What is the value-add of measuring household water insecurity experiences for understanding child diarrhea?

Evidence from the Mozambique DHS 2022–23

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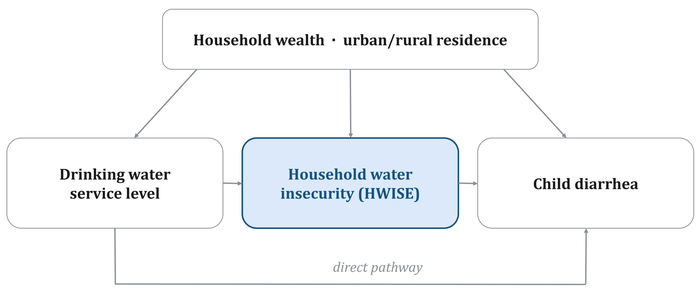
Background

Drinking water service ladders characterize the type and functionality of the water supplies households use. Newer experiential measures, such as the Household Water Insecurity Experiences (HWISE) Scale, capture whether water is reliably accessible and adequate for diverse household uses. Because survey space is limited, it is important to establish what such measures add. We therefore asked:

(Q1) How does water insecurity vary across the drinking water service ladder?
(Q2) Are water insecurity and drinking water service level each associated with child diarrhea after accounting for the other?

Data and methods

- Mozambique Demographic and Health Survey (DHS) 2022–23; nationally representative, cluster-sampled, survey-weighted throughout.
- Drinking water service level: modified 5-rung WHO/UNICEF Joint Monitoring Programme (JMP) ladder. Because DHS tested water quality in only a subsample, our top rung, "on premises & available," is an improved source on premises and available when needed.
- HWISE: 12 items scored 0–3, summed to 0–36; recall period past 4 weeks.
- Child diarrhea: past 2 weeks. Logistic regression adjusted for urban/rural, wealth quintile, child age and sex.
- Correlation: survey-weighted OLS of HWISE score on service level.



Conceptual model. Service level may affect child diarrhea directly and through water insecurity; wealth and residence may affect all three.

Q1 · How does water insecurity vary across the drinking water service ladder?

Water insecurity was more common lower on the ladder: moderate-to-high water insecurity ranged from 6% (on premises & available) to 42% (surface water). However, service level explained only 9% of the variation in HWISE scores, suggesting the two measures capture distinct aspects of household water access.

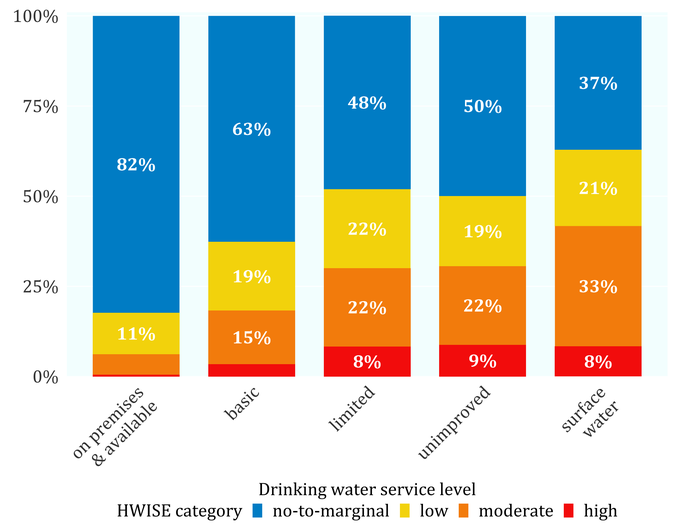


Fig 1. Household water insecurity (HWISE category) by rung of the drinking water service ladder; n = 14,230 households, survey-weighted. HWISE score categories: no-to-marginal (0–2), low (3–11), moderate (12–23), and high (24–36).

Notes and limitations

- Within the subsample with water quality testing (n = 1,121 children), using the full JMP "safely managed" definition produced nearly the same result as using the "on premises & available" definition.
- Diarrhea recall is the past 2 weeks; HWISE recall is the past 4 weeks.
- Cross-sectional; associations are not causal.
- The two lowest service levels are 87–93% rural, so estimates there rest largely on rural households.

Q2 · Are water insecurity and drinking water service level each associated with child diarrhea after accounting for the other?

Children in households with moderate-to-high water insecurity had more diarrhea, regardless of service level. Diarrhea did not decline steadily up the service ladder.

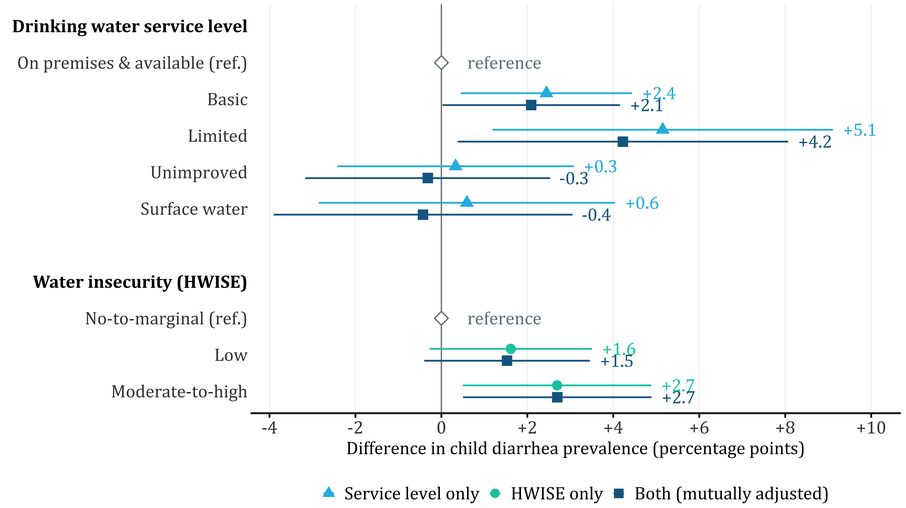


Fig 2. Adjusted differences in the prevalence of child diarrhea (percentage points, 95% CI) relative to the reference categories (no-to-marginal water insecurity; on premises & available), among 8,765 children under 5. Models: service level only, HWISE only, and both together; all adjusted for urban/rural residence, wealth quintile, and child age and sex. HWISE categories collapsed to no-to-marginal (0–2), low (3–11) and moderate-to-high (12–36).

+2.7 percentage points higher prevalence of child diarrhea with moderate-to-high vs. no-to-marginal water insecurity (10.5% vs. 7.8%), essentially unchanged (2.7 points) after accounting for drinking water service level

Conclusion

Water insecurity experiences and service levels are **complementary**, not redundant. Experiential measures capture aspects of household water access that service levels miss, including aspects associated with child diarrhea, so they merit space in national surveys.

Data: INE & ICF. Mozambique Demographic and Health Survey 2022–23. Maputo and Rockville: INE and ICF, 2024.

Secondary analysis of de-identified public-use DHS data; exempt from IRB review. · jrmcirwin@uchicago.edu