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The rivers cannot be anymore analyzed as solely natural systems, because their hydrological dynamics is defined to a greater extent by strategic human decisions and management to meet social and economic water demands. The necessity of coupling local social dynamics with hydrological processes for river catchments analysis is around for a decade and more and more authors are speaking about the concept of human-natural systems and the ways to investigate their mutual effects dynamically. Following this idea, the studies on the impacts of climatic change on the hydrological systems has to incorporate the mutual effects of the socio-hydrological system to investigate its resilience as well as ways of system transformation to increase its adaptive capacity to projected changes. Recently, agent-based models (ABM) have proven their strength in representing complex social and economic dynamics, where the interaction of heterogeneous agent gives raise to emergent phenomena. In this work, we take a fresh theoretical path combining hydrological process-based model (Soil and Water Management Model) SWIM with an ABM in order to capture the social-hydrological evolution of the Tagus River headwaters under climate change. The two models will interact on the monthly time step exchanging information about the decision making processes of agents (farmers, river and reservoir authorities, Segura beneficiaries) in the ABM and run-off and water volumes information calculated by SWIM. The ensuing SWIM-ABM hybrid can then be employed as a laboratory to design and test the effects of different transformative policies.