

# Water for Life:

## Community Education for Water Conservation and Rainwater Harvesting in the United States Affiliated Pacific Islands

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### Background

In small, remote Pacific Island nations, fresh water is scarce. Rainwater is the main source of drinking water and water for other critical needs. In the face of combined threats from increasing frequency and severity of extreme weather events - prolonged droughts and more pronounced seasonality of rainfall - along with relentlessly increasing water needs from both growing populations and accelerating development, a major concern is how reliable, sustainable supplies of quality, potable water can be achieved in an economically feasible fashion.

At the same time, these islands lack the infrastructure of informal science education that we take for granted here in the U.S. - having essentially no museums, zoos, or science centers - and thus have few organized mechanisms to nurture and promote community-based science learning.

*Water for Life* addresses both of these issues, enhancing access to higher quality drinking water through engaging entire communities in informal service and science learning experiences around water.

### Approach

In each of the four project sites - the Republic of Palau, Chuuk and Yap States in the Federated States of Micronesia, and the Republic of the Marshall Islands, local PREL staff liaisons have assembled and cultivated **Core Teams** of local leaders from the education, environmental, and water resource communities. These Core Teams bring together the knowledge and expertise needed to identify and prioritize specific *Water for Life* project needs and locations. Core Team members gather and engage collaboratively with other community members and groups in planning, developing, and implementing activities to effectively raise awareness and knowledge of drinking water issues, and provide enhanced access to higher quality drinking water in their communities.

Based on these locally-determined needs, resources, and priorities, projects in the four sites range from the creation of youth and/or community educational materials, to setting up water quality monitoring systems, to improving natural springs and other sources of surface water, to repairing and upgrading community rainwater catchment systems.

## How can we improve access to potable water through community service learning in the Pacific Islands?



### Yap

Living in the westernmost and driest state in the Federated States of Micronesia, Yap's 11,400 citizens face increasingly variable weather patterns, with severe droughts becoming more common. The Core Team decided to focus initially on improving the quality of captured/stored rainwater through the installation of first-flush diverters in community catchment systems. Diverters have now been installed in four such community systems on Yap proper, serving >600 residents. *Water for Life* is installing five more diverters on the largest of Yap's outlying atolls, Ulithi, providing >500 people who rely solely on rainwater catchment for drinking water with access to cleaner, higher quality water.

### Chuuk

Chuuk consists of a central semi-atoll with dozens of mountainous islands enclosed by a barrier reef, and hundreds of smaller low lying islets scattered across >300,000km<sup>2</sup> of the surrounding ocean. Because Chuuk's high islands are densely populated yet lack public infrastructure, the initial projects in the state focus on enabling better access to high quality groundwater sources. A spring on the island of Tol that provides the best available local water is being improved through creating a cement catchment basin and cover, so as to minimize contamination, and the enlarged reservoir is also being piped ~200m off privately owned land to a tap on a public shoreline. Similar projects are starting in other remote communities that rely on groundwater springs.



### Marshall Islands

The 68,000 people of Marshall Islands are scattered across hundreds of low-lying atoll islets. Because the nation lacks volcanic islands altogether, no place is more than a few hundred meters from the ocean, nor is any spot more than a few meters above sea level. Rainwater catchment is thus the primary - and generally the only - available source of drinking water.

*Water for Life* is working with the Ministry of Education to upgrade existing catchment systems at three public schools around Majuro. Gutters are being replaced/repainted, screens and/or first-flush diverters installed, leaks fixed, covers replaced, tanks cleaned/repainted, runoff/drainage improved, etc.

### Palau

As part of a national effort to preserve watersheds and prepare for the predicted El Niño drought, *Water for Life* helps communities collaborate with ecologists to protect and revitalize streams and other rain basin catchments that were traditionally used as drinking water sources but have been neglected in recent decades. Teams are planting vegetation, repairing dykes and dams, clearing trash from streambeds, etc.

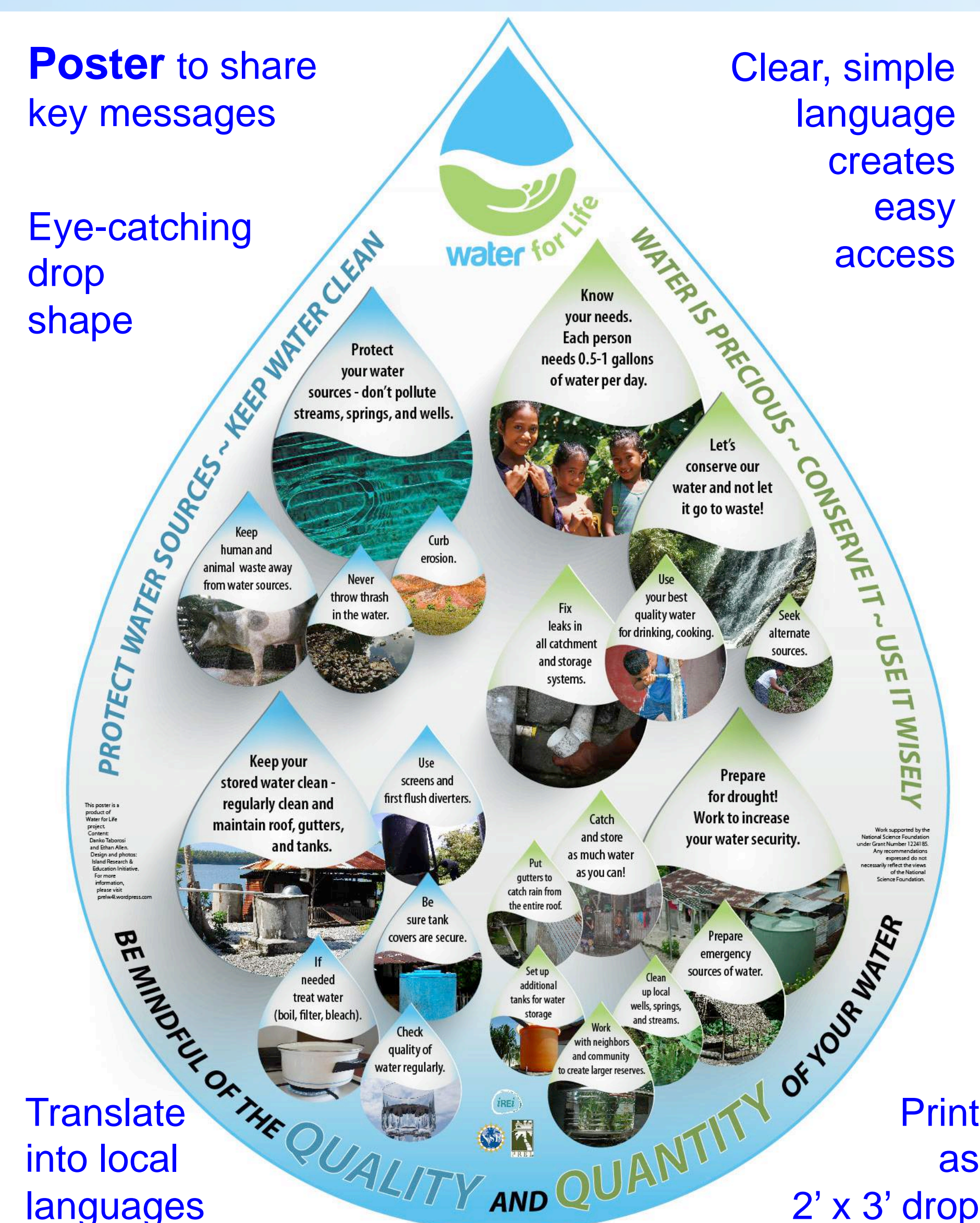
Other activities include working with teachers to create engaging, out-of-classroom science-learning experiences to help youth gain an appreciation of their unique island resources.



Poster to share key messages

Eye-catching drop shape

Clear, simple language creates easy access



Translate into local languages

Print as 2' x 3' drop

## How can we use water as a theme for informal island science education?

**Blog:** <http://prelw41.wordpress.com/>

With both internally and externally generated materials, including pictures and reports of site-based projects. Also, both a Facebook page and Facebook group help Core Teams and others share information.

**Booklet:** *Fresh Water in Micronesia:* A 14-page guide to water issues on Pacific Islands.

**Billboards:** First one in Chuukese, with key, locally-relevant water conservation messages.

**Water Cycle Handout:** An overview of Pacific islands' water cycles to broaden understanding of this key topic.



Award No. 1224185

Poster for 2014 NSF AISL PI Mtg

**Workshop:** A five-day immersion for Core Teams in **six modules on water science:**

- Chemistry and Physics
- The Oceans
- The Atmosphere
- The Hydrological Cycle
- Island Geology & Hydrology
- Fresh Water Quality

Other, shorter workshops on some topics for local groups.

**Angaur Outdoor Lesson:** The first of a series, each customized to a specific site, engaging local youth in place-based learning about core geological and hydrological facets of their own islands.

**Community Awareness-Raising Events:** Core Teams in each site collaborate with other groups to lead community activities around water in events such as World Water Day, Earth Day, etc.

### Challenges

- **Distance:** Same E/W expanse as contiguous 48 states
- **Language:** 4 major language groups, w/ some sites having multiple, distinct languages
- **Culture:** Traditional Pacific Island values & ways of knowing
- **Connectivity:** Low bandwidth, slow speeds, outdated hardware & software, power failures, etc.

