Pacific WASH
WEBINARS

EVENT SNAPSHOT

EVENT DETAILS

Groundwater Assessments to Support Planning and Resilience

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Speakers

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Event recording and resources available here.

Image 1 SWA Drilling Rig (Samoa Water Authority)

Groundwater is a critical water source used across the Asia-Pacific. This webinar focused on how Pacific water utilities are exploring groundwater sources to meet growing water demand of urban populations.

Webinar Overview

Understanding groundwater resources is central to building resilience in water supply systems. As demand for water in Pacific urban centers rises and sources become increasingly stressed by climate change, being able to assess the potential of groundwater becomes even more important. The ADB Pacific WASH Technical Assistance (REG TA-6551), in association with the Pacific Water and Wastewater Association (PWWA), hosted an online discussion in May to present basic concepts, tools and data used to undertake a groundwater assessment and its application in water security planning. The webinar highlighted how Samoa Water Authority and Water PNG Ltd. are utilizing systematic geospatial data collection and analysis in their groundwater assessments to inform water resources planning and development. The event was attended by 49 participants, including 18 from 8 Pacific countries.

The webinar explored several key topics:

- Basic concepts on hydrogeology, watershed mapping and geospatial data and techniques used in conducting groundwater assessment
- How analyzed data can be used for water planning and development
- Pacific utility experiences with developing groundwater assessments

Groundwater in the Pacific

In many Pacific Island Countries water supply is challenged by either too little water – a climate-induced decline in precipitation, drought, change in rainfall patterns and changes in temperature, or too much water – tropical cyclones, floods and associated landslides. Groundwater resources are impacted by both. Where there is too little water, there is a direct impact on groundwater recharge and decline in well or spring water production. Where there is too much water, damage to water supply networks and the flooding and inundation of wells and well fields also impacts water security and the availability of groundwater. In both instances the potential of groundwater contamination and saltwater intrusion pose further risks to freshwater supply.

Having data available on the potential of groundwater resources supports the practice of evidence-based water planning. Undertaking a groundwater assessment allows utilities to gather the information needed, utilize the data collected to undertake a water balance and confirmatory field investigations, and apply the findings to planning and strategies to identify where and when to invest resources to future-proof water supply.

Case Study: Samoa

The Samoa Water Authority sources 75% of its water from surface water resources and the remaining 25% from boreholes and springs. Recent prolonged drought has seen surface water reservoirs recede, while some existing boreholes drilled near coastal areas are over extracted to meet increased demand, resulting in salt water intrusion. To gather the data needed for informed-water supply planning and future-proofing supply, Samoa Water Authority undertook a GIS-aided groundwater assessment and water balance analysis with support from the Asian Development Bank.

The assessment was validated through field work to verify the data collected and increase confidence in the results and recommendations of the report. The assessment identified and delineated 33 watersheds in Upolu and 35 watersheds in Savai'i. Areas within these watersheds with favorable groundwater potential were further delineated, displaying a combination of 3-8% slope, young volcanic and rocks and moderate degree of stream dissection. The assessment also established that the salt-water intruded wells are located at the coastal sections of the small watersheds of both islands. Through the assessment, Samoa Water Authority developed an action plan for exploration, well drilling, groundwater monitoring and well field management (Figure 1).

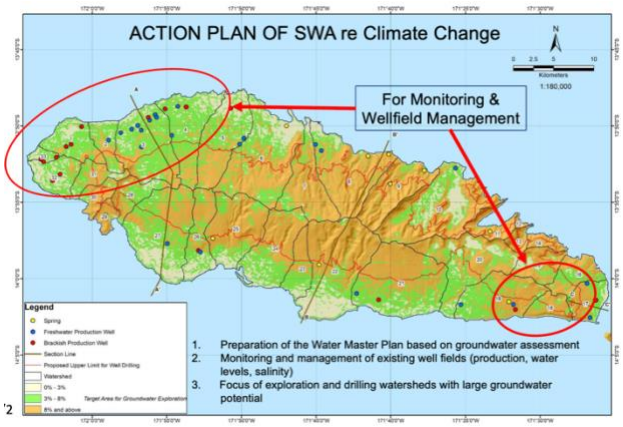

Figure 1 Action Plan for SWA (Samoa Water Authority)

Starting your groundwater assessment

While nothing surpasses a full field investigation, it is possible to begin a groundwater assessment using existing data on topography, climate and geology in any region you seek to assess. To begin you need some basic data on the location and production of wells and springs of the study area, geology, climate, topography, drainage and slope. By overlaying maps with this information, you can identify some key features of your watersheds and catchments and locate areas for future groundwater exploration works. Once you have completed a preliminary desktop assessment, data should always be verified with field work to validate findings.

Case Study: Papua New Guinea

Port Moresby relies mainly on surface water to supply its domestic and commercial water requirements. Groundwater is tapped by wells but the yields are low and used only by a limited number of residences and establishments. Both surface and groundwater resources are vulnerable to climate change. The Asian Development Bank commissioned a study with Water PNG Ltd. to assist in the water supply planning for Port Moresby. A desktop, GIS-aided spatial analysis, using thematic maps on well location, topography, drainage, catchment/watershed, geology and slope was performed in combination with water balance analysis. The assessment generated the following results: (1) identification of potential groundwater sources at the floodplain located immediately north of Port Moresby, (2) identification and delineation of fracture-controlled and alluvial groundwater systems, which can be used for planning groundwater exploration, (3) provided an explanation for the low yields of the wells drilled within Port Moresby. The said condition is attributed to the location of the capital city within a small catchment, low rainfall due to the landlocked condition of Port Moresby and the underlying low-permeability rock formations.

Learning Snapshots

- *The basic unit for any water resource assessment, planning and management is the watershed. Accurate delineation and assessment of its features such as area, stream network, slope, terrain, geology and the existing or proposed water points such as springs and wells are needed for effective and comprehensive planning, management and mitigation against climate change impacts.*
- *Using basic maps on geology and topography and available rainfall and temperature data, preliminary assessment can be performed by water utilities prior to the conduct of extensive groundwater exploration. The assessment will lead to the identification of potential water sources and can be used as basis for monitoring current sources.*

Upcoming Events

5 July 2023 – The Role of Utilities in Supporting Rural WASH. Register here.

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Past ADB Pacific WASH webinars can be accessed here: Pacific WASH Webinars

ADB continues to support government and water service providers in the region to build resilience, capacity and knowledge to manage threats in our changing world.