



# **Geologic Study, Map Development, and Water Resources Analysis of Fais Island, Yap State, FSM**



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This project assessed the physical resources and sociocultural factors that must be considered in order to develop a reliable source of potable water to meet the needs of the residents of the small (2.6 km<sup>2</sup>), remote island of Fais, Yap State, Federated States of Micronesia. Fais's resident population of about 320 people currently relies almost exclusively on rainwater catchments to meet its potable water needs. However, on average once a decade a major storm destroys or damages existing catchments, most recently in November 2003. Groundwater development is limited to one functional well that has demonstrated its potential to provide fresh water and the existence of a natural feature that has been used in past droughts to draw fresh water from the aquifer. Although these resources along with the potential for further groundwater development may establish an excellent emergency supply, the existing rainwater catchment system is operating at less than 25% of its potential. Bringing the catchment system up to its full potential and providing the means to maintain it may produce enough potable water to meet the needs of the people in all but the worst of droughts or storm events.

The socio-cultural portion of the project included an inventory of all catchment areas and storage volumes both in-use and potentially available. Along with a survey of water usage patterns and other demographics these data provided a basis for evaluating the effectiveness of the existing system, the potential of the system, and an estimate of future demand. Continued development of the groundwater on Fais for dealing with emergencies was also explored. The small size and subsistence economy of Fais along with the prevailing traditional social organization and land tenure was considered in the technical

recommendations for development and protection of groundwater. These recommendations were designed to be compatible with the island's social traditions, cultural values, and indigenous authority.

The size of the island and the physical constraints on the size and shape of the freshwater lens is also vital to the development projects that were proposed. Most existing wells provide saline water demonstrating that the prior estimations of the lens' properties and location are inaccurate. The refinement and completion of our map of the key karst features that constrain the drainage, storage and discharge of groundwater were key to understanding of future development of this resource. The study employed the classical methods of geological and anthropological fieldwork. The results included recommendations for appropriate development and management approaches that will ensure that water from the developed sources will be available when needed.

The project supported the second year of a graduate thesis project in Environmental Science at the University of Guam for a graduate research assistant was trained on a broad range of graduate academic topics, including hydrology, hydrogeology, cultural anthropology, environmental economics and management, and the use of databases and GIS.

