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Mapping UNSW Impact
Global Development

Primary SDG	**6: CLEAN WATER AND SANITATION**
Broad theme	Testing water in poor or emergency areas to determine if it's drinkable
Research	Instantaneous tests of drinking water in poor or emergency areas where the water is potentially contaminated by human faeces
Impact region	Ethiopia, the Congo and Yemen; any emergency recovery or living area where water contamination could be a major issue
Faculty	Science
School/Institute	School of Biological, Earth and Environmental Sciences
Academic	Professor Andy Baker
Project partners	Previous partners: UK Engineering and Physical Sciences Research Council (GBP 212,000 in funding, 2009-11), Umgeni Water (South Africa), eThequini Water and Sanitation (South Africa)
Related SDGs	3: Good Health and Wellbeing
	14: Life Below Water

Elevator pitch

UNSW research can immediately determine if water is drinkable in emergency relief or poor areas where human waste could be contaminating the water supply, contrasting with the three days it normally takes to test water, limiting the spread of disease and saving lives.

The Challenge: How can we test if water is drinkable in a faster, easier way?

According to the WHO, at least 2 billion people around the world use a drinking water source contaminated with faeces. Contaminated water can transmit diseases such diarrhoea, cholera, dysentery, typhoid, and polio. It causes over 500,000 diarrhoeal deaths each year. By 2025, the WHO estimates half of the world's population will be living in water-stressed areas.

NGOs and other organisations use water testing kits at potentially contaminated sites. Testing takes 36 hours, a large enough window of time for a disease like cholera to spread throughout the population. Kits also require

significant battery or solar power, an experienced person to count the microbes under a microscope and a sterilised environment, something that is hard to replicate in the field.

UNSW's solution: Use a handheld UV light probe that provides an immediate drinkability reading

Before this project, Andy was researching caves in Africa and other parts of the world using UV light to determine historical drought and rainfall conditions. At the same other academics were using this new UV light technique to investigate water properties. Andy met these other experts at a conference and together they decided to trial the technique to test water drinkability.

The result is a handheld probe that runs on AA batteries and can instantaneously determine if water is drinkable. The probe shines short wavelength UV light into the water. Microbes fluoresce in response to this light. If high levels of microbes are present, the water appears fluorescent, indicating its unsuitability for drinking.

After a successful trial of the probe in the UK, they received funding from the UK Government to undertake a second test in South Africa at a river used by a nearby shanty town. Results show the probe was effective in determining the drinkability of water. The probe is now commercially produced by private companies. If further funding was available, Andy can acquire probes (around GBP 5,000 each) and train up users to test water quality in targeted areas.

The Impact: Limit disease and save lives in disaster relief areas and poor communities

If the probe shows the water is undrinkable, Andy can inform local authorities to restrict access to the water while a more rigorous 36-hour test is undertaken. This will limit the spread of disease, save lives, and save money and medical resources devoted to treating people who would otherwise become sick.

Ethiopia, the Congo and Yemen have critical problems with contaminated water and related diseases, like cholera. There are many other areas and countries in the world where this applied research can be put to use to ensure disadvantaged people are not drinking disease-laden water.

Researcher

Professor Andy Baker is a pioneer of using UV light to determine organic matter in cave stalagmites and microbes in sewage, rivers and groundwater. Since moving to Australia in 2009, his research has focused on groundwater issues, including water quality. Andy was inspired to help those living in poverty when working on cave research projects in remote areas of Ethiopia in the 2000s.

Ben Falkenmire 12.09.17