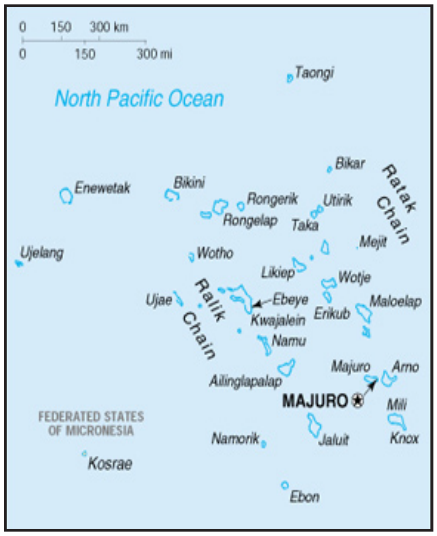
Applying knowledge to improve water quality
Southwest States & Pacific Islands Regional Water Program
A Partnership of USDA CSREES & Land Grant Colleges and Universities

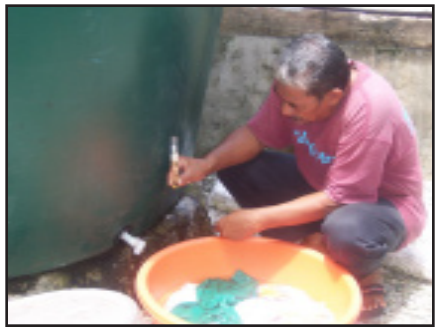
Spring 2008
HPIWQ005

The Effectiveness of Using H_2S to Test Household Drinking Water Sources

Comprised of remotely isolated and scattered islands, many communities throughout the Republic of the Marshall Islands (RMI) depend on rainwater catchment systems to provide water for washing, cleaning, cooking and drinking purposes. Unfortunately, few households have their water tested by appropriate agencies on a regular basis. Many islanders believe their water is safe, and are surprised to learn, through simple testing methods demonstrated on their catchments, that their water is contaminated. While residents of Majuro and Ebeye are fortunate to have an Environmental Protection Authority (EPA) water quality monitoring lab and trained technicians available on site to help them, the other more sparsely populated islands are not so fortunate. Surveys conducted by the RMI EPA and the College of the Marshall Islands Cooperative Research and Extension Program (CRECMI) have documented the unsanitary living conditions faced by the people living in the 24 outer island communities, including the fact that only a few households have proper toilets and septic tanks. Most importantly, however, they discovered that not all households have water catchments to collect rain water, and if they do, many do not treat their water for bacterial contaminants.




A typical rainwater catchment tank


Taking a water sample from a catchment tank

Beginning in 2003, the CRECMI and the RMI EPA joined efforts to address these issues in the outer islands. The main goals are to establish a water quality monitoring program based on an outer island, train representatives in these communities to test the water, conduct a sanitary survey on groundwater wells and catchments, and increase the number of water catchments available for every household. Since then, communities in more than 20 outer islands have been visited by these two organizations. In 2005, the Southwest States and Pacific Islands Water Quality Program became a new member of this team and will continue to provide fiscal and technical resources.

An H_2S test, also known as the Hydrogen Sulfide test, was selected to be the method to monitor the water samples because it is a good indicator of fecal matter in the water. A sanitary survey developed by the World Health Organization for groundwater and rainwater

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This material is based on work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2004-51130-02258

catchments was used during the implementation of this project. A total of 1000 water samples collected from the outer islands were tested using the H_2S method. More than 50 percent of the samples were found to be positive for fecal coliforms, which meant that the water was not safe for either drinking or cooking. The sanitary survey also indicated that the reason for the high bacteria content was due to a dirty environment in the vicinity of the catchment system, and in some cases, because the spigot reached the ground and was not covered or protected from contamination.

Testing water samples

The RMI Water Quality Extension Agent conducted meetings and gave presentations to the communities to demonstrate how to treat their contaminated water. Educational materials explaining two possible ways to treat contaminated water, either boiling the water for up to five minutes or placing three drops of bleach to one gallon of water, were provided to the clients. A demonstration of the bleach method was also conducted for community members.

More than 500 adults have already been trained in using the H_2S testing method via workshops, and home and outreach visits, and students have also been trained through demonstrations at their schools. The method is simple to use and can produce results within 24 to 72 hours. It is also inexpensive, with an average cost of only $1 per test. The test does not require the use of electricity, which is an important consideration for the outer islands that do not have electricity. Feedback from communities has been positive, indicating that they will strive to ensure they have safe drinking water for their families. The need to address the water quality issue of safe drinking water in the islands is great and this will be an ongoing process. The collaboration of the Southwest States and Pacific Islands Water Quality Program, RMI EPA and CRECMI will help to keep the process moving forward.

Conducting outer island workshops

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