

Willingness-to-pay for clean water in rural Tanzania

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Evidence from the Simiyu Climate Resilience Project

Water for Simiyu

Simiyu, one of Tanzania's poorest regions, increasingly faces severe water shortages, especially during the rainy season. The lack of clean water threatens agricultural livelihoods and poses significant health risks to the population. In Simiyu, water availability and quality shapes peoples' daily lives: during the dry season, women and children spend an average of three hours a day collecting water, resulting in school absences and limited employment opportunities. The water they fetch is often unsafe, resulting in health risks from waterborne diseases.

The *Simiyu Climate Resilience Project* (SCRP) aims to provide clean and reliable water for nearly half a million people in remote areas and three towns. In rural areas, the project, which is jointly funded by the Government of Tanzania, the German Federal Ministry for Economic Cooperation and Development through KfW, and the Green Climate Fund, will deliver treated water from Lake Victoria by pipeline to water kiosks near settlements. Residents living within a reasonable distance to these access points will be able to obtain clean water for a small fee.



Photo: Jonas Wresch / KfW

A willingness-to-pay experiment

However, experience shows that poor households often face difficulties transitioning from collecting free, low-quality water to paying for safer, higher-quality water. Also, to provide benefits in the long-run, the project will need continuous funding for maintenance in the future. Understanding how much people are willing and able to pay for water is thus critical from a public policy perspective.

That is why, as part of a broader research agenda around the impact of project, we (KfW's *Development Impact Lab*; DIL) conducted a so-called willingness-to-pay experiment as part of a pilot study in 2024. (A separate policy brief summarises other findings from the pilot that was conducted in 2024.)

Overall, 1 809 individuals across 90 villages in the Simiyu region, participated in our willingness-to-pay experiment. Willingness-to-pay was measured by presenting respondents a hypothetical scenario:

*"I want you to imagine that a clean drinking water system would be constructed in your village [...]. Imagine the water of this new system would be **safe to drink**. It would be **cleaned**, and its **quality checked** regularly. The water would be **available reliably at any time** during the day, even in the dry season. You would have to go collect it yourself from a public tap. The next water tap would be used by a maximum of 250 households, but you would not spend more than [DISTANCE – 5 minutes or 20 minutes] minutes to get there."*

Participants then answered a series of yes/no questions, where the price was continuously increased ("Would you be willing to pay...?"), to determine their maximum willingness-to-pay for a 20-liter bucket of clean, safe water. We randomly changed starting prices, varied distances to the (hypothetical) water kiosk, asked about willingness-to-pay during the dry and rainy season, and formulated different informational nudges highlighting benefits such as time savings and better health.

Results- What did we learn?



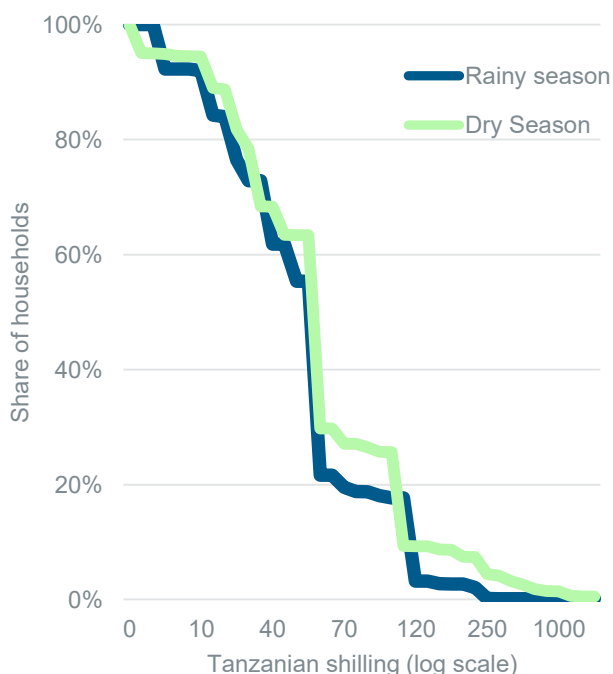
Households are willing to allocate a significant portion of their budget to safe water.

Most households in Simiyu are poor; their ability to pay for water is limited. Nevertheless, over 92% of respondents are generally willing to pay for clean water (Figure 1). This finding is remarkable given that only a small proportion of households currently pays for water. The median willingness-to-pay for a 20l-bucket is 50 Tanzanian shillings (TZS) (approximately EUR 0.02). We also estimate that, on average, households are willing to allocate about 12% of their total consumption expenditure to clean water.

 **Demand for water is price elastic.** Figure 1 shows demand curves for safe water by season, indicating the share of the population that would purchase a 20l-bucket by asking price. For instance, at a price of TZS 30 per bucket (about EUR 0.01), nearly eight in ten households would purchase it during the dry season. If the price doubles, however, only three in ten households would still be willing to pay for clean water. Clearly, if the asking price is too high, households will revert to their current sources of water – even if they are often unsafe.

 **Willingness-to-pay is higher in the dry season when water is scarce.** On average, households reported they were willing to pay 84 TZS per 20l-bucket during the dry season, about 70% more than during the rainy season.

Figure 1: Willingness-to-pay for a 20l-bucket by season



Note: This figure shows the demand curves of the surveyed households for clean water in the rainy and the dry season.

 **Household income and education matter for demand.** We used multivariate regression analysis to understand what drives willingness-to-pay. We find that, on average, men are willing to pay more than women.¹ Despite being responsible for collecting, using, and managing it, only 30% of women are responsible for financial decisions regarding water. As expected, households with lower income have a lower willingness-to-pay. Also, better-educated individuals tend to exhibit a higher willingness-to-pay while age and marital status did not have a significant effect.

 **Households understand the risks associated with unsafe water.** The experiment varied the information provided to respondents to assess whether their willingness-to-pay would change. This could serve as an indicator for the potential effectiveness of outreach efforts in the villages. One randomly selected group received brief messages about the health benefits of clean water (see example below), others about time savings, and a third group received no additional information.

However, these brief messages had no statistically significant effect on willingness-to-pay. Very likely, most respondents were already aware of the health risks associated with contaminated drinking water: when asked about the causes of diarrhoea, almost all respondents identified unclear water as a major risk factor.

“Access to clean and safe water is crucial for maintaining good health and well-being. Safe drinking water reduces the risk of waterborne diseases like cholera, diarrhea, and typhoid fever, which can be life threatening, especially for children and the elderly. The use of clean drinking water can prevent diseases and even deaths.”

 **Moderate variation in the walking distance between homestead and water source does not affect willingness-to-pay.** In rural Simiyu, households often face substantial time costs in fetching water every day. During the rainy season, when water is more plentiful, they spend an average of 49 to 78 minutes per day collecting water, depending on whether they have a water source at home. In the dry season, this average increases to more than three hours. It is thus not surprising that willingness-to-pay does not vary with minor changes in the walking distance to the (hypothetical) water source. As long as walking distance remains below 20 minutes, willingness-to-pay remains unchanged. This gives implementers some flexibility when it comes to the placement of water kiosks.

 **Aggregate demand for clean water is substantial – especially during the dry season.** We used the data to estimate the expected water consumption and willingness-to-pay for clean water at the village level. A back-of-the-envelope calculation suggests that the 90 villages are collectively willing to spend about TZS 17.6 million (around EUR 6 348) per day on clean water during the rainy season, corresponding to a total consumption of 7 491m³. In the dry season, potential demand increases to 12 856m³ and collective willingness-to-pay rises to TZS 49.5 million per day. Seasonal variations of this magnitude have significant implications for the provider's intra-year revenue flow as well as the need for maintenance.

Policy implications

In brief, we find that households clearly understand the risks associated with unsafe water and thus value safe drinking water. Despite their poverty, they are willing to allocate a significant portion of their budgets to clean water – especially during the dry season. The low sensitivity of willingness-to-pay to differences in walking distance affords planners some flexibility regarding the placement of kiosks. Finally, there is strong seasonal variation in demand – with implications for expected future revenues.

More generally, the willingness-to-pay experiment illustrates how pilot studies and baseline data collection can already provide valuable insights for project implementers. In this case, insights from the pilot study and the willingness-to-pay experiment can help implementers anticipate the demand response to different price schedules, thus informing the design of schedules that balance affordable access with sustainable funding.

¹ Men may be more likely to overstate their willingness-to-pay as they experience more social pressure to provide for their families. Another explanation is that men

generally handle larger amounts of cash, making it easier for them to imagine paying higher amounts.