Integrating Governance Analysis and Participatory Modeling to Address Groundwater Depletion in the Konya Closed Basin

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The Konya Closed Basin (KCB) is one of the most water-stressed agricultural regions in Türkiye, where decades of intensive groundwater abstraction have resulted in rapid aquifer depletion, declining lake levels, and increasing environmental degradation. Addressing these challenges requires not only improved hydrogeological understanding but also insights into the governance structures and socio-economic dynamics that drive groundwater use.

This presentation brings together results from the InTheMED project, integrating governance analysis with participatory and hydrogeological modeling approaches. First, a governance assessment of the basin identifies institutional arrangements, policy instruments, and key challenges in groundwater management, highlighting gaps between regulatory frameworks and local water use practices. Stakeholder perspectives collected through Living Lab workshops further reveal competing priorities between agricultural production, water conservation, and regional development.

Building on these insights, a participatory system dynamics model was developed collaboratively with stakeholders to explore the socio-economic feedbacks influencing groundwater use, including crop choices, economic incentives, and policy interventions. In parallel, a groundwater modeling framework using MODFLOW was developed to simulate hydrological responses under different climate and management scenarios.

By combining governance analysis with participatory socio-economic modeling and hydrological simulations, this research provides a more integrated understanding of groundwater depletion in the Konya Closed Basin and identifies potential pathways for more sustainable and adaptive groundwater management.