CF Challenge Fund

National Institute of Water & Atmospheric Research

Developing an open source, real time, probabilistic drought risk visualization

CONTEXT

Predicting the onset of drought in Small Island States in the Pacific region – with an adequate understanding of antecedent conditions, current observations, and probabilities of near-term forecasts – is a significant challenge for climate experts where resources are limited.

This results in a lack of actionable, early warning information that would allow for proper drought preparations to be activated. For example, there have been several recent cases in the Pacific region where communities have run out of potable drinking water during drought events, endangering lives and hampering recovery efforts. This has also meant that ad-hoc emergency supplies have had to be urgently organized, resulting in higher expenses and increased risk for citizens.

A team at New Zealand's National Institute of Water and Atmospheric Research (NIWA) focused on working with national meteorological services in three Pacific countries – Fiji, Solomon Islands, and Samoa – to provide open source drought risk monitoring and visualization tools to help overcome this challenge. The goal was to provide climate services staff with the ability to be able to quickly generate improved drought information and policy input for national disaster management agencies and other partners, and to support the development and implementation of Drought Response Plans.

HIGHLIGHTS

Built on the open source software infrastructure of the CliDE database, developed by the Australian Bureau of Meteorology.

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Installed 9 drought risk visualization tools in 3 National Meteorological Services in Fiji, Samoa, and Solomon Islands.

Trained 15 climate services staff to analyze drought risk in near real time, and provide daily assessments to sectors like Agriculture and Tourism.

Enabled the general public to access near real time information through mobile devices and web services.

Samoa Tourism Authority staff test the new CliDEsc drought risk software.

APPROACH

Early in 2016, NIWA scientists met with climate services staff at national meteorological services in Samoa, Solomon Islands, and Fiji to better define drought risk information needs and scope potential services. Consultations were also held with disaster management offices in the three countries to ensure alignment with requirements for the design and implementation of national drought response plans.

Based on the consultations, software for new and improved drought information was written using open source tools and scripting. The new software was installed on existing hardware and platforms in each country, and NIWA teams delivered corresponding technical training on the new drought tools.

Assistance was also provided to the Meteorological Services to improve near real time analysis of climate data from existing observation programs, in order to ensure that sufficient available data to support the proposed drought services. All installations and training were completed by the end of November 2016.

In phase I, the team developed a Drought Risk Visualization Toolkit (DRVT) for three Pacific Island countries: Samoa, Solomon Island and Fiji. The objective of the tool is to assist National Meteorological Services provide better and more timely advice and early warning to drought-sensitive communities, government agencies, and other key clients in the Pacific.

In the second phase, NIWA are developing and extending the DRVT to Kiribati, Vanuatu and Papa New Guinea, with an additional focus on uptake and end-user pre-drought contingency and action planning.

"We need this early warning information to support our national drought response plans."

– Senior Official, National Disaster Management Office, Samoa.

NEXT STEPS

There is significant potential for this project to be leveraged by installing the new drought tools application in other small island states of the Pacific. The new software is now operating in Fiji, Samoa, and Solomon Islands, but up to 18 Pacific countries stand to benefit from the newly developed tools. While local customization will be needed to ensure the correct operation of the new tools, the applications developed are easily transferable to other contexts. In addition, as the drought visualization tools become more widely used, countries will be able to share lessons learned and exchange improved versions of the software as they are developed.