RECHARGE

Resilience in a Changing Climate: Advancing Research on Groundwater for Equity

Rural Vanuatu

Groundwater Country Profile

February 2025

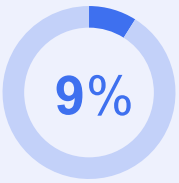
77% of Vanuatu's population resides in rural areas.

21% of rural households use groundwater via wells or piped schemes as their primary drinking water source.

7% of rural households have access to safely managed drinking water services.

Rural water service coverage

In rural Vanuatu, rainwater tanks are the primary drinking water source, followed by piped water. Piped water sources include both groundwater and surface water.



of rural households use **groundwater** for washing.

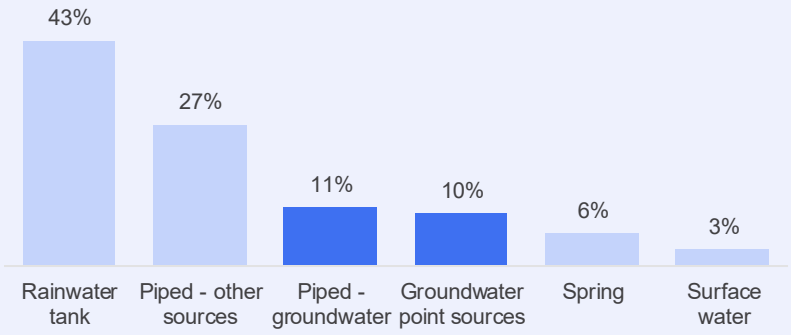


Fig. 1 – Percentage of rural household coverage for primary drinking water sources (Vanuatu MICS, 2023).

Water sources by provinces

There are geographical differences in the distribution of water sources across provinces, particularly for groundwater point and piped sources, and rainwater.

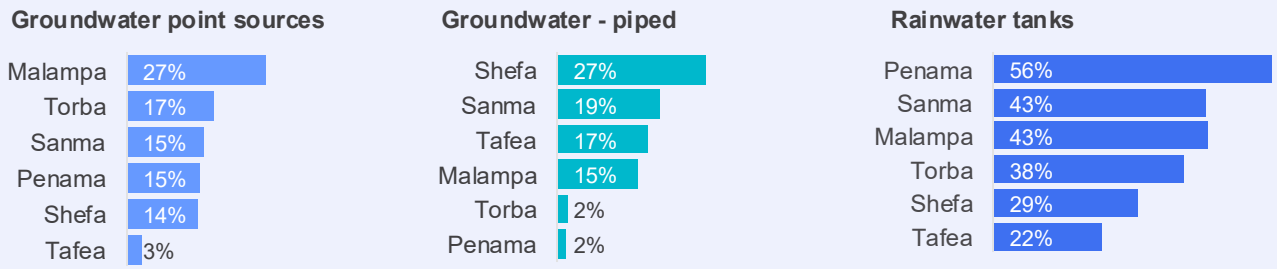


Fig. 2 – Distribution of water sources by provinces (Vanuatu MICS, 2023).

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Water sources by wealth quintiles

Access to drinking water in rural Vanuatu varies significantly by wealth. Wealthier households tend to use piped water, while poorer households rely more on springs and surface water, which are generally less protected sources. Rainwater tanks and **groundwater point sources are more commonly used by households in the middle wealth quintiles.** These patterns highlight disparities in access to improved water services, with poorer communities more dependent on potentially less safe sources.

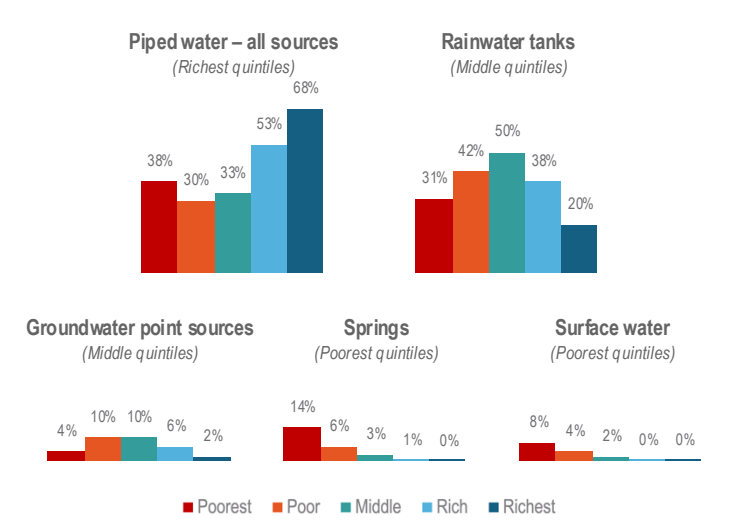

Fig. 3 – Percentage coverage of drinking water sources in rural areas by wealth quintiles (Vanuatu MICS, 2023).

Groundwater source locations

Groundwater sources are distributed across all six provinces of Vanuatu, with piped groundwater sources predominantly concentrated in Sanma, Malampa, and Shefa Provinces, and wells and boreholes sparsely distributed across all provinces.

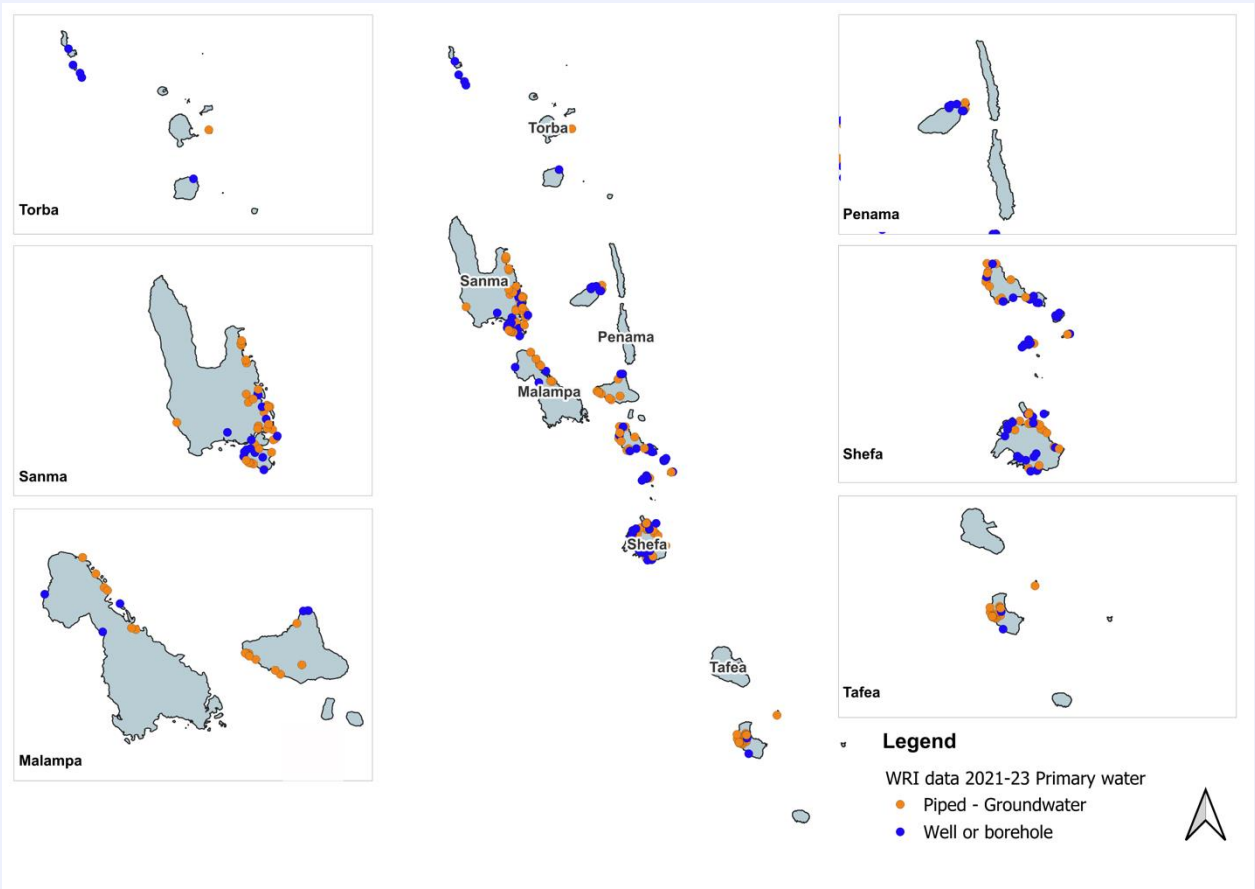

Fig. 4 – Primary drinking water sources: 2021-2023 (Vanuatu Water Resources Inventory, 2023).

Water availability when needed

Groundwater is the most reliable water source in rural areas.

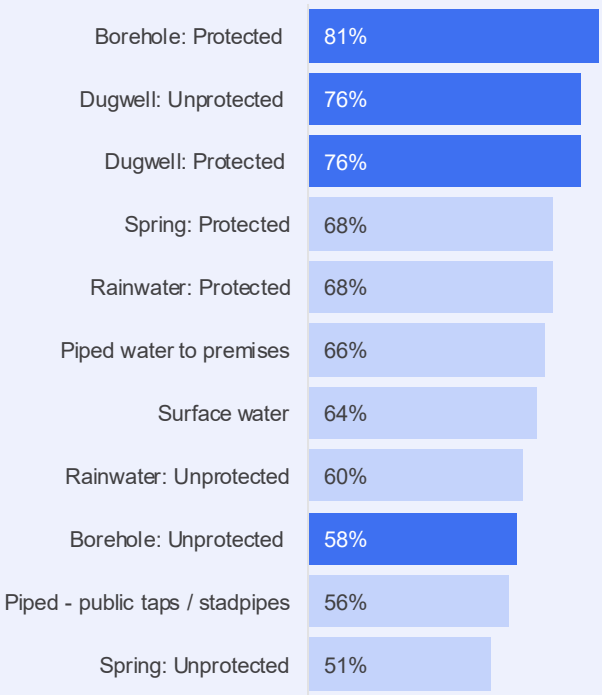

Fig. 5 – Percentage of rural households with water always available in the last month, by water source (Vanuatu MICS, 2023).

Water quality

Water quality is a concern across all water sources, with **over three-quarters** of sampled piped, groundwater and rainwater sources found to be heavily contaminated with *E. coli* according to the 2023 multiple indicator cluster survey (MICS) – a national survey undertaken by the Government of Vanuatu and UNICEF.

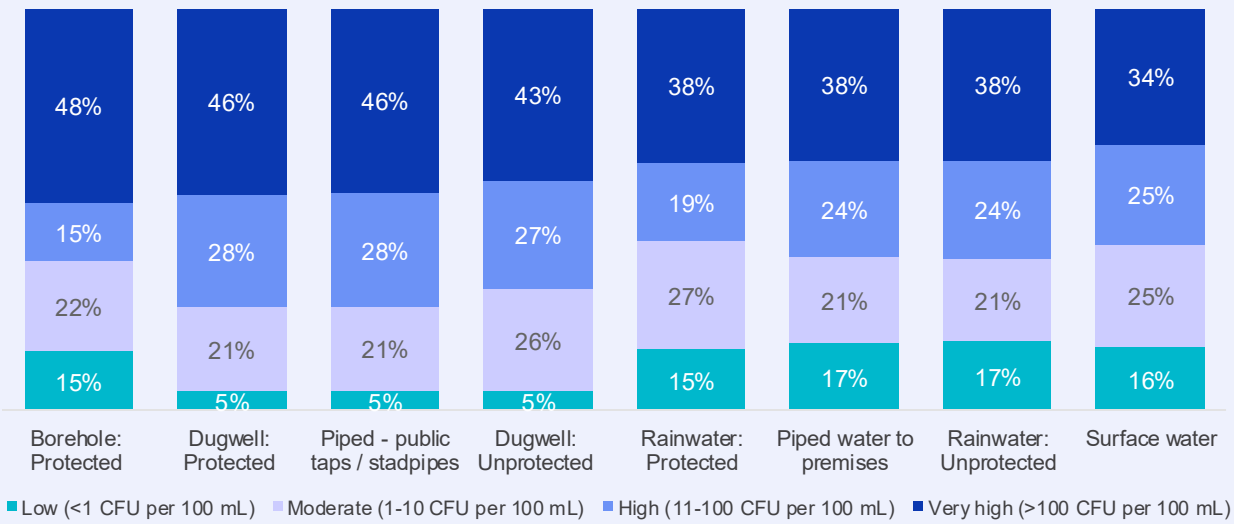

Fig. 6 – *E. coli* concentration in rural water sources, colony-forming units (CFU) per 100 mL (Vanuatu MICS, 2023).

Key availability indicators

- **Piped groundwater sources perform relatively well**, offering more reliable year-round and 24-hour supply and fewer disruption from climate events, but are prone to technical breakdowns
- **Rainwater sources** often do not provide a year-round supply of water and are prone to water shortages during dry spells but have fewer technical breakdowns.
- **Piped surface water** or **spring sources** are the most prone to disruptions from disasters and extreme weather and are most inconsistent in providing a 24-hour supply.

Table 1 – Proportion of water supplies meeting availability indicators. (Vanuatu Water Resources Inventory, 2021-23)

	24-hour supply	Year-round supply	No disruption due to drought or water shortage	No disruption to natural disaster or extreme weather event	No disruption due to technical breakdown
Piped – Groundwater	81%	71%	59%	69%	83%
Piped – Surface or spring	68%	61%	61%	44%	83%
Point sources – Groundwater	86%	60%	38%	63%	93%
Rainwater tanks	77%	34%	26%	62%	97%

Vanuatu hydrogeological island types

The geology of Vanuatu consists of diverse island types with a mix of **volcanic, complex, and composite** formations. Due to this diversity in geological conditions, potential sources of groundwater are highly variable, and its access and management are complex.

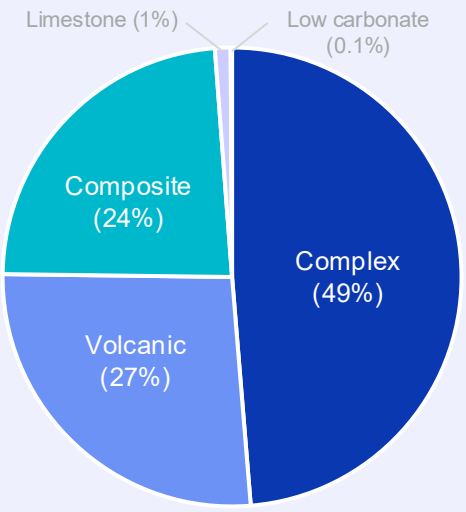

Fig. 7 – Percentage of area by island types in Vanuatu (Dixon-Jain, 2014).

Groundwater vulnerability to climate change

Changes in rainfall

- Groundwater can be a reliable source that can provide substantial water supplies, even during periods of **severe drought** (FAO, 2016).
- Overall, future **changes in rainfall** have been estimated to have a **low to moderate impact on groundwater** sources in Vanuatu, although groundwater on smaller islands is at higher risk.

Sea level rise

- Overall, **sea level rise** has been estimated to have a **low to moderate** impact on groundwater.
- However, similar to the effects of rainfall changes, smaller islands experience a moderate to high impact, making them more susceptible to rising sea levels.

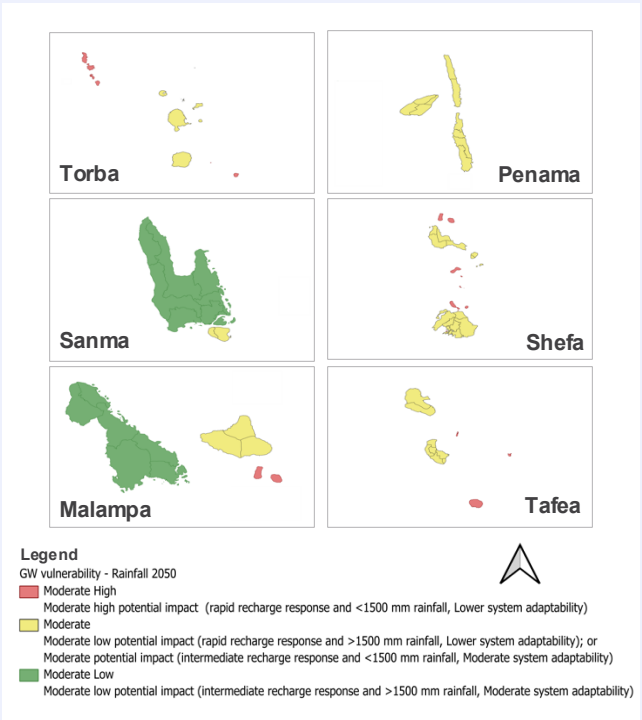

Fig. 8 – Potential vulnerability of groundwater with future changes in rainfall in Vanuatu: 2050 (adapted from Dixon-Jain et al, 2014).

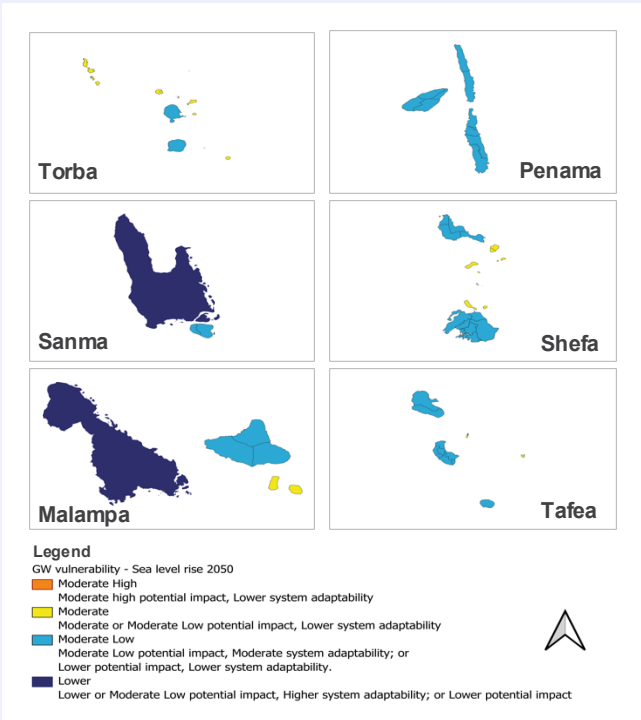

Fig. 9 – Potential vulnerability of groundwater with sea level rise in Vanuatu: 2050 (adapted from Dixon-Jain et al, 2014).

Water sources by safely managed criteria

- **Protected Groundwater:** May be on premises and can be piped to premises depending on location, somewhat available when needed (70% availability), but often contaminated.
- **Protected Rainwater:** Often available on premises, somewhat available when needed (60% availability), but can be problematic during dry spells and often contaminated.
- **Protected Springs:** Often not directly on premises but can be piped there, somewhat available when needed (60% availability), and often contaminated.

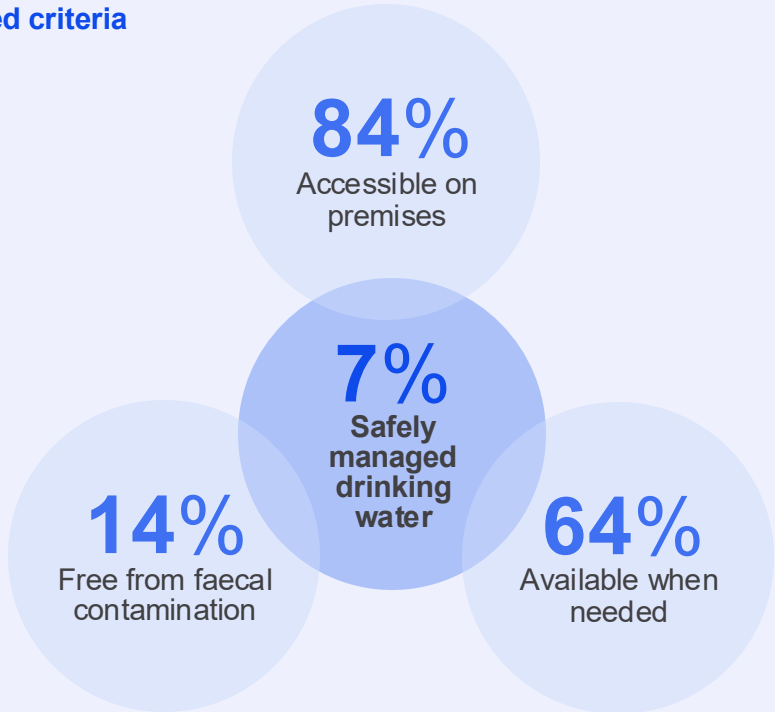

Fig. 10 – Percentage of rural households with safely managed drinking water services criteria (Vanuatu MICS, 2023).

Groundwater and rural water service management and policy

Groundwater supplies (like most rural water supplies) are **managed by communities** through volunteer committees or by private households.

Vanuatu National Water Policy Priorities (2017-2030)

1. High levels of water safety and security
2. Market-based water service delivery
3. Water services compliance
4. Formalise water providers
5. Securing land rights of water assets
6. Strengthening Provincial Council by-laws
7. Secure water future through strengthening coordination

Rural Vanuatu Groundwater Profile

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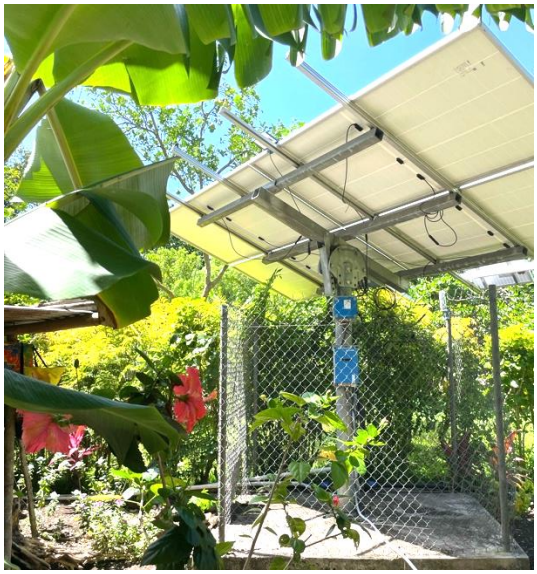
Groundwater in rural Vanuatu

Challenges

- Groundwater services and products (e.g., drilling, pumps) are **not widely available** on all islands.
- Groundwater potential for safe water supply is **poorly understood**.
- Aquifers in low-lying islands are especially **vulnerable** to **climate change impacts.**
- Groundwater development and use is **not widely monitored.**

Opportunities

- Groundwater development warrants greater attention due to its relative **resilience to climate change.**
- **Solar-pumping systems** present an opportunity to leverage **climate finance.**
- Strengthening **monitoring systems** and **regulation of drillers** will support sustainable management.



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