



Photo Credit: Ranjith B. Ariyaratne

Helping restore the quality of drinking water after the tsunami

The tsunami

The tsunami that struck the Indian Ocean on December 26, 2004, devastated parts of Sri Lanka's southern and eastern coastline. As well as killing 31,000 people, it also destroyed wells that fell within the range of the saline floodwater. As a result, many families living along the island's east coast found their supplies of freshwater abruptly cut off. IWMI's research formed the basis of guidelines on cleaning wells that restore water quality and avoid outbreaks of infectious diseases.

Rapid action required

Within the first week following the tsunami, a Senior Scientist from IWMI, Karen Villholth, was on the ground assessing the situation along the east coast. She soon realized that representatives from several different NGOs were attempting to clean wells but were not following any standard protocols or recording the locations or details of any actions taken.



Photo Credit: Rajith B. Ariyaratne

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Many people were attempting to clean wells by simply pumping out the saltwater and discharging it on the surface close to the well. This simply caused more saline water to flow into the well and the water recently pumped out soon percolated back into the well. This chaotic approach prolonged contamination of the water and prompted Karen to draw up guidelines and contact NGOs and relevant authorities to help explain that well owners should remove debris and dirty water from their wells but not keep pumping out water. The well water could be used for bathing and over time, rainfall would dilute the saltwater and the wells could once again be used for drinking water.

Monitoring the impacts

As various coordinating committees were set up for food and shelter, drinking water and sanitation, Karen attended meetings to disseminate the new guidelines and conduct training sessions to prevent further damage being caused from pumping. Two and a half months after the tsunami, IWMI initiated a monitoring program to assess the extent of the damage and monitor the recovery of water quality. Scientists selected 150 wells in Kallady, Kaluthavalai and Oluvil, within the Batticaloa and Ampara districts, each lying within 2 kilometers (km) of the coast. Although many of these wells had been affected by the tsunami, others had not, and these provided a useful baseline for pre-tsunami conditions.

Directly after the tsunami, salinity levels of flooded wells were similar to those of seawater. The levels dropped after a few

weeks but then remained more or less constant during the ongoing dry season. Following the first rains after the tsunami, salinity levels in the affected wells continued to decrease and came close to the range of drinking water, although they were on average still above the levels observed in the unflooded control wells. This indicated that the groundwater had still not fully recovered from the saltwater intrusion. Continued monitoring revealed that the water quality in affected wells was restored to pre-tsunami levels one and a half years after the event.

Recommendations for emergencies

Following the monitoring program, IWMI scientists drew up a series of recommendations. They suggested cleaning wells immediately after a tsunami to remove debris and avoid outbreaks of infectious diseases from pathogenic microorganisms. They also recommended no further pumping as this has little positive impact. Instead, they advised letting the natural cycle of rainy seasons dilute the salinity until acceptable drinking water levels are reached. In 2008, the World Health Organization (WHO) officially endorsed the well-cleaning protocol from IWMI and partners as part of its series of Emergency Guidelines.

Donors and collaborators

During its post-tsunami well-cleaning and groundwater-monitoring operations, IWMI worked with CARE, Canadian International Development Agency (CIDA), United Nations Children's Fund (UNICEF), Eastern University of Sri Lanka, Italian Red Cross, International Committee of the Red Cross (ICRC), International Union for the Conservation of Nature (IUCN), Action Against Hunger (ACF), Veolia, Oxfam, US Army Corps of Engineers, ZOA Refugee Care, Medair, Solidarités, local NGOs and the local and national authorities, University of Copenhagen, US Science Foundation and other Sri Lankan and US universities. Funding for the work was provided by CARE and CIDA.

For more information

WHO guidelines:

www.who.int/water_sanitation_health/hygiene/envsan/technotes/en/index.html

IWMI report:

www.iwmi.org/tsunami/pdf/Tsunami_Impacts_on_Shallow_Groundwater.pdf

Field, laboratory and numerical studies:

www.fiva.dk/doc/thesis/Thesis_MVithanage.pdf