

## **Freshwater Resources for Selected Atolls -- Recommendations & Conclusions Based on Modeling Study**

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**Abstract.** Water security for the atolls of Yap State is an important area of study at this time due to historical events and projected future climate change. Freshwater supplies on atolls are collected by island residents using rainwater catchments and groundwater is often used to supplement wash water supplies. As a result of the direct collection methods and limited available space for storage, islands are highly sensitive to short-term changes in climate, especially droughts. To aid the island communities in managing their freshwater sources, the Secretariat of the Pacific Community-Global Climate Change Alliance Pacific Small Islands States (SPC-GCCA: PSIS) developed the Adaptation Project through which this study was developed. This report summarizes the tools available to estimate the existing collection and storage capacities of four atoll islands: Eauripik, Ifalik, Satawal, and Falalop (Ulithi). Rainwater collection and storage was modeled using an algebraic model, and the groundwater availability was modeled using a modified version of the USGS numerical model SEAWAT. One major finding from this study suggests historical rainfall data is adequate for drought planning and preferred to global circulation models (GCMs). Simulations for rainwater catchment and groundwater models show simulations using historical rainfall data provide the most conservative results. This study also provides planning and management strategies including a stepped approach to improving the rainwater collection network, reliability charts for making effective changes to rainwater catchment systems, a range of expected groundwater lens sizes based on future climatic conditions, and general recommendations for preserving sources for future shortages.