

Most detailed maps yet of Africa's groundwater

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A scattergun approach to borehole drilling in Africa is likely to be unsuccessful.

This is the message from a group of UK researchers who have, for the first time, quantified the amount, and potential yield, of groundwater across the whole of Africa.

They estimate the total volume of groundwater to be around 0.66 million km³ – more than 100 times the available surface freshwater on the continent – and hope that the assessment can inform plans to improve access to water in Africa, where 300 million people do not have access to safe drinking water.

The results have been published today, 20 April, in IOP Publishing's journal *Environmental Research Letters*.

The researchers, from the British Geological Survey and University College London, warn that high yielding boreholes will not be found using a scattergun approach and a more careful and exploratory approach that takes into account local groundwater conditions will be needed, which they hope their new study will encourage.

Their results show that in many populated areas in Africa, there is sufficient groundwater to supply hand pumps that communities can use for drinking water. These hand pumps can deliver around 0.1-0.3 litres per second.

Opportunities for boreholes yielding five litres per second or more – the usual amount needed for commercial irrigation – are not widespread and limited to specific areas, such as countries in the north of Africa.

Central to the researchers' methods was the collation of existing national hydrogeological maps as well as 283 aquifer studies from 152 publications. The vast amount of data was compiled into a single database in which the researchers were able to make their calculations.

The amount of groundwater present in a certain region is reliant on the interplay between the geology of the area, the amount of weathering and the amount of rainfall experienced both in the past and present. All of these factors were considered to estimate the volume and potential yield of groundwater in each aquifer.

As a result of population growth in Africa and a planned increase in irrigation to meet food demands, water use is set to increase markedly over the next few decades. Climate change will pose a huge threat to this increase; however, groundwater responds much more slowly to increasing climatic variability as opposed to surface water, so will act as a buffer to climate change.

The lead author of the study, Dr Alan MacDonald, said: "Groundwater is such an important water resource in [Africa](#) and underpins much of the drinking water supply. Appropriately sited and developed boreholes for low yielding rural water supply and hand pumps are likely to be successful and resilient to climate change.

"High yielding boreholes should not be developed without a thorough understanding of the local [groundwater](#) conditions."

More information: *Environ. Res. Lett.* 7 024009

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