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Exploring nature-based solutions to droughts and floods in the Limpopo basin

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Southern Africa faces both severe droughts and strong floods. Communities describe how they are impacted by both extremes, but do not regard them as connected. They prepare for droughts by implementing water-saving measures and crop changes, but report doing little to prepare for floods. Governance actors instead try to manage both extremes, for example by installing dams that can capture floodwater to increase water availability during dry seasons. In the Connect4WR project, we combined community and governance interviews and workshops with scenario modelling to explore more nature-based solutions focusing on subsurface storage and infiltration. The governance actors in the four countries of the Limpopo (Botswana, Zimbabwe, South Africa and Mozambique) were keen to explore effects of afforestation, sand dams, managed aquifer recharge, and rainwater harvesting. The coupled surface-water-groundwater model we set up, showed that these measures can successfully reduce both droughts and floods. Especially measures that increase groundwater levels both increase water availability and reduce flood peaks throughout the basin. Although downstream communities benefit from the decreased flooding, they could be negatively affected if measures that increase (ground)water storage are combined with high abstraction for irrigation in the upstream part of the basin. In a transboundary river basin like Limpopo, international cooperation and information sharing is crucial. Also, these measures are often too costly and large-scale for the resource-limited rural communities, who can often only respond to extremes by relocating to less drought- or flood-prone areas. Training and government support can help with the implementation of nature-based solutions, but measures need to be resonating with local cultural practices to be adopted and effective land- and water management is important. In this presentation I will discuss the benefits and challenges related to the implementation of nature-based solutions in low- and middle-income countries with fragile populations.