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Virtual Watershed: Co-production of Agricultural Commodities and Ecosystem Services from an Agricultural Watershed

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Virtual Watershed: Co-production of agricultural commodities and ecosystem services from an agricultural watershed

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Decisions regarding the use of agricultural land result in the production of food and fiber commodities as well as ecosystem services such as water quality. Funded through the NSF *Biocomplexity in the Environment* program, this project investigates this ecological economic dilemma by constructing a spatial decision support system called Virtual Watershed that combines environmental simulation models, geographic information systems, evolutionary algorithms, and agent-based modeling to capture the interactions among economic conditions, public policies, land and water managers' behavior, and the resulting ecological and economic performance of a watershed. Evolutionary algorithms produce a production possibilities frontier that demonstrates that the current landscape is sub-optimal, especially with respect to ecosystem service provision. The construction of farmer agents allows economic and policy variables to be tested by the model user in order to achieve economic and ecosystem service goals. The visually improved web-based Virtual Watershed model will be valuable in educational and policy-making settings.

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