

Research shows that Africa's groundwater can cope with climate change, but that it shouldn't be taken for granted



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# Ground control

## An examination of groundwater levels in nine African countries has raised hopes for a more resilient future

**H**umans take the water we need, be it for drinking or irrigation, from one of two sources: surface water, contained in lakes, rivers and reservoirs; and groundwater, in which water flows through porous rocks beneath the ground. In the UK, how much we rely on the latter depends on where we live and the type of rock which makes up the land (not at all in Scotland; quite a bit in London, where groundwater is rising in parts). But in much of sub-Saharan Africa, groundwater is a vital resource. It is often the only source of clean drinking water in rural areas and its use is also increasing in cities. Working out how groundwater levels will react to climate change is therefore vital.

A group of 32 researchers, led by UCL and Cardiff University, sought to test this across nine countries in Africa, including Uganda, Tanzania and South Africa. The research involved analysing long-term records of groundwater levels and rainfall and, in a rare moment of good news, demonstrated that groundwater levels may be more resilient to climate change than previously thought, particularly in the driest areas.

The key reason is that in dry areas most groundwater recharge takes place when water leaks out of temporary streams and ponds – a process which only happens after heavy rainfall. Climate change is expected to lead to fewer rainfall events in the region, but their intensity will increase. This in turn will increase leakage. As a result, the researchers predict that groundwater levels will remain resilient, even if the overall volume of rain decreases.

This is a vital finding because, according to Richard Taylor, a professor of hydrogeology at UCL, 'groundwater is the key pathway proposed to amplify agricultural production.' In light of this, the study also puts forward strategies to enhance groundwater, including capturing excess water during rainy periods and deliberately pumping it underground – a method that has benefits over storing water in reservoirs because it dramatically reduces water loss through evaporation. 'During times of seasonal river discharge or any time of surplus, you can start banking it,' says Taylor.

Ensuring a regular water supply in this way will only become more essential. Despite the fact that this study represents something of a climate-change silver lining, it's the lining to a very dark cloud. 'We hope the response to our paper is not: climate change – bring it on,' says Taylor. 'In a warming world there will be fewer but heavier rainfall events and this is tragic for agriculture. It means a reduction in soil moisture, and the need for irrigation will increase, which means more water is needed to grow food. That's not a future we should be embracing. But we're pointing out that there's an element of the hydrological system – groundwater – which actually benefits.' The key is to utilise that benefit in the best way possible to offset the damage. ●