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## Integrated water resources management in a water stressed region of Illinois using participatory groundwater and hydrologic modelling

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**Abstract:** Integrated water resources management (IWRM) is a widely accepted principle involving all sources of water in planning and management. It is of importance to develop integrated surface water and groundwater for regions where both water sources are used. Hydrologic models and groundwater models are commonly used to examine surface water and groundwater resources, respectively. It is critical that stakeholders understand and are willing to implement the water resources management strategies and thus participatory modelling (PM) has grown considerably recently. In this study, a participatory modelling study, which combines groundwater modeling using MODFLOW and hydrologic modelling using SWAT, is proposed to explore the integrated water resources management in a southern suburb area of Chicago, a water stressed region. MODFLOW is used to develop a regional groundwater model to investigate the impact of current and future water demand and the SWAT is employed to develop a watershed hydrologic model for the Kankakee River watershed to examine impact of water demand and potential climate change and variability. The modeling results are presented to stakeholders and policy makers and feedback received from them are used to adjust scenarios and the models. Results show that the groundwater would not be sustainable resources for the region and surface water will have to be tapped as the major water source in the near future. To protect aquatic ecosystems in the surface water system, groundwater may be needed as a backup source during extreme drought conditions.

**Keywords:** Participatory modelling, water supply planning, SWAT, MODFLOW, water resources management