

# Critical problems for fresh water supplies in Pacific

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Despite high average annual rainfalls and balmy temperatures, an expert from The Australian National University warns that small island nations in the Pacific face freshwater supply and sanitation problems among the most critical in the world.

Professor Ian White from the Fenner School of Environment and Society at ANU played a leading role in an eleven-year study into the impacts of natural and human-induced changes on groundwater in Kiribati. Research partners included Ecowise Environmental, the Government of the Republic of Kiribati, the French agency CIRAD and the Pacific Islands Applied Geoscience Commission.

“Island countries with atolls – ring-like coral islands and reefs that nearly or entirely enclose a lagoon – use the shallow, fresh groundwater as the major source of drinking water,” Professor White said. “As a result, sea-level rise due to increasing global temperatures and the incidences of water-borne diseases and associated infant mortalities are major concerns in many small island countries.”

The research team found that very limited land areas and extremely permeable coral soils in atolls reduce surface runoff to insignificant amounts and decrease the potential for surface storages of water. This means thin lenses of fresh groundwater floating over seawater are the major source of reliable freshwater for people in many atolls.

“We found that both the quantity and salinity of atoll groundwater is

extremely vulnerable to frequent droughts,” Professor White said. “Droughts can last as long as four years and occur with a frequency of one significant drought, coupled to La Niña events, every six to seven years. In long droughts domestic water wells are often too salty to drink and some communities have to rely on large groundwater lenses or on coconuts.

“Population growth due to natural increases, inward migration and urbanisation mean that fresh groundwater sources are reaching their limit of sustainable supply in Kiribati. Groundwater can also become salty due to over-pumping or inappropriate methods of pumping.”

The researchers proposed a number of strategies to help increase the resilience of small island communities to fresh water shortages, including improving the institutional management of water, increasing the amount of rainwater used by households, and protecting groundwater source areas from contamination and salinity.

The work was initiated by UNESCO International Hydrological Programme and supported by the Australian Centre for International Agricultural Research, the Government of France, the Australian Academy of Science, the Australian Research Council and the European Union Pacific Water Governance Programme. The findings are published in the latest issues of the *Vadose Zone Journal*.

Source: ANU

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