

Climate variability and hydropower production: Improving energy security at Afulilo Dam, Samoa

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The theme of the proposed poster

The Afulilo Dam is a freshwater reservoir located in Samoa which supplies the Ta'elefaga Powerhouse, Samoa's largest hydropower station. Together, the Afulilo Dam and the Ta'elefaga Powerhouse make up the Afulilo hydropower scheme. When commissioned in 1993, the Afulilo hydropower scheme accounted for 80% of Samoa's electricity needs. However, growing demand due to provision of electricity to a wider population and the uptake of improved electricity services has reduced the total proportion of energy produced by hydropower in Samoa to around 30-45% depending upon local conditions.

The Climate and Oceans Support Program for the Pacific (COSPPac), funded by AusAID and implemented by the Bureau of Meteorology is a project which aims to improve the capacity of Pacific Island Meteorological Services to provide climate monitoring and forecasting services to climate vulnerable sectors in the region. COSPPac is currently working in collaboration with the Samoa Meteorological Division (SMD), Water Resources Division (WRD) and the Electric Power Corporation (EPC) to develop a monthly water storage forecasting system based on the relationship between rainfall and water storage at Afulilo Dam.

Given the relatively high skill of ENSO-based rainfall forecasts in Samoa, the use of climate forecasts for the management of hydropower production is seen as a feasible option for improving the management of water resources and increasing the efficiency of the energy production at Afulilo Dam. COSPPac has completed the calibration of a water balance model linking rainfall and water storage at Afulilo Dam. The strength of correlation between rainfall dam storage in this model strongly affirms the potential for implementing a useful and effective dam level forecasting system to assist in the management of water and energy resources at Afulilo Dam. COSPPac is now working towards the implementation of an operational water storage forecasting system with its climate and energy sector partners in Samoa.

The relevance to GFCS

The application of climate information services to water resource management is one of the four priority areas of the GFCS. The development of an operational water storage forecasting system also incorporates key components of the GFCS framework including:

1. The observation and monitoring of local climate and water resources for monitoring purposes.
2. The use of local climate and water storage data for the development of a water balance model to characterise the relationship between these variables

3. The development of the water balance model and ongoing climate and water storage monitoring to facilitate the creation of a climate information service.
4. A user interface platform provided by regular correspondence between the SMD, WRD, EPC and COSPPac.

The expected benefit of presenting the poster at the meeting

The presentation of the poster at this conference will allow for the international climate community to gain a broader awareness of the integration of climate services into water resources management. It will allow interested researchers the opportunity to learn more about the application of GFCS projects in the health sector and facilitate opportunities for collaboration and discussion.