Alan MacDonald explains why groundwater is increasingly important in maintaining supplies of our most precious resource, clean water, for the world's poorest people.

Groundwater, health and livelihoods in Africa

Groundwater is Africa's most precious natural resource, providing reliable water supplies to at least a third of the continent's population. Where it can be found, groundwater has many advantages over river water: it is naturally protected from contamination, able to provide water throughout dry seasons and droughts, and can often be found close to the point of need and therefore developed incrementally and at low cost.

Ongoing research is highlighting that access to safe and reliable water is fundamental to improving health and livelihoods for the world's poorest people. With increased access to safe water and sanitation, the disease burden can fall and lead to improvements in child mortality and maternal health. Also, without the daily long walk for water collection, people have more time for income-generating activities and education. Access to safe water is seen as a fundamental step to moving out of poverty.

Although using groundwater for water supplies has many advantages, it is not a panacea. Groundwater must be developed with care and knowledge to ensure new supplies will be safe and sustainable over the long term.

Staff from the BGS and the Nigerian Geological Survey Agency measure groundwater chemistry from a community borehole in Nigeria.

New research into African groundwater and climate change

The BGS is leading new research funded by the UK government to improve understanding of the resilience of African groundwater supplies to climate change. The study is developing a map of Africa, highlighting where groundwater could be used to help people adapt to a changing climate, and also identifying which areas may be most vulnerable. A series of case studies in Ethiopia, Tanzania and Nigeria is showing that access to reliable groundwater sources has a major influence on people's ability to generate wealth and sustain livelihoods through current climate variability.

Long queues can develop at hand pumps during the dry season, since groundwater is often the only reliable source of water.

Over the past 50 years our scientists have been at the forefront of applied research trying to understand and map groundwater across Africa. Working with government departments, universities and organisations such as WaterAid and UNICEF, we have helped develop appropriate methods to locate and sustainably exploit groundwater for reliable community water supplies across the diverse geology and landscapes of Africa.

A woman collects water from a shallow well in Nigeria; this well often dries up and will be highly vulnerable to climate change.

The challenges in Africa remain immense. More than half the rural population in Africa (over 300 million people) still do not have access to reliable water supplies but are dependent on highly contaminated and unreliable surface ponds and seepages. High population growth and increasing climatic variability are exacerbating problems of poverty, health and hunger. To help reduce poverty and adapt to climate change, groundwater resources will need to be developed at a much faster pace. This is not a trivial problem and will depend critically on understanding the hydrogeology and having skilled people and partnerships to make informed decisions.

As we look forward, the BGS will continue to have an important role to play: passing on existing knowledge and best practice to our African colleagues; helping to map groundwater resources and their quality; and conducting new research to meet current and future challenges. In particular, research efforts must focus on understanding how resilient groundwater resources are to climate change and the increasing pressures from population growth and urbanisation.

For more information, contact:

Alan MacDonald, BGS Edinburgh
Tel: +44(0)131 667 1000
e-mail: amm@bgs.ac.uk