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## An Agent-based approach to evaluating sustainable drought adaptation policy

Mike Johnson

University of California, Santa Barbara, [mike.johnson@geog.ucsb.edu](mailto:mike.johnson@geog.ucsb.edu)

Marthe Wens

VU Amsterdam, [marthe.wens@vu.nl](mailto:marthe.wens@vu.nl)

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## An Agent-based approach to evaluating sustainable drought adaptation policy

**Mike Johnson<sup>1</sup>, Marthe Wens<sup>2</sup>**

<sup>1</sup> Department of Geography, UCSB. [mike.johnson@geog.ucsb.edu](mailto:mike.johnson@geog.ucsb.edu)

<sup>2</sup> Institute for Environmental Studies, VU Amsterdam. [marthe.wens@vu.nl](mailto:marthe.wens@vu.nl)

**Abstract:** Droughts are an increasingly prevalent and costly hazard that impact urban populations, agricultural production, and natural ecosystems. As climate becomes more variable, drought-prone regions are working to adapt through policy measures that address the diverse needs of urban centers, irrigation districts, farmers, governments, and NGOs. Developing policy pathways is a useful way to design such drought policies, however, their development requires an understanding of how human and biophysical systems interact and respond to a variety of climate and policy scenarios. In our research, we link a distributed hydrologic model with an agent based model to simulate the emergent, heterogeneous drought adaptation decisions of different stakeholders. This technique supports the evaluation of long-term water management options such as groundwater pumping restriction, urban use reductions, variable water pricing schemes, and subsidies in the face of increasing climate variability. Further we evaluate the impacts of such policies on food production, economic well-being, and measures of environmental health. To ensure congruence, key variables such as groundwater depth, evapotranspiration rates, and adaptation measures have been validated against historic data. The preliminary findings indicate this technique can provide an effective approach for evaluating and designing drought adaptation policy pathways.

**Keywords:** Agent-based model, climate change, drought, policy evaluation, human behavior