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Challenges for involving water stakeholders in educational and decision-making participatory processes supported by ABM

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Abstract: We implemented a participatory process with water stakeholders for improving resilience to drought at watershed scale, and for reducing water pollution disputes in drought prone areas. The purpose is to facilitate participatory decision making in a rural watershed impacted by recurrent droughts related to ENSO in Northwestern Costa Rica. The process involved co-designing “*ContaMiCuenca*”, a hybrid agent-based model, as a mediation object. We followed a Companion Modeling approach and organized 6 workshops that included research techniques such as participatory diagnostics, ARDI diagrams (actor-resources-interaction), agent-based model design and interactive simulation sessions. We collectively assessed the main water issues in the watershed, prioritized their importance, defined the objectives of the process, and pilot-tested the use of *ContaMiCuenca* for environmental education with adults and children. Simulation sessions with adults resulted in debates about the need to improve the model accuracy, arguably more relevant for decision-making. This helped identify sensible knowledge gaps in the groundwater pollution and aquifer dynamics that need to be addressed in order to improve our collective learning. Based on the *ContaMiCuenca* model, we developed a role-playing game for environmental education that triggered school children’s interest and commitment in water issues. Interestingly, children emphasized the need for coordination and awareness rising, which contrasts with the adults’ perspective. Our findings provide significant guidance for improving the trans-generational engagement of water stakeholders in participatory modeling processes in a context of drought emergency, limited technical information, and weak water governance.

Keywords: Participatory Modelling; Role-Playing Game; ABM; Hybrid Simulation.