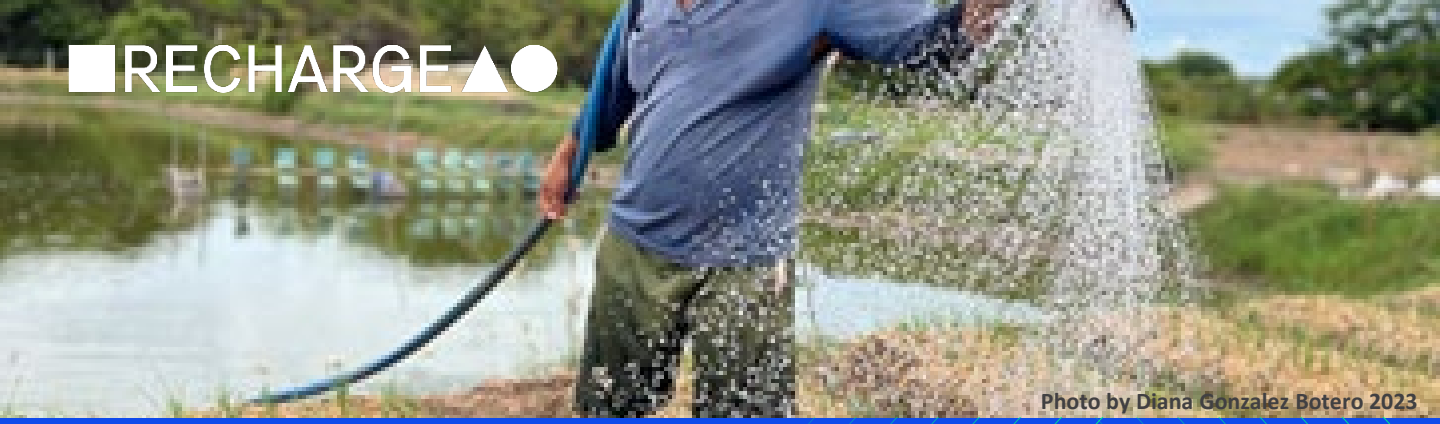


Photo by Diana Gonzalez Botero 2023

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

Vietnamese Mekong Delta (VMD)

Groundwater Profile

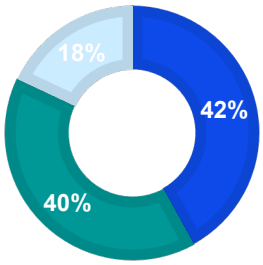
February 2025

76% - 83% of households surveyed by the RECHARGE team relied on groundwater for drinking and domestic purposes (in wet and dry seasons respectively).

50% Of VMD households are dependent on groundwater for their livelihoods

Drinking water use

In rural Vietnam, bottled water is the primary drinking water source, followed by rainwater.



Use by sector

Groundwater use is predominantly for domestic purposes followed by agriculture

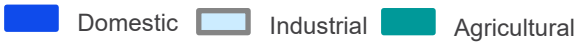


Fig. 1 – % Volume of VMD water use by sector (Ha et. al. 2015).

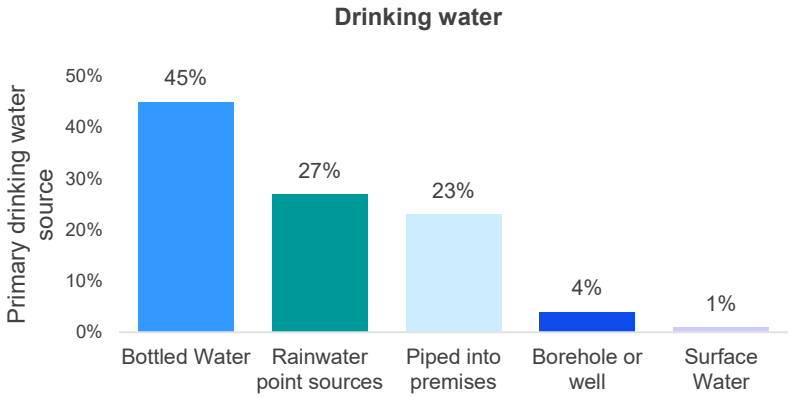


Fig. 2 – Primary drinking water in the VMD sources (Viet Nam MICS, 2021).

Drinking water use by ethnicity

Khmer communities are more reliant on private supplies such as rainwater, wells and boreholes

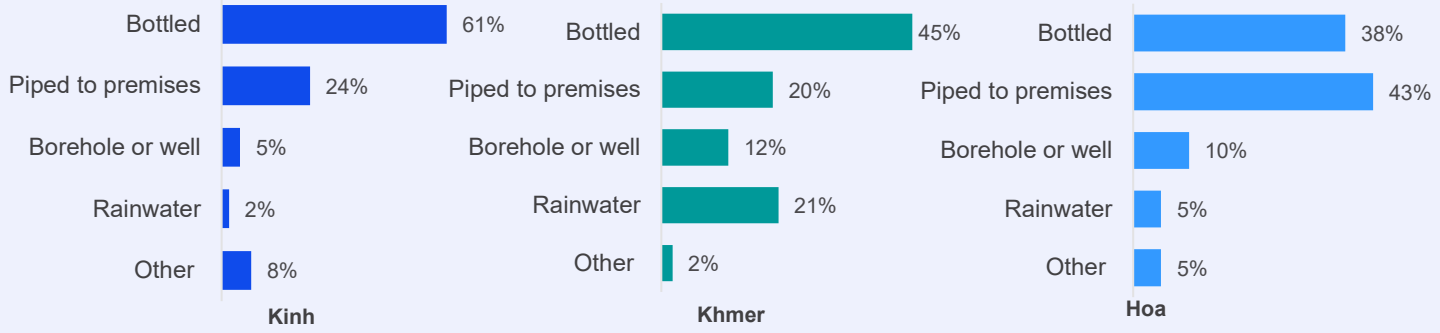


Fig. 3 – Primary dry season drinking water source by ethnicity (UTS-ISF, 2024).

* *Bottled water and piped water can be sourced from groundwater.*

UTS Institute for Sustainable Futures

Water For Women

Australian Aid

Vietnamese Mekong Delta groundwater profile

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Drinking water use by wealth quintile

Higher-income households have a higher rate of access to piped supplies and lower income households rely more on rainwater and private groundwater

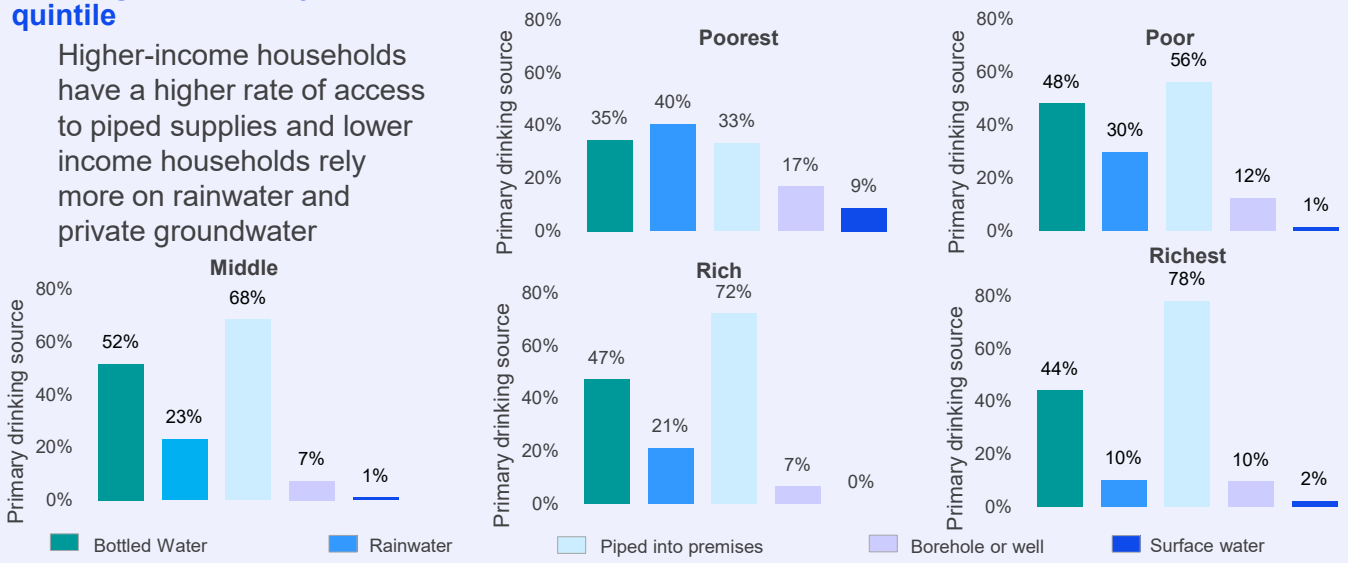


Fig. 3 – Use of drinking water sources in VMD by wealth quintiles (Viet Nam MICS, 2021).

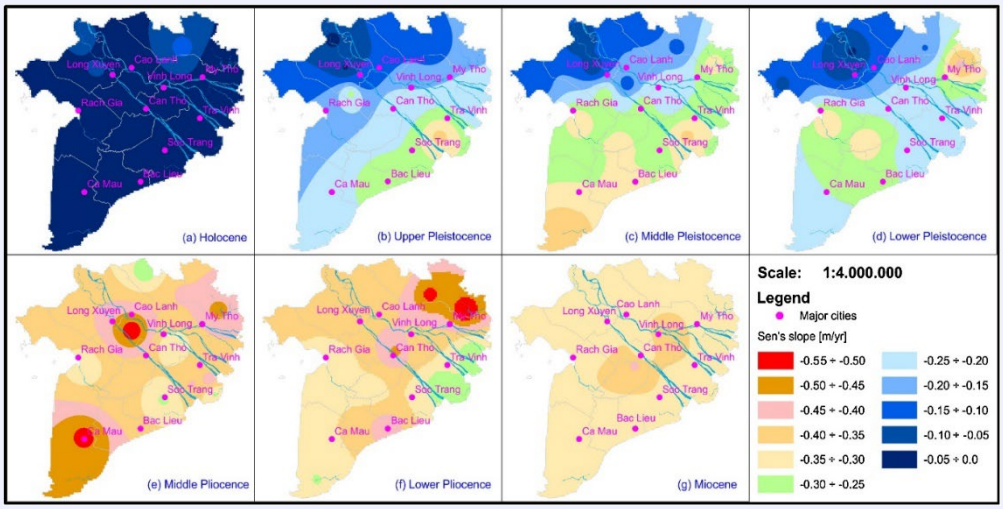


Fig. 4 – Spatially interpolated recent (1996–2017) trends of GWLs of the seven different aquifers in the VMD (Duy et. al. 2021).

Groundwater level changes

- Potable water aquifers in the VMD are decreasing at a rate of 85cm per year (An Tran et. al. 2022).
- Groundwater extraction exceeds groundwater recharge in these aquifers by 35% (Van et al., 2023).

Groundwater salinity changes

- Declining water levels in potable aquifers are leading to increased saline intrusion from shallow aquifers.
- Saline intrusion is exacerbated by climate change induced sea level rise.
- High chloride levels are predicted in the main potable aquifer to a depth of 150m by 2030, exceeding the Viet Nam technical Viet Nam technical regulation on drinking water quality of 0.25g/L (An Tran et. al. 2022).

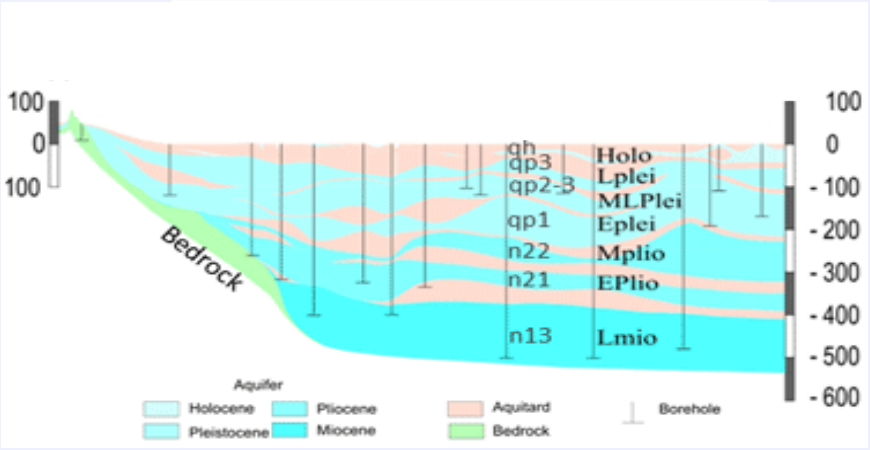


Fig. 5 – Cross-section of the seven groundwater aquifers in the VMD (Gunnik et. al. 2021).

Vietnamese Mekong Delta groundwater profile

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Water reliability

Bottled water and rainwater are considered by households to be the most reliable drinking water sources with significantly lower perceived reliability for piped groundwater and private groundwater sources

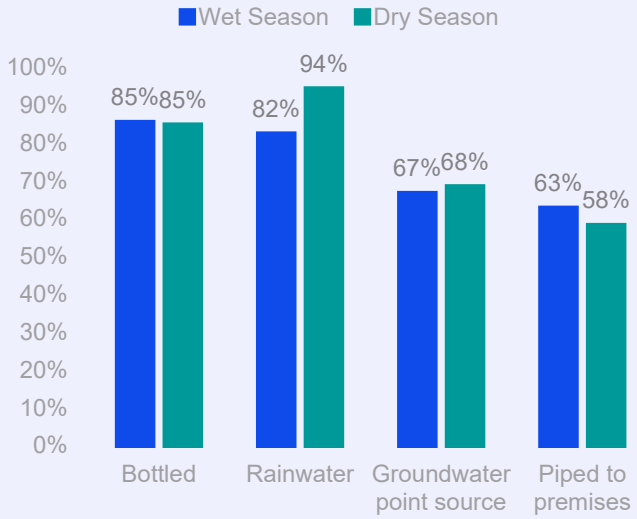


Fig. 6 – Percentage of households reporting water as always available by source (UTS-ISF, 2024).

Water quality

Water quality is a concern across various sources. More than 40% of piped supplies, 60% of rainwater and all surface water supplies tested positive for *E. coli*. Boreholes and protected wells had the lowest contamination rate at 13%

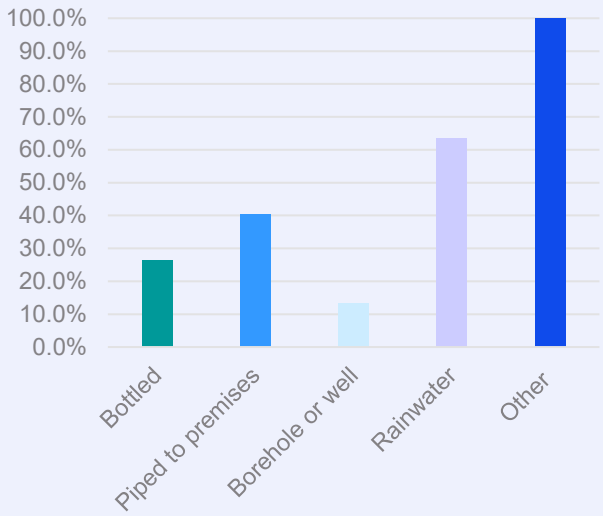
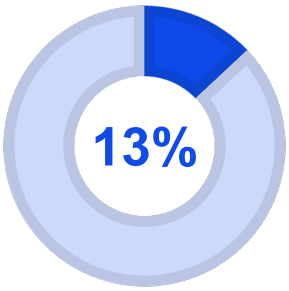


Fig. 7 – Proportion of sampled drinking water sources testing positive for *E. coli* colony forming units (Viet Nam MICS, 2021).



Borehole registration

Only 13% of private boreholes are registered with government authorities limiting monitoring and planning of extraction

Fig. 8 – Percentage of private boreholes users reporting registering the borehole with local authorities (UTS-ISF, 2024)

Challenges

- Groundwater levels are decreasing across the VMD as demand exceeds recharge rates
- Salinity is increasing across VMD groundwater aquifers further reducing the availability of acceptable drinking water
- *E.coli* contamination is significant, and household treatment is required to ensure safety
- Lower wealth households and Khmer households have significantly lower levels of access to on-premises piped water supplies
- Low levels of borehole registration are limiting monitoring of extraction levels

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