

Developing climate-resilient water, sanitation and hygiene (WaSH) in the Pacific

Project team

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Timeframe

2014 - ongoing

Project description

Climate change is a serious threat to Pacific Island Countries (PICs) and their freshwater resources. Sea level rise, saltwater intrusion, increasing evaporation rates and changing patterns of rainfall and extreme events (such as floods, cyclones and droughts) will all affect the water cycle and, potentially, the availability and quality of water for human use (Hadwen et al. 2015). These climatic changes pose significant adaptation challenges for sustainable development and human health in PICs, especially with respect to WaSH (water, sanitation and hygiene) infrastructure and practices.

In this project, hereafter referred to as the PACCWASH (Pacific Adaptation to Climate Change for Water, Sanitation and Hygiene) project, we sought to understand current WaSH settings in 13 rural communities across the Solomon Islands and the Marshall Islands and couple that knowledge with an understanding of the threats that climate change poses to infrastructure and services. To do this, we spent a lot of time in our focus communities, both to conduct household surveys and facilitate focus group discussion sessions to learn about how water, sanitation and hygiene influence, and are influenced by, climate hazards. We explored vulnerability of practices, both in light of climate threats as well as environmental pollution risks.

We used the information gathered from our communities to build models of the local water systems, incorporating risks from extreme events like floods and droughts and considering current and proposed interventions. These models can be used to support decision making through the evaluation of scenarios (either climate change scenarios or management scenarios).

Outcomes

The five key principles stemming from the PACCWASH project for developing climate-resilient WaSH in the Pacific are:

- **Adopt a systems approach:** Adopt an integrated systems approach to incorporate all dimensions of climate change and all of the connected aspects critical to developing sustainable water, sanitation and hygiene systems. A systems approach can enable decision makers to assess
 - a) climate change impacts,
 - b) current WaSH systems and their vulnerabilities,
 - c) climatic and non-climatic aspects concurrently,



d) intervention performance and unintended consequences (maladaptation) and e) the relative benefits of combined interventions, including software (e.g. maintenance) and hardware (e.g. rainwater tanks) approaches.

This integrated and deliberately systematic approach to climate resilient WaSH also inherently includes the need to involve stakeholders from across sectors and have them provide the best available data to inform decision making.

- **Use models and new tools to collect and analyse data:** To enable the implementation of risk management for the protection of water resources and provision of sustainable WaSH services, a framework and clear guidance on methods and tools for data collection, risk assessments, analyses and management is required. The use of models and digital technologies to support data collection, analysis and decision making opens up great opportunities in regions like the Pacific. New tools, including the Bayesian Belief Networks (BBN) and the Computer Assisted Personal Interview (CAPI) tablet-based survey developed and implemented in the PACCWASH project are excellent examples of computer-based tools that can simplify complex tasks and provide managers and policy makers with increased capacity to make decisions in a systematic way. Furthermore, a BBN model offers the capacity both to integrate diverse sources of data as well as to capture the connectivity within systems to ensure that decisions around particular climate change scenarios or intervention options can be made with reference to both the anticipated and unintended consequences on the system in question.
- **Learn from regional activities:** There is a lot of work underway in the Pacific region, both on WaSH development and, increasingly, on climate change threats and adaptation options, so there is a growing opportunity to learn from the successes and failures of projects and policies implemented throughout the region. Coupled with a systems-understanding through the use of a BBN model, regional sharing will enable policy makers to make strong decisions whilst keeping in mind the local social, cultural, economic and environmental context of rural and remote PIC communities.
- **Develop integrated governance structures:** To foster greater cooperation and coordination at the project and policy scales, opportunities exist for improved governance structures which will mainstream and drive climate change adaptation and disaster risk reduction activities across WaSH and other sectors. Specifically, Rural WaSH policies and plans like those in the Solomon Islands should clearly define functions and responsibilities for reducing and managing climate and disaster risks at the national government, provincial government and community levels. This should include coordination between WaSH stakeholders and disaster management groups, in order to strengthen links between disaster and development WaSH, and align with existing institutional structures for disaster risk reduction and management.
- **Build capacity and understanding:** Efforts to build capacity and understanding of the complexity of WaSH and climate change impacts are required throughout the Pacific region, as this will enhance adaptive capacity to climate variability and change. Targeted training to build capacity for risk management is necessary at all levels of government, down to the community. Joint capacity building exercises with climate change adaptation (CCA) and disaster risk management (DRM) actors could also improve cross-sectoral partnership and coordination.

The future for water, sanitation and hygiene in the Pacific

In order to change the pattern of stagnating and, in worst cases, declining water and sanitation coverage in PICs, interventions must be mindful of how WASH sits in an increasingly unpredictable water cycle. The feasibility of taking an Integrated Water Resource Management (IWRM) approach to tackle both WASH and climate change challenges is, therefore, worth considering for the Pacific region. Recent project experiences with IWRM have built a broad level of support for the philosophy (WHO & SOPAC 2009) and the more recent development of, and growing support for, the Ridge to Reef approach to land and water management (Overmars & Gottlieb 2009 IUCN 2013) shows much promise in terms of integrating the challenges (and solutions) of WASH and climate change adaptation in vulnerable communities. Through the adoption of a spatially (Ridge to Reef) and temporally (past, current, and future) integrated approach, based on IWRM principles, PIC communities will be able to develop sustainable practices with respect to WASH in the medium to long term that do not compromise other aspects of their lives or increase their vulnerability to climate change threats (Hadwen et al. 2015).

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Partners

- Research team members from: Griffith University (Australian Rivers Institute), Monash University, University of Alabama, University of North Carolina, International WaterCentre.
- In-country partners: University of the South Pacific, Marshall Islands Government, Solomon Islands Government.

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Research outputs

Final Report and fact sheets available at <http://www.watercentre.org/portfolio/wash-and-climate-change-adaptation-in-the-pacific>

Final Report:

Hadwen, W. L., MacDonald, M. C., Kearton, A., Elliott, M., Chan, T., and Shields, K. (2016) Developing climate-resilient WaSH in the Pacific. Final Report Pp80. Available at <http://www.watercentre.org/portfolio/wash-and-climate-change-adaptation-in-the-pacific>

Project Briefs:

Methods-focused briefs:

Climate Resilient WaSH in the Pacific – Using mobile survey tools to understand multiple water sources and uses - <http://www.watercentre.org/resources/attachments/climate-resilient-wash-in-the-pacific>

Climate Resilient WaSH in the Pacific - Developing Bayesian Belief Network models for water and sanitation - <http://www.watercentre.org/resources/attachments/climate-resilient-wash-in-the-pacific-2>

Policy Briefs:

Policy integration and risk-based management for WaSH and adaptation in the Republic of the Marshall Islands - <http://www.watercentre.org/resources/publications/attachments/policy-brief-1>

Climate Resilient WaSH in the Pacific - Strengthening the enabling environment for climate resilient WaSH in the Solomon Islands - <http://www.watercentre.org/resources/attachments/policy-brief-2>

Programming Briefs:

Climate Resilient WaSH in the Pacific - Improving rural water supply in the Solomon Islands via rainwater tanks - <http://www.watercentre.org/resources/attachments/policy-brief-1>

Climate Resilient WaSH in the Pacific - Multiple household water sources - a traditional strategy for addressing rainfall variability - <http://www.watercentre.org/resources/attachments/policy-brief-2>

Peer-reviewed journal articles:

Hadwen, W. L., Powell, P., MacDonald, M. C., Elliott, M., Chan, T., Gernjak, W. and Aalbersberg, W. G. L. (2015), Putting WASH in the water cycle: Climate change, water resources and the future of water, sanitation and hygiene challenges in Pacific Island Countries. *Journal of Water, Sanitation and Hygiene for Development* 5(2), 183-191.

Saunders, S. G., Barrington, D. J., Sridharan, S., Meo, S., Hadwen, W. L., Shields, K. F., Souter, R. and Bartram, J. (2016) Addressing water, sanitation and hygiene challenges in Pacific Island Countries: A participatory systems mapping approach to empower informal settlement community action. *Habitat International* 55: 159-166.

MacDonald, M.C., Elliott, M., Chan, T., Kearton, A., Shields, K., Bartram, J. and Hadwen, W. L. (2016) Computer assisted personal interview (CAPI) surveys to assess multiple household water sources and uses. *Water* 8(12): 574 doi:10.3390/w8120574

MacDonald, M. C., Chan, T., Elliott, M., Kearton, A., Shields, K. F., Barrington, D. J., Souter, R. T., Powell, B. R., Bartram, J. and Hadwen, W. L. (in press) Temporal and thematic trends in water, sanitation and hygiene (WaSH) research in Pacific Island Countries: A systematic review. *Journal of Water, Sanitation and Hygiene for Development*.

Elliott, M., MacDonald, M. C., Chan, T., Kearton, A., Shields, K. F., Bartram, J. K. and Hadwen, W. L. (in review) Multiple household water sources and their use in remote communities, with evidence from Pacific Island communities. *Water Resources Research*