

**Groundwater Futures in Sub-Saharan Africa- an integrated approach to assessing sustainable groundwater use for poverty alleviation**  
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Sub-Saharan Africa is characterised by endemic poverty, food insecurity, and some of the most variable hydrological environments on the planet. Groundwater, Africa's largest distributed and natural store of freshwater, can play a vital role in alleviating poverty and food insecurity through expanding access to safe water and irrigated agriculture as well as enabling adaptation to freshwater variability amplified by climate change. Research under the Groundwater Futures in Sub-Saharan Africa (GroFutures) consortium project seeks to make advances not only in the physical understanding of groundwater systems which can inform and constrain decision-making as well as prompt innovation but also critically through advances in social science as the latter address non-physical constraints that fundamentally restrict access to, and use of, groundwater for poverty alleviation. We present a rationale and methodology for integrated social and physical research and modelling that recognises the vital but ultimately subordinate role of physical science in determining resources availability. We report on preliminary observations highlighting the range of political, socio-economic, and biophysical conditions that exist within a representative Network of African Groundwater Observatories and how these shape groundwater demand, renewability and use in Sub-Saharan Africa. Developed models are used to constrain the range of physically viable development pathways+ a Pathways Approach is applied to link our interdisciplinary, multi-scale research with a deliberative, multi-stakeholder engagement process. This Pathways Approach is designed to inform and influence groundwater governance and planning processes at nested scales opening up new pathways towards more sustainable and socially just groundwater futures in Sub-Saharan Africa.

