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Assessing water resources availability in headwater sub-catchments of Pungwe River Basin in a changing climate

Anesu D. Gumbo^{a,*}, Evison Kapangaziwiri^b, Hector Chikoore^a, Harrison Pienaar^b

^a University of Venda, Thohoyandou, South Africa

^b Council for Scientific and Industrial Research (CSIR), Pretoria, South Africa

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Abstract

Study Region: The Pungwe River Basin, which is predominantly rural, is a transboundary river shared between Zimbabwe and Mozambique. The riparian communities along the river largely depend on the availability of streamflow for their livelihoods which are now being threatened by the effects of a changing climate. **Study focus:** The study assessed the effects of climate change on water resources availability in 10 selected headwater sub-catchments of the Pungwe River Basin using the Pitman hydrological model. The model was driven by 10 statistically downscaled climate models forced with RCP 4.5 and RCP 8.5 for the near (2020–2060) and far (2061–2099) futures. **New Hydrological Insights for the Region:** The results of water resources availability varied, depending on whether the short- or long-term scenarios were modelled. 70 % of the sub-catchments predicted an increase in stream flow for the near- and far-future under the RCP 4.5 emission scenario. Under the RCP 8.5 scenario, a decrease in streamflow was simulated for all sub-catchments with the decrease ranging from -4.17 % to -71.69 %. The reduction in water resources would be significant in the drier parts of the basin than in the wetter parts, which are projected to maintain approximately 90 % of current streamflow levels. Given the uncertainty in future climate simulations, it is prudent that both scenarios be regarded as probabilities. Thus, effective adaptive basin management should consider both.