans should learn to anticipate and build adaptive capacity to extreme hydrological variability by comparing the decisions of human-subject groups that participated in the experiment. Our findings suggest that under hydrological stability, groups may be able to perform well without frequent adjustments to their strategy. They can still succeed as long as they tightly coordinate on shared strategies along with active monitoring of their irrigation system and user participation in decision-making. However, such groups may be fragile under hydrological variability. Only the groups that experience active learning, monitoring of irrigation system, and probing of the boundaries of their status-quo strategies are likely to remain resilient under hydrological variability.

Keywords: behavioral experiment, irrigation system, socio-hydrology