



Identifying Sustainable Water Storage Infrastructure for Atoll Island Communities



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Water shortages are a persistent concern for residents of atoll islands. Under normal rainfall conditions, water demand is able to be met by rooftop rain catchment, but prolonged droughts, such as those associated with ENSO events in the western Pacific region, can exhaust water storage, leaving residents dependent on groundwater or imported water. In response to the recommendation by the FSM Advisory Council meeting of October 23, 2006 in Pohnpei, WERI researchers have developed an accurate, readily portable groundwater management spreadsheet tool that is based on results from numerical modeling simulations. Beginning in April and May 2008, and continuing into August 2009, October 2010, and October 2011, the developers of the model presented demonstrations of the groundwater management tool to a limited number of available water resource managers and government officials. These presentations also included general knowledge transfer of atoll island hydrology and methods to conserve water quantity and water quality on atoll islands. During the previous year, the groundwater management tool was also calibrated against atoll island groundwater observations in the FSM and used to predict the estimated freshwater lens thickness during average rainfall and intense drought conditions for each atoll island within the FSM (Bailey and Jenson, 2011; Bailey et al., 2011).

A complete assessment of water resources available to atoll island communities, however, must include an analysis of store rain catchment water, which is the primary source of potable water for island residents. This project aims at providing such an assessment, and will combine model-calculated available groundwater volumes with available rain catchment volumes. With knowledge of the number of inhabitants for an atoll island, the water demand per inhabitant, and the daily rainfall, coupled with accurate results of groundwater volumes from groundwater

modeling results, a calculation of daily available potable water for the island community during both average rainfall and intense drought conditions can be made. This assessment will be performed within the context of a new spreadsheet tool, derived from the existing groundwater management spreadsheet model, and will provide a readily-portable tool for water resource managers. Upon completion of the spreadsheet tool and publishing an associated user's manual, FSM officials will be trained on the use of the model.

The objectives of this project are hence two-fold. First, it is a research project that uses state-of-the-art modeling results as well as field-collected demographic information to obtain available water supply volumes for atoll island communities. Such information is vital for atoll island residents and policy makers in the FSM. Second, it is an information transfer project in which water resource managers and government officials will be provided results of the research within the timeframe of the project. Within this second objective, the water resource managers will be trained to use the new spreadsheet model. This will be done through workshop training, at which time a user's manual for the spreadsheet will also be provided. A poster outlining keys to water management and conservation will also be created for distribution to schools within the FSM. Furthermore, an ongoing technical support relationship will be established between the authors and end-users so that there will be a continuing dialogue to support continued successful use and application of the model to water resource management in the FSM.