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Linking stakeholder scenarios and shared socioeconomic pathways for policy making in human-water systems

Mohammadreza Alizadeh, Jan Adamowski, and Azhar Inam
McGill University, Bioresource Engineering, Canada (mohammadreza.alizadeh@mail.mcgill.ca)

Climate change has caused many environmental problems, as well as water and food insecurity, and health and social impacts in many parts of the world, and especially in the world's vulnerable regions such as developing countries. Studies have demonstrated the impacts of socio-economic and climate changes and how they result in water and environmental problems at global and regional scales. Socio-economic variation and climatic change influence the dynamic interaction of human and water systems, and our ability to address environmental problems at sub-regional scales. From this perspective, the Shared Socio-economic Pathways (SSPs), as a form of alternative development scenarios, were recently introduced to help decision-makers to cope with uncertain futures and improve their policies for mitigation and adaptation to climate change. To take advantage of SSP scenarios for policy guidance at regional and national scales, it is necessary to explore the socio-economic feedbacks and water management policies informed by different sub-regional knowledge sharing through stakeholders' narratives. In this study, we link SSP scenarios developed with regional stakeholders using a coupled socio-economic and environmental model, in conjunction with stakeholder-generated narrative storylines for a sub-region of Pakistan. The framework allows for linking corresponding scenarios across different uncertainty levels to improve regional scale policy making, while providing knowledge regarding the future of human-water systems under a range of plausible future climate and socio-economic scenarios.