

Climate Resilient WaSH in the Pacific

Multiple household water sources - a traditional strategy for addressing rainfall variability

PROGRAMMING BRIEF

Research statement

Global research and monitoring surveys on household water sources typically focus exclusively on the “primary source”. While there are recent examples of research on the prevalence and use of multiple water sources at the household level (Evans et al., 2013; Shaheed et al., 2014; Ozdemir et al., 2011), considerable knowledge gaps remain regarding household water management practices, how it varies by season, and how these practices contribute to adaptation and resilience. This study analysed the way multiple water sources are used at the household level as well as household water use and management practices in response to seasonal variability and extreme events in two Pacific Islands Countries (PICs): Republic of the Marshall Islands and the Solomon Islands.

Recommendations

1. Water and sanitation interventions to adapt to rainfall variability should be designed building on existing and widespread local adaptation strategies, which involve the use of multiple household water sources in PICs.
2. Rather than focusing solely on the “primary source” of water, data collection on household water sources should include water used for drinking and cooking, as well as non-consumptive purposes like handwashing, washing clothes, bathing, animals and gardening.
3. Data should be collected on water use in both the wet and dry seasons to obtain more representative annual data through either multiple visits to a community or by asking residents how water sources and uses change by season.
4. Implementers should consider increasing household-level rainwater storage to improve both household-level and community-level resilience, particularly in the Solomon Islands.

Background

Climate change is a serious threat to PICs and their freshwater resources. Sea level rise, saltwater intrusion, increasing evaporation rates and changing rainfall patterns will all the water cycle and, potentially, the availability of water for human use. This poses significant adaptation challenges for development and human health in PICs. The data collected in this study is unique in its focus on multiple water sources rather than a primary source, and in its approach to critically analysing household water management in relation to climate variability and extreme events.

Methods

Research described in this brief was conducted as part of the Pacific Adaptation to Climate Change for Water, Sanitation and Hygiene (PACCWASH) Project, investigating adaptation to climate change for WaSH in PICs. This research was funded by the Australian Government Department of Foreign Affairs and Trade, and managed by the International WaterCentre. The research partners were the Water Institute at the University of North Carolina, Griffith University, Monash University, University of Alabama, and the University of the South Pacific. Data reported here were gathered during 405 household interviews

Who is this brief intended for?

This brief describes findings and recommendations from a household survey conducted in the Solomon Islands and the Republic of the Marshall Islands. Recommendations are intended for local programming staff, but have broader relevance for regional and international monitoring and evaluation practitioners in the water, sanitation and hygiene (WaSH) sector.

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conducted in thirteen PICs communities. In the drought-prone atoll environment of the Marshall Islands, 299 household interviews were carried out across eight communities. In the flood-prone Solomon Islands, 106 household interviews were conducted across five communities. Further detail on methods for collecting data on multiple water sources is included in the briefing note *Using mobile survey tools to understand multiple water sources and uses*.

Finding 1: Nearly all households used multiple sources of water to meet their daily needs

Routine use of multiple household water sources to meet daily needs is widespread in PICs. Over 90% of households surveyed in the Marshall Islands and the Solomon Islands reported using more than one source of water to meet their daily needs. The average number of different sources used per home was 2.55. In the Solomon Islands, the number of water sources varied from 2 to 5 (mean 3.14), and in the Marshall Islands, the number of water sources varied from 1 to 4 (mean 2.32) (Figure 1). Households in the Marshall Islands that reported only one water source relied solely on private rainwater collection.

Typical water use patterns varied between the countries. In study communities in the Marshall Islands, the typical household relied on private rainwater for drinking and cooking, and had a private well that was used for non-consumptive purposes. Whereas in the Solomon Islands, household water sources and uses were much more diverse (Figure 2).

Finding 2: The primary water source is an inadequate indicator of household water sources

Although most research, surveys and datasets focus on the primary source of drinking water, the daily use of multiple sources is widely practiced and essential in many PIC communities. Determining the “primary source” of drinking water for a household is therefore inadequate for measuring resilience to climate variability. For more information on an efficient and inexpensive method for collecting data on multiple water sources and uses, see the briefing note *Using mobile survey tools to understand multiple water sources and uses*.

The use of different water sources for drinking varied greatly within study communities in the Marshall Islands and the Solomon Islands, and was also highly variable between the countries. In the Marshall Islands, private rainwater use accounted for the vast majority of drinking water use throughout the year. This reflects the choice of many Marshall Islands households to limit rainwater use during the dry season to consumptive uses only (Figure 3). In contrast, diverse sources are used for drinking water in the Solomon Islands, with only public standpipes used by a majority for drinking at any time of year (Figure 3).

Comparing Figures 2 and 3 reveals a stark difference in drinking water sources versus water sources used for any purpose. This underscores the inadequacy of focusing on the primary source of drinking water in settings where such diverse sources and uses exist.

Figure 1: Number of regular household water sources used

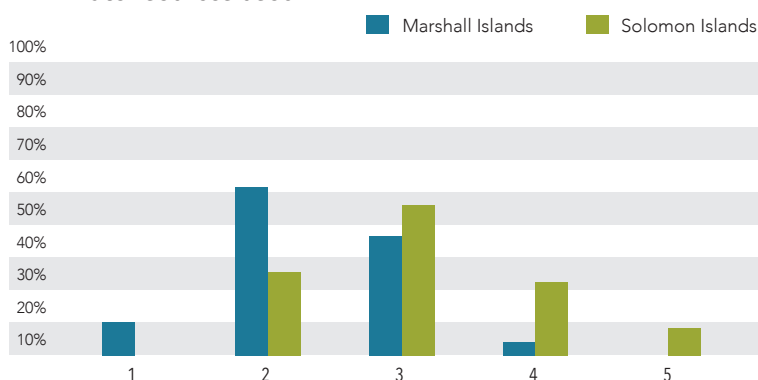
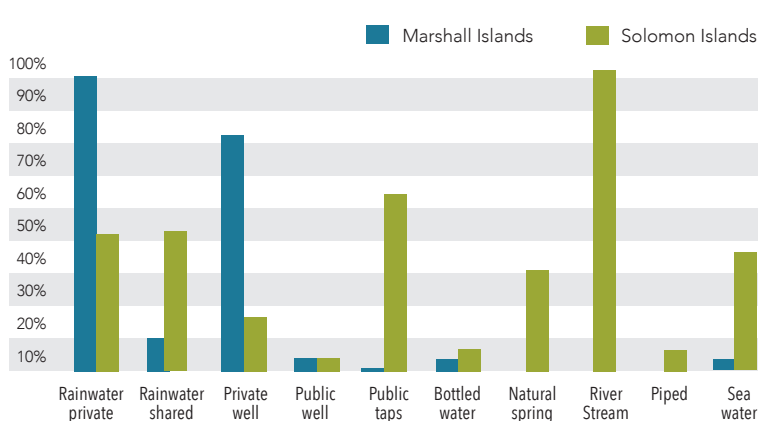


Figure 2: % of households that use each of these sources in either season



Finding 3: Seasonal variability of household water sources differed across study communities.

Household water sources and uses varied little across seasons in Marshall Islands study communities (Figure 4), whereas in the Solomon Islands, sources and uses varied widely by season (Figure 5). These differences are likely to have evolved based on historical water availability and rainfall patterns experienced by the study communities. The dry season is generally longer and drier in the Solomon Islands than in the Marshall Islands (Figure 4). In the Solomon Islands, drinking and cooking using water from rivers, springs, public taps and private wells all increased substantially during the dry season, whereas consumption of rainwater (the preferred source in the wet season) decreased substantially (Figure 5). Climate change may jeopardize the adequacy of historical household water practices, however, the use of multiple water sources can improve the ability and opportunities, to adapt to climate variability.

Finding 4: Increasing private rainwater storage volume can enhance resilience

In a typical Marshall Islands home, large (800-3000L) private rainwater tanks were used primarily for consumptive (drinking and cooking) purposes with private wells most commonly used for non-consumptive needs throughout the year. Marshall Islands households reported the ability to ration stored private rainwater for consumptive uses throughout the dry season. This is consistent with findings from other settings like southern Vietnam where the dry season lasts many months (Ozdemir et al., 2011). In both the Marshall Islands and the Solomon Islands, many of the households surveyed report that they wash their hands at a source away from home (e.g. river) during the dry season. This practice almost certainly leads to a substantial reduction in the frequency of handwashing at critical times.

In contrast to study communities in the Marshall Islands, the use of private rainwater declined by almost 90% in the dry season in the Solomon Islands. Private rainwater collection was typically informal, using small pots and pans; while rivers, public taps, shared rainwater tanks, and private wells were widely accessed for a variety of consumptive and non-consumptive uses. Increasing private rainwater storage volume in the Solomon Islands could increase resilience to climate change by providing households with the option to ration stored rainwater for drinking and cooking throughout some or all of the dry season. It would also provide a potential source of handwashing water at the home.

Figure 3: % of households drinking each of these in either season

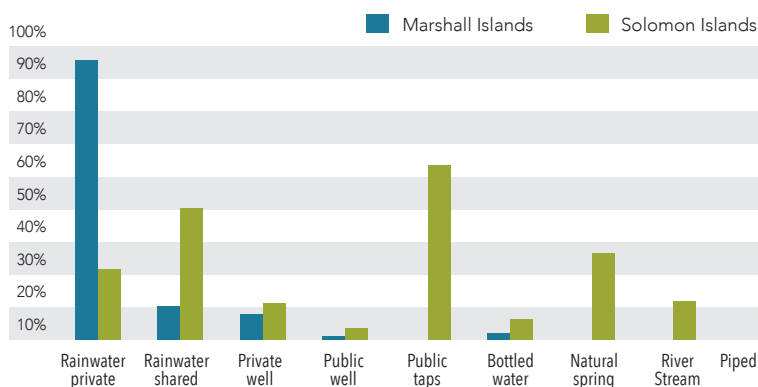


Figure 4: % of households drinking each of these in Marshall Islands during these in wet vs. dry season

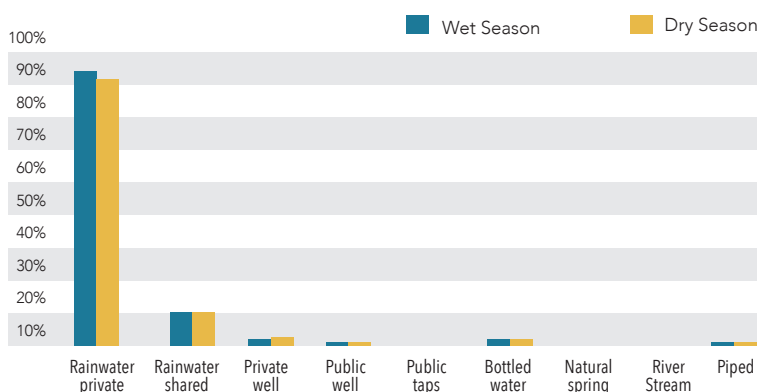
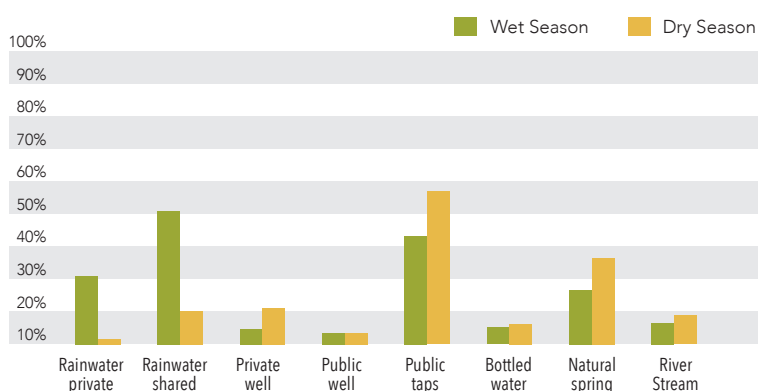


Figure 5: % of households drinking each of these in Solomon Islands during these in wet vs. dry season



References

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- Ozdemir, et al. (2011) Rainwater harvesting practices and attitudes in the Mekong Delta of Vietnam. JWASH Dev. 1:171.
- Shaheed, et al. (2014) Why “improved” water sources are not always safe. Bull WHO. 92:283.

Want to know more?

This brief describes findings from the Pacific Adaptation to Climate Change for Water, Sanitation and Hygiene (PACCWASH) Project. For more information, please contact Principal Investigator, Dr Wade Hadwen, at w.hadwen@griffith.edu.au, or visit www.watercentre.org/portfolio/wash-and-climate-change-adaptation-in-the-pacific

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