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Sustainability of river basin development under uncertain future climate and economic conditions

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This study demonstrates a socio-hydrological model used to examine what future conditions could be like in the Murrumbidgee basin, Australia, arising from change in climate and the economy. The model uses a coupled socio-hydrological dynamical system with endogenous social values and preferences. The dynamical system is represented by a suite of differential equations that can evolve over time. The model exogenous drivers were economic and climatic-based. The model revealed possible future scenarios and the exogenous forcing conditions that led to sustainable basin development. The model revealed that a higher level of diversification in the basin's economy increases its sustainability and how this is enhanced by the moderate growth of the national economy. This highlights the link between a diversified basin economy and sustainability and how policy-makers and resource managers should focus on measures that diversify a basin's economy when the national economy is expanding when it is perhaps easiest to implement.