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2609

Familiar Taste, Safer Choices: Sensory Heuristics and the Adoption of Clean Water

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July 2026

CENTRO DE ESTUDIOS
MONETARIOS Y FINANCIEROS
Casado del Alisal 5, 28014 Madrid, Spain
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CEMFI Working Paper No. 2609
July 2026

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Abstract

We provide experimental evidence from rural Egypt on the benefits of incorporating sensory familiarity into the design of health interventions in developing countries. Using a “taste-preserving” filtration technology that mimics the local water profile, we find adoption rates of 91 percent, far exceeding the 50 percent ceiling previously documented for chlorinated water. Willingness to pay is 61 percent higher for filtered water than chlorinated water. Mechanism tests show that familiar taste strongly shapes perceptions of water’s healthiness, suggesting that alignment with imprinted sensory preferences improves uptake of health technologies.

JEL Codes: D10, I10, C93, Q53, Z10

Keywords: Chlorination, water-borne diseases, field experiments, Egypt.

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Acknowledgement

We gratefully acknowledge financial support from The Abdul Latif Jameel Poverty Action Lab (J-PAL), The Hub of Advanced Policy Innovation for the Environment (HAPIE), the Sawiris Foundation for Social Development, the Bravo Center for Economic Research at Brown University, and Programa de Apoyo a la Investigación-Udesa. We acknowledge the invaluable help from Life from Water and J-PAL Middle East and North Africa, particularly Mohannad Hesham, Hesham Sadek, Amira Ali, Ahmed ElSayed, Amena Ihab, Heba El-Sahn, and Mona Amer. For comments, we thank Lorenzo Aldeco Leo, Guillermo Caruana, Andrew Foster, Emily Oster, Lorena Pompilio, Stelios Michalopoulos, Adam Osman, Pedro Mira, and Tommy Murphy. The research protocol was approved by IRB-Brown University (2023003560) and by IRB-American University in Cairo (2022-2023-181). It is registered in the AEA RCT registry as AEARCTR-0009944 (Buccione and Rossi, 2024). All errors are our own.

A quarter of the global population consumes contaminated water. This leads to more than a million fatalities each year from waterborne diseases - half of them among children (UNICEF, 2023). Point-of-use chlorination, the conventional strategy to promote safe water consumption in regions lacking reliable centralized water treatment infrastructure, generally works in reducing waterborne illnesses in field trials (Ahuja et al., 2010; Dupas et al., 2023).[1] However, expanding access alone is insufficient: safe drinking water depends on both access and adoption, and adoption rates remain disappointingly low. Even when chlorine is provided for free, adoption rates fail to surpass 50 percent (Dupas et al., 2016; Haushofer et al., 2021; Dupas et al., 2023). This puzzling pattern mirrors broader evidence that take-up of health products, even when offered for free, is often low (see Dupas and Miguel, 2017 for a review; Milkman et al., 2011; Duflo et al., 2019).

Traditional approaches such as subsidies and information campaigns have yielded limited success in increasing adoption of safe, chlorinated water (Jalan and Somanathan, 2008; Luoto et al., 2012), especially among low-income households that exhibit a consistently low willingness to pay (Ahuja et al., 2010; Null et al., 2012; Berry et al., 2020). Even alternative approaches based on nudges appealing to negative emotions or social pressure have likewise failed to consistently shift behavior (Null et al., 2012).

We hypothesize that prior interventions have overlooked the role of sensory familiarity in shaping the adoption of health products. While related work has examined how cultural factors—often defined as deeply rooted institutional norms and social practices- shape development policy success (Ashraf et al., 2020; Bau et al., 2024), we focus instead on more immediate, experience-driven heuristics, such as how a product tastes or smells. We posit that sensorial familiarity serves as a a rule of thumb that economizes on cognitive costs and is formed through experience (Giuliano and Nunn, 2021).[2] Such familiarity is typically acquired early in life, when repeated exposure to specific sensory cues — such as the local taste of water, forms a stable reference point for what is perceived as "normal" or "safe." A large body of research in developmental psychology and behavioral biology shows that early-life exposure shapes enduring taste preferences, a process sometimes described as sensory imprinting (Ventura and Worobey, 2013; Birch, 1999; Beauchamp and Mennella, 2009). Consequently, individuals tend to favor water that resembles what they consumed in childhood, even if the underlying environmental conditions have since changed. We argue that repeated exposure to a specific taste creates a stable sensory norm that people

[1] For a review of low-cost point-of-use water treatment systems in developing areas, see Pooi and Ng (2018).

[2] Our use of "heuristics" is conceptually closer to Giuliano and Nunn (2021), who model habit-based cultural transmission under changing environments, than to Tversky and Kahneman (1974), whose focus is on cognitive biases and mental short cuts in one-shot judgments under risk.

rely on to judge the acceptability and safety of drinking water—a mechanism also hinted at in anthropological and sociological studies (De Guzman et al., 2015; Jaravani et al., 2016; de França Doria et al., 2009). In this sense, taste familiarity functions as a sensory heuristic in health decision-making.

While these taste-based preferences can be adaptive—for instance, in the historical adoption of antimicrobial spices (Nunn, 2021)—they can also slow down the uptake of new, superior products when those conflict with established sensory expectations.[3] In the case of chlorinated water, we hypothesize that aversion stems not from misinformation or fear, but from divergence from a familiar, trusted taste. This is particularly problematic in developing countries given that environmental degradation has made much of the "local" water unsafe (FAO, 2022).

In this paper, we study the role of taste-based heuristics in the take-up of safe water, by presenting evidence from a series of randomized controlled trials (RCTs) in rural villages in Egypt's Asyut Governorate. This region faces rising salinity and water contamination due to seawater intrusion and soil degradation (African Development Bank, 2015), resulting in high rates of kidney disease and waterborne illness. As salinization is recent, people's sense of what tastes "safe" or "pleasant" reflects the lower salinity of their childhood water, not the degraded sources available today. In this setting, we introduce a "taste-preserving" water treatment technology that filters local water and reintroduces local healthy minerals and salts—producing safe drinking water that closely resembles the taste of what households are accustomed to. This stands in contrast to chlorination, which alters the familiar taste of water (Dupas et al., 2023) and may disrupt the expected flavor of traditional beverages like tea, which are integral to daily consumption routines and social life. Moreover, in addition to eliminating bacteria, filtering has the added benefit of reducing excess salinity, which may have positive effects on kidney health and broader policy implications.

We find that individuals strongly prefer filtered water to chlorinated water.[4] In a blind taste test, where individuals tasted two water samples without knowing their type and reported their preferences, 80 percent of individuals preferred filtered water to chlorinated water ($p = 0.01$). This finding is consistent with previous research in the field. For example, Dupas et al. (2023) found that 46 percent of individuals in their sample disliked the taste of chlorinated water.

Preference for filtered water translates into remarkably higher adoption rates and greater

[3]For instance, Atkin (2016) shows how migrants consume fewer calories to stick with their food preferences from their place of origin, which are shaped by favorable environmental conditions there.

[4]From now on, we refer to our "taste-preserving" filtered water simply as *filtered water*. It is useful to keep in mind, however, that our filtration system reintroduces healthy minerals from the local water composition in acceptable concentrations as explained in the Context section.

willingness to pay compared to chlorinated water. In a second experiment, participants were randomly presented with either a 20-liter bucket of filtered water (treatment) or chlorinated water (control), without informing them of the type of water presented. After tasting the water, we employed the Becker et al. (1964) mechanism to determine their willingness to pay for the bucket. We find that willingness to pay is 61 percent higher for filtered water compared to chlorinated water (p=0.01). At zero prices, we document adoption rates of 91 percent for filtered water - 42 percentage points higher than for chlorinated water (p=0.01), far exceeding the 50 percent ceiling identified by previous studies (Dupas et al., 2016; Haushofer et al., 2021; Dupas et al., 2023).

To address the central question of whether this preference is driven by taste itself or by perceptions of healthiness, we conducted a third experiment in which participants were randomly assigned to taste and rate the taste and perceived healthiness of two equally safe water samples: filtered (treatment) and chlorinated (control).[5] Importantly, participants were not informed of the type of water they received; they were only told beforehand—via a short message—that the water met World Health Organization safety standards (WHO, 2011). Despite receiving the same health information, participants who tasted the filtered water rated it as both tastier and healthier, suggesting that taste itself influences perceived healthiness.

What aspect of taste is most relevant? Is this a general preference for a neutral taste — free of chlorine or salt — or a deeper attachment to the familiar taste of local water? To disentangle this, we replicated the experiment above by comparing our filtered water (treatment) with Evian (control), a widely recognized bottled water that, like our filtered water, is non-chlorinated, mild, and safe. As in the previous experiment, participants were not told the origin of the water; they only received the same brief information confirming that it met WHO safety standards. The crucial difference is that Evian lacks any local component, such as the natural local minerals that our filtration system reintroduces. This design allows us to hold constant health and mildness while varying only the *familiarity* of taste. Participants in Asyut still preferred filtered local water over Evian, suggesting that the preference is not merely about favoring mild water (e.g. devoid of chlorine), but about an affinity for a familiar taste.

However, it is still possible that filtered water is simply more palatable than Evian water, not only for people in Asyut due to familiarity but also for individuals from other regions. To rule this out, we replicated the experiment in Cairo, where participants are accustomed to

[5] Our filtered water is typically healthier than local chlorinated water—due to the removal of excess salt. To isolate the effect of taste, water engineers adjusted the chlorinated water by removing excess salt, ensuring both samples met the same health standards. In other words, filtered and chlorinated water were equivalent in health but distinct in taste.

a different local water profile.[6] As expected, preferences reversed: Cairo participants found Evian water to be both tastier and healthier than filtered water from Asyut, supporting our hypothesis that taste preferences are shaped by localized sensory norms.

Finally, we explore whether taste, specifically the familiarity of taste, functions as a rule of thumb to assess water quality, even when some information is available. Across all experiments, participants consistently perceived tastier water as healthier, despite being informed that all samples met WHO safety standards. Pooling across experiments, we find that respondents are 70 percentage points more likely to report water as healthy if they find it tasty as well. Since actual health and health information were held constant, these results suggest that taste familiarity serves as a sensory heuristic influencing health perceptions in contexts where information may be limited, or difficult to interpret —for example, for individuals with low literacy or limited trust in formal sources.

Our findings provide new insights on the potential of incorporating taste-based preferences and sensory expectations into the design of health interventions in developing countries. In the case of safe water adoption, we show that preferences for the taste of traditional water—rather than aversion to chlorine per se — drive the adoption gap. Rather than trying to change these preferences, we propose adapting technology to accommodate them.

This paper contributes to a growing literature that emphasizes understanding the local context, broadly construed, as essential to effective development policy (Nunn, 2019; Bau, 2021; Lowes, 2022). Prior work has focused on deep rooted cultural norms, such as marriage payments affecting girls schooling in Zambia (Ashraf et al., 2020), or colonial-era mistrust reducing vaccination take-up in Africa (Lowes and Montero, 2021). Other studies underscore how the impact of health information hinges on social norms—whether shaped by shared identity with the messenger (Alsan et al., 2019) or by efforts to counteract misinformation (Bau et al., 2024). We explore a distinct mechanism—taste-based sensory heuristics—through which longstanding exposure to specific sensory experiences, like taste, shapes perceptions of quality and product adoption. The behaviors we study operate through intuitive, automatic judgments that individuals rely on under uncertainty. This distinction matters for policy design: while mistrust or misaligned norms may require trust-building or information campaigns, sensory-based preferences can often be accommodated directly through product design and adaptation.

Second, we contribute to the literature on the persistence of food preferences, initiated by Staehle (1934) and extended by Logan and Rhode (2010) and Bronnenberg et al. (2012), who document that migrants carry their food preferences with them.[7] Relevant to our

[6] It is worth noticing that people in Cairo also consume more bottled water than rural people.

[7] Bronnenberg et al. (2012) study not only food preferences, but also several nonfood products, showing

study, Atkin (2016) shows that food cultures can generate negative health consequences, specifically lower caloric intake among inter-state migrants in India. While these studies take preferences as given, we extend this debate by showing that strong food —in our case, water— preferences can emerge when sensory familiarity serves as a heuristic for safety in environments with high contamination risk. In our blind taste test, preferences for local water persist when the water is used to prepare tea, suggesting that the familiar taste of commonly consumed beverages guides safe consumption choices.

We also contribute to the literature on demand-side health interventions in low-income countries. Much research emphasizes subsidies, which can promote the use of vaccines, bed nets, and HIV testing (Banerjee et al., 2010; Cohen et al., 2015; Thornton, 2008). Yet even fully subsidized products often see limited uptake (Dupas and Miguel, 2017). While information campaigns show mixed results (Jalan and Somanathan, 2008; Luoto et al., 2012), we find that integrating sensory-based preferences into product design can drive adoption rates well beyond established ceilings—by over 42 percentage points compared to ceiling identified in previous literature for chlorinated water (Dupas et al., 2016; Dupas et al., 2023). Additionally, while past studies show a somewhat low willingness to pay for safe water (Null et al., 2012), we observe a notably high willingness to pay in our setting. An exception is Burlig et al. (2026), who show that decentralized treatment producing filtered water, when coupled with home delivery to rural households, can achieve take-up rates exceeding 90 percent, closely mirroring our adoption levels. While the authors rigorously quantify willingness to pay and cost-effectiveness in a large-scale RCT, we focus on why this model succeeds. We provide evidence that taste familiarity underpins willingness to pay and adoption. Moreover, we show that willingness to pay is significantly higher for filtered water than for chlorinated water, even when both are delivered home and ready to drink, suggesting that sensory preferences rather than convenience or delivery mode explain the high adoption.

Finally, we contribute to the literature on technology adoption. Resistance to adopting new technologies is often attributed to inertia or informational gaps (Foster and Rosenzweig, 2010; Mokyr et al., 2015). Our results show that cultural inertia rooted in sensory-based preferences can be a powerful barrier—one that requires rethinking not only how we deliver health innovations, but how we design them in the first place.

The paper continues as follows. Section 1 provides a contextual overview of our fieldwork, detailing the pre-experiment strategy. Section 2 describes the sample selection and implementation details. Section 3 presents the experimental designs, econometric methods, and main results. Section 4 investigates potential mechanisms. Finally, Section 5 concludes.

how migrants' preferences have consequences for brands' market shares.

1 Context

Egypt faces a severe shortage of safe drinking water. The primary source of water pollution stems from anthropogenic activities, including agricultural and industrial waste discharged directly into the Nile River, Egypt's main freshwater source. In addition, climate change also affects the quality of available drinking sources, further exacerbating water deterioration (Kipsang et al., 2024). As a consequence, every year between 3,500 and 4,000 Egyptian children die from diarrhea, the second leading cause of death among under-five-year-olds, and around 100,000 adults suffer from kidney failure (WHO, 2020; Egyptian Organization For Human Rights, 2009).

Most of these challenges disproportionately affect rural communities, which account for 56% of the Egyptian population (CAPMAS, 2023; WHO, 2020). Groundwater, historically a reliable source, is increasingly contaminated; in particular, shallow aquifers tapped by wells and boreholes are now exposed to rising salinity and contamination due to seawater intrusion and soil degradation (FAO, 2022). As a result, authorities have implemented stricter regulations on well and borehole use.[8] Still, unequal water distribution leaves around 18% of the rural population on unreliable sources such as wells or handpumps, heightening the risk of waterborne diseases like diarrhea, typhoid fever, and cholera (Egyptian Organization For Human Rights, 2009; UNICEF, 2023).

Despite a substantial expansion in water infrastructure coverage over recent decades, piped water in rural areas still presents high levels of contamination, due to recontamination within the distribution pipes.[9] Salinity can increase along distribution networks due to intrusion of brackish water from shallow aquifers, while corrosion of pipes may release metals such as iron and copper (World Bank, 2017).

1.1 Study Population

Our study targets villages in rural Upper Egypt, the southern portion of Egypt, where 60 percent of poor Egyptians live (CAPMAS, 2023). Together with The Sawiris Foundation for Social Development and the local NGO Life from Water, we developed a project on safe water access for communities exposed to increasing contamination of original water sources and deteriorating health conditions in the governorate of Asyut.[10] Life from Water operates

[8]For instance, the Law No. 147 of 2021 imposes fines ranging from EGP 50,000 to 500,000 and imprisonment for up to one month for unauthorized wells. The law aims to prevent over-extraction from the groundwater, and protect water quality.

[9]In general, piped water in low-income settings is often just as contaminated as untreated surface water (World Bank, 2017).

[10]The Sawiris Foundation is a major Egyptian donor of sustainable development projects, supporting local NGOs in co-designing and financing the implementation of their projects. Life from Water is a local NGO

water treatment units (WTUs) across 30 villages in Upper Egypt, providing safe drinking water through a filtration process described in detail below. Unlike piped systems, this water is not delivered directly to households. Instead, residents either walk to the treatment stations to collect water or pay for a bundled service that includes water delivery via local tuk-tuks, locally known as "water taxis." See Appendix B, Figure B1 for an illustration of the WTUs.

Life from Water operates in medium to large villages of around 10 thousand individuals with poor water quality and high incidence of water-borne diseases, especially chronic stomach and kidney illnesses. In our sample, we targeted villages where water had been scientifically tested by the NGO's team of engineers and found to be contaminated while also having an operating WTU. Table A1 reports baseline characteristics of participants in our experiments. The sample is relatively homogeneous in terms of socioeconomic background. Households are typically large, averaging around 6 members, with approximately 3 children under the age of 10. Notably, roughly 68% have never received any form of formal education (among them, 85% are unable to read or write). In terms of water sources, 70% have government pipes installed, while the remainder rely on wells and public taps. A significant proportion of respondents indicated that a member of their household had experienced a health problem within the last 4 weeks. Specifically, 52% of households reported symptoms of diarrhea, 42% percent reported incidents of vomiting, and 63% percent reported cases of fever. Although it is not possible to establish a causal link, these symptoms are often indicative of waterborne illnesses. Given the economic constraints of these households, only about 17% have filter systems installed in their homes, which are costly to maintain (Alia, 2019).

1.2 Pre-Experimental Findings: Taste and Safe Water Adoption

As part of the pre-experiment strategy, we visited 10 villages in three field trips in Upper Egypt to understand the major barriers to the adoption of safe water.[11] The first visit was in September-October 2021. In this first field visit, through small focus groups (N=10) and site visits, it emerged that individuals were not adopting available chlorinated-water solutions, but were favorable to use and, when available, pay for filtered water from water-treatment units. This latter finding informed our second visit in June 2022, aimed at further investigating the local factors driving demand for safe filtered water.

During the second field visit, we conducted focus groups in 6 villages with men (N=48),

and our implementing partner in Upper Egypt. It operates in rural areas of Upper Egypt, providing needy families with sustainable solutions to water problems.

[11] These villages were distinct from those in our study sample, with the exception of one.

women (N=88), and local leaders (N=15), as well as short surveys (N=11). Interestingly, both surveys and focus groups revealed that the taste of filtered water may influence individuals' perceptions of its health and cultural suitability, leading to higher adoption and willingness to pay than for chlorinated water. Respondents commonly mentioned using a "tea test" to determine water quality, relying on the taste of tea as a proxy. In rural Egypt, tea is an everyday beverage, used to accompany food, as a drink to share in social gatherings, and as an alternative drinking source to water during the day. Consequently, participants were more inclined to use filtered water when their tea tasted better, ranking the "tea test" as the most effective strategy to convince them to adopt safe water, surpassing traditional methods such as information campaigns or messages from local authorities. This finding is in line with other qualitative evidence in Upper Egypt, reporting that differences in taste among different samples of water were most noticeable when drinking tea (Alia, 2019).

Indeed, choices about drinking water consumption are governed by a complex set of factors related to sensory perceptions. Research across anthropology, medicine, and sociology suggests that people tend to prefer what is familiar to them, often using aesthetic properties as benchmarks for judging water quality, such as taste, colour and odour. These studies, based on surveys or qualitative evidence, reveal that consumer satisfaction with the aesthetic qualities of water, particularly flavor and perception of chemicals present in the water, like chlorine, significantly influence self-reported satisfaction (de França Doria, 2010; Owen et al., 1999; Strang, 2001; de França Doria et al., 2009).

In poorer places, these sensorial proxies may have major adverse health implications. Studies in rural Australia and the Philippines have shown that prolonged exposure to hazards manifested in color, taste, smell, and hardness can desensitize individuals, affecting their risk assessment (Jaravani et al., 2016; De Guzman et al., 2015). Interestingly, De Guzman et al. (2015) found that 77% of villagers who had access to chlorinated water in the Philippines preferred drinking from untreated wells contributing to a cholera outbreak, despite increased cases and deaths. Similarly, research in South Africa revealed that public perceptions of drinking water safety were primarily influenced by water aesthetics rather than demographic or socioeconomic factors, despite a significant cholera outbreak (Wright et al., 2012).

While suggestive evidence exists indicating that taste and preferences influence the adoption of safe water, our study is the first, to the best of our knowledge, to establish this relationship causally.

1.3 The Technology of Water Treatment Units

A key step then in improving water policy in rural communities is to ensure that locals' preferences about water are more clearly incorporated in safe-water solutions. Our NGO provides a safe water solution designed to preserve the familiar taste of local water by using a multi-stage filtration process. The process begins with sedimentation, which removes large particles like sand. Then, water passes through fiberglass vessels containing filtration media to remove impurities. Chlorine is added to remove bacteria. Next, dosing pumps eliminate the added chlorine, as well as other odors and organic compounds that affect taste. A process of reverse osmosis filter out dissolved salts, heavy metals, and microorganisms. Finally, essential salts and minerals from the local groundwater's original chemical composition are reintroduced to restore the natural taste of the water. See Panel B, Figure B2 for an illustration of filtration components.

This filtration creates water that tastes closer to traditional water. To illustrate this, we conducted lab tests on various water samples, and Table 1 presents the results for key water parameters that influence water's taste and health.[12] Column (1) reports characteristics of local groundwater samples collected from four monitoring sites. This groundwater sample serves as a proxy for the traditional taste of ancestral water in the area.[13] Indeed, the Asyut aquifer is often shielded from surface-level influences, making it less susceptible to recent climatic changes, pollution, or human activity. Its characteristics reflect the natural mineral composition of the region's geology, offering insights into how water would have tasted before surface contamination (Said et al., 2022). Crucially, this ancestral taste is not merely historical but autobiographical: most adults in our sample grew up drinking water

[12]We focus on several key characteristics of water (WHO, 2011). Ph: measures the acidity or alkalinity of water on a scale from 0 to 14, where 7 is neutral; values below 7 indicate acidity, while values above 7 indicate alkalinity. Ideal drinking water has a pH between 6.5 and 8.5. Total Dissolved Solids (TDS): represents the concentration of dissolved substances, such as salts and minerals, in water (measured in ppm); levels below 300 ppm are considered excellent for drinking, while levels above 500 may affect taste. Total Hardness: indicates the concentration of calcium and magnesium in water, measured in ppm; soft water is below 60, moderately hard is 61-120, and hard water exceeds 180 ppm., where high hardness may lead to scaling in pipes and affect taste. Sodium Chloride (NaCl): reflects the salt content in water, measured in ppm; while sodium is naturally present, excessive amounts, above 20 ppm, can affect taste and, above 80 ppm, pose risks for individuals with certain health conditions. Chlorine: disinfectant to kill harmful bacteria, typically added in amounts of 0.2-0.5 ppm. Iron (Fe): indicates the presence of dissolved iron in water, measured in ppm; levels above 0.3 can cause a metallic taste, staining, and discoloration. Turbidity: measures the cloudiness or haziness of water due to suspended particles, reported in Nephelometric Turbidity Units (NTU); safe drinking water typically has turbidity levels below 5 NTU, with lower values indicating clearer water.

[13]Water samples were collected from existing deep wells reaching up to approximately 50 meters. These sources reach the upper layers of the groundwater system, influenced by some surface recharge, and thus differ chemically from deeper confined water. Our samples are less mineralized than aquifer estimates reported by hydrologists (Said et al., 2022) but provide a reasonable proxy for the water historically consumed in the area before piped supply, when drinking water was drawn from such outlets.

with this mild, low-salinity profile. Rising salinity is a relatively recent phenomenon, meaning that individuals' sense of what "good water" tastes like was shaped during childhood under very different environmental conditions (Said et al., 2022).

Based on its characteristics, this water has a mild, neutral taste, barely mineralized due to its moderate TDS (176 ppm) and low NaCl (41 ppm), and minimal metallic components from low Fe (0.2 ppm). Moreover, it is relatively clear and pure, with slight turbidity. In contrast, column (2) shows the results from a sample of water taken from household taps, which represents the water that people actually consume. Piped water presents high TDS (522 ppm) and NaCl (100 ppm), conducive to a strong salty flavor, with noticeable metallic notes from Fe (0.41 ppm). Furthermore, tap water may be highly cloudy (with a turbidity of 16 NTU), suggesting the presence of suspended particles and impurities.

While the standard approach of chlorination improves water safety by eliminating bacteria, it may fail to address individuals' taste preferences as chlorine alters the taste of local water. Indeed, in column (2), the sample of local piped water was tested in the lab after adding chlorine (0.4 ppm), which additionally affect the palatability of water.

In response, we introduce a filtration system aimed at preserving the original taste of water. Column (3) shows results on a sample of our filtered water. In our approach, chlorine is added during filtration to purify the water, but it is then removed, as indicated by the absence of chlorine in column (3). Moreover, filtering, aside from eliminating bacteria, has the additional advantage of removing excess salinity, with potential beneficial effects on kidney diseases: indeed, NaCl is low (20 ppm). Overall, this filtered water is soft and neutral, characterized by extremely low TDS (42 ppm) and NaCl (20 ppm), making it almost tasteless but clean. Moreover, it is free from turbidity, making it cleaner than piped water.

Relevantly, our safe-water solution resembles the taste of traditional water. Indeed, a comparison between groundwater (column (1)), our proxy for ancestral water, and filtered water (column (3)) shows that both waters are very soft, clear, and low in TDS, salt, and iron, although groundwater retains slightly more minerals due to its natural origin.[14]

2 Sample Selection and Implementation Details

We conducted four experiments across eight rural villages in Asyut Governorate, Upper Egypt, during July 2023 and June–October 2024, in partnership with the NGO Life from Water. Detailed descriptions of each experimental design are provided in subsequent sec-

[14]Pure groundwater and filtered water both are very clear and clean, raising the question of whether people may just prefer these qualities as opposed to a traditional taste. For this reason, we also compare these waters to Evian, a commercial water brand, in Table 1, and include it in a taste experiment described in Section 4.

tions. Here, we summarize the sampling strategy and implementation procedures that were common to all experiments.

We targeted villages where the NGO's engineering team had tested the water and found it contaminated, and where a WTU was already operating.[15] Figure A2 maps the study sites. Sampling in all experiments was stratified at the village level. Eligible households were located between 2 km and 5 km from the nearest WTU, ensuring that they were too far to access WTU water without arranging private transport.[16] This design minimizes the risk that our results are driven by prior familiarity with the NGO or its water, rather than by its similarity to traditional water.

On the day of each experiment, enumerators used a random-walk method to sample eligible participants within the 2–5 km buffer zone. Separate samples were drawn for each experiment, so households that had participated in one experiment were not eligible to take part in another. Within each village, all experiments were held on the NGO's premises, with free round-trip transportation provided to participants. They also received small in-kind gifts as compensation for their time.[17] We also conducted an additional experiment in Cairo. This took place in a covered city market where people typically shop for food and groceries. Enumerators set up a stand and invited shoppers to participate in the experiment, surveying 204 respondents. Figure A1 presents the full project timeline.

3 Evidence on Preferences and Safe-Water Demand

The aim of this study is to show that safe-water technologies that incorporate local taste-based preferences can result in significantly higher levels of willingness to pay and adoption rates compared to chlorinated water provision. We focus on a "taste-preserving" technology that uses water treatment units to filter local water while maintaining its familiar taste.

[15] Among the eligible villages, the NGO was concurrently implementing a broader health project supported by the Sawiris Foundation across 30 villages. To avoid overlap, we randomly excluded eight villages from that project and used them as our study sites.

[16] Each WTU can supply water to roughly 5,000 individuals, but only 1,000–2,000 residents live within immediate reach (NGO data). Our study sample lies outside this catchment area, and indeed only 18% of participants reported ever using WTU water. During the study period, the NGO did not provide home delivery, implying that access would have required private transport payments.

[17] Recruitment and implementation were conducted entirely by the NGO's secular field staff and our enumerator team; no religious leaders were involved and tasting scripts made no reference to religious framings of water and purity. Islam, Egypt's main religion, contains many prescriptions on water that can affect behaviors (Buccione, 2026). While rural Upper Egypt is religiously homogeneous, limiting our ability to test heterogeneity along this dimension, the experimental design isolates sensory cues from religious channels in two ways: information is held constant across treatment and control via a standardized script citing WHO and Egyptian Ministry of Health standards, and water type is withheld from participants until after tasting, mechanically ruling out belief-based and messenger channels.

3.1 Preferences

Design. – The first experiment investigates individuals' preferences between chlorinated water and filtered water. In a "blind taste test", participants are provided with samples of both chlorinated water and filtered water. The eligible population for this experiment comprises permanent residents of the villages, including both men and women. Each individual blindly tastes the two samples of water, meaning they are not informed of the type of water, and then reports their preferences. To examine whether preferences differ based on whether participants taste plain water or tea, we randomly assign half of the participants to taste plain water, while the remaining half taste tea. Furthermore, to mitigate potential biases, the order in which participants sample the two varieties of water is randomized.

Results. – Figure 1 represents individuals' preferences in the raw data. Overall, 79.6 percent of individuals prefer filtered water to chlorinated water: 82.1 percent of those that tasted plain water and 76 percent of those that tasted tea. To explore individuals' preferences for alternative types of safe water in a regression framework, we estimate the following equation:

$$y_{1i} = \alpha_1 + \epsilon_{1i} \tag{1}$$

where i indexes individuals, y_{1i} is a dummy equal to 1 if the individual reports to prefer filtered water (*Prefer filtered*), α_1 is the constant term, and ϵ_{1i} is the usual error term. If individuals were indifferent between chlorinated water and filtered water, the constant in regression (1) would be expected to be equal to 0.5. However, as shown in column (1) of Table 2, the constant is significantly higher than 0.5, suggesting that individuals prefer filtered water. This result remains consistent when we restrict to the sub-samples of individuals who either tasted water (column (2)) or tea (column (3)). Consistently, we reject the null that the constant equals 0.5 in an F-Test. In Table A2 in the Appendix, we show that results are not affected by the ordering of tasting.

3.2 Adoption and Willingness-to-Pay

Design. – The second experiment investigates whether preference for filtered water translates into higher adoption rates and higher willingness to pay (WTP) compared to chlorinated water. In this experiment, we target a sample of 400 women, since they are the primary responsible for water collection and purchases (Devoto et al., 2012). In this setting, women purchase safe water directly from the treatment station and have the option to pay for both the water and its delivery to their homes. To closely replicate this real-life scenario, we conducted the experiment at the treatment unit, offering the typical product package, which includes both the water and transportation service.[18]

Women in our sample were randomly presented with either a 20-liter bucket of filtered water (treatment group) or chlorinated water (control group), without informing them of the type of water presented. Randomization was stratified at the village level. Table A3 in the Appendix verifies the randomization balance in the baseline sample of women.[19]

To elicit adoption rates and WTP, we follow the Becker et al. (1964) procedure (BDM). After tasting the water, women were asked to make purchase choices of the tasted water for different, randomly drawn, offer prices for a 20-liter bucket of water (including delivery home, but excluding the bucket itself). The price range considered in this study went from zero price to the highest market price fetched.[20] In the BDM, a random transaction price is drawn from an unmarked set of envelopes. If the random transaction price exceeds the offer price, the woman cannot make the purchase. However, if the random price is equal to or lower than the offer price, she must proceed with the purchase, paying the drawn random transaction price rather than her stated offer. For expected utility maximizers, the optimal strategy is to bid the true maximum willingness to pay.

We followed the standard protocol used in the literature to realize the BDM (Berry et al., 2020). First, the surveyor provided a concise explanation of the BDM procedure. Emphasis was placed on the fact that participants would have a single opportunity to acquire the bucket, with no option to alter their bid after the draw, and the necessity of being prepared to make the payment immediately. Following this, the woman was asked to state her maximum WTP for the 20-liter bucket. Subsequently, the surveyor inquired if the participant would still purchase the 20-liter bucket if the drawn price exceeded her bid slightly, allowing her to adjust their bid accordingly. For instance, if the bid price was 2 Egyptian Pounds (EGP), the surveyor asked if the woman would still purchase the bucket for a price of 2.5 EGP; if the woman agreed, then the new bid considered was 2.5 EGP. This process continued until the woman was no longer willing to revise her bid. Upon finalization of the bid, it was reiterated to the participant that if the drawn price matched their bid, they must be prepared and capable of making the payment. Throughout the procedure, hypothetical scenarios were

[18] As mentioned in Section 2, we selected households located far enough from the WTU in villages where the NGO had not yet introduced its delivery service. This approach achieves two objectives: first, it minimizes bias by targeting households less familiar with the NGO because of distance; second, it allows us to estimate WTP for a bundled water and transport service. This is particularly policy-relevant, as delivery feasibility is critical for scaling up WTUs as a sustainable water solution.

[19] As only 3 women attrited, we don't correct for attrition in our main specification and exclude them from the sample.

[20] We consider as highest price the maximum price that can be fetched for such water in any area of Egypt, which is 15 EGP. The average price in rural areas is around 5 to 8 EGP. The price includes both the cost of water and the delivery of the tank to the household. However, it does not cover the cost of the jerrycan, which women bring with them.

presented to assess the participant's comprehension.[21] Once the final bid was established, the price was drawn, and the participant either proceeded with or declined the purchase of the 20-liter bucket. Importantly, respondents were not obliged to present cash equivalent to their bid before the draw. However, prior to the draw, reassurances were sought multiple times regarding the respondent's access to the necessary funds. Out of the 104 respondents who drew a price less than or equal to their bid, 103 (99.04%) completed the purchase.[22]

Results. – To explore willingness to pay and adoption rates, we estimate the following regression model:

$$y_{2ij} = \alpha_2 + \beta_2 * T_{2ij} + \delta_j + \epsilon_{2ij} \quad (2)$$

where i indexes women, j indexes villages, y_{2ij} is any of the outcomes of interest, T_{2ij} is a dummy variable that takes the value 1 for treated women (those who are offered filtered water) and 0 for control women (those who are offered chlorinated water), δ_j are village (strata) fixed effects, and ϵ_{2ij} is the usual error term. We report hetroskedasticity-robust standard errors, and in Table A4 in the appendix, we present results with clustering at village level (with bootstrapping), and randomization inference estimates with individual-level standard errors.

Estimates of equation 2 are presented in Table 3. We start by investigating the effect of the treatment on women's willingness to pay, measured as the final bid in the BDM procedure (*WTP*). In column (1), results indicate that women exhibit a higher willingness to pay for filtered water in comparison to chlorinated water. Specifically, women, on average, are willing to pay 2.66 EGP for chlorinated water and 4.31 EGP for filtered water. This implies that the willingness to pay for filtered water is 61 percent higher compared to chlorinated water.

Then, we move to examine adoption rates for filtered and chlorinated water. We assume that a person bidding any positive amount would be willing to adopt safe water at a zero price (i.e. full subsidy). That is, we proxy adoption rates by the proportion of women willing to pay any positive amount (*Positive WTP*). According to the estimated coefficients in column (2), when filtered water is offered at a zero price with a full subsidy, adoption rates reach up to 91.2 percent, which is 41.7 percentage points higher than adoption rates observed for chlorinated water. Furthermore, this rate remarkably exceeds the previously reported ceiling of 50 percent identified by previous studies (Dupas et al., 2016, Haushofer et al., 2021, and Dupas et al., 2023).[23]

[21] We record once in the data whether the respondent answered correctly to an hypothetical bidding scenario, and we find that every woman but one answered correctly.

[22] Among them, 30% of the women paid on the spot, while the remaining 70% completed the purchase upon the water being successfully delivered home.

[23] All results from the willingness-to-pay experiment are robust to controlling for all the set of pre-treatment

Despite our inability to directly observe water usage, we operate under the assumption that when a household is willing to pay a positive amount for water, they are inclined to utilize it subsequently. This hypothesis is substantiated by prior research conducted in developing countries. For example, Ashraf et al. (2010) document that households with a greater willingness to pay for chlorine are also those most likely to consistently incorporate it into their drinking water treatment. In a similar vein, Dupas et al. (2023) document that a relatively small proportion of households engage in the effort of redeeming coupons for free chlorine without subsequently utilizing the product.

Finally, in Figure 2 we plot demand curves across treatment groups. The curves show that women exhibit a higher demand for filtered water than for chlorinated water, meaning that at every price there is a higher share of women willing to bid more for filtered water than for chlorinated water. This relation is particularly strong at lower prices: at our lowest price (0.5 EGP), the gap in take-up is about 88 versus 47 percent. Importantly, approximately 50 percent of households are willing to pay at least a price equal to the full cost of filtered water (5 EGP), while about 38 percent are willing to pay at least the cost of dilute chlorinated water (4 EGP).[24] These cost also represent the lowest prices fetched on the market, meaning that there is a substantial positive price at which households demonstrate significant willingness to pay for safe filtered water.

Compared to previous literature (see Null et al., 2012), filtered water generates an almost threefold larger willingness-to-pay to cost ratio than other safe-water methods, such as ceramic filters (Berry et al., 2020; Luoto et al., 2012). ADD HERE TABLE DESCRIPTION

4 Mechanisms: Familiarity as a Signal of Health

Having shown that filtered water leads to higher adoption rates and WTP than chlorinated water, we next examine the mechanisms driving this result. Our hypothesis is that our filtering technology produces safe water that closely matches locals' sensory preferences and familiar taste, which ultimately shape their health decisions.

Taste Experiment. We design a third experiment (*Taste Experiment*) to test whether the observed preference for filtered water is truly driven by taste rather than by differences in health quality. Indeed, filtered water is healthier than chlorinated water, as it additionally removes excess salt. To address this difference, in this experiment we prepare two samples of

characteristics available, as well as for unbalanced characteristics, as shown in Table A5.

[24]The cost of a 20-liter bucket of filtered water comprises 1.9 EGP to produce the water, and 3 EGP of transportation. The cost of a 20-liter bucket of chlorinated water comprises 0.8 EGP to produce the water, and 3 EGP of transportation.

water that exclusively vary in taste, holding constant the actual healthfulness of the water. The first water is filtered water. The second water is filtered water blended with chlorine and healthy levels of salt, thus specially formulated to replicate the taste of local chlorinated water while maintaining the same health benefits of the filtered water. As shown in column (4) of Table 1, this variant closely matches piped water (column (2)) in saltiness, hardness, and chlorine content but it is healthier due to meeting scientific thresholds for salt and iron levels and lacking turbidity.[25]

Respondents were randomly assigned to taste one of these two water samples identical in health properties but distinct in taste. Importantly, before tasting and rating the water, participants in both treatment and control were perfectly informed about the healthiness of water according to World Health Organization standards and Egyptian standards, thus equalizing also information across treatment status (WHO, 2011).[26] However, they were not told which type of water they were drinking. After tasting the water, individuals were asked to evaluate its characteristics, specifically taste and perceived healthiness, on a scale from 1 (very bad) to 5 (very good). We construct two main dependent variables, *Tasty* which take the value 1 if the individual answers that the water has good or very good taste, and *Healthy*, which takes the value 1 if the individual answers that the water is healthy or very healthy.

To explore the role of taste, we first estimate the following regression model:

$$y_{3ij} = \alpha_3 + \beta_3 * T_{3ij} + \delta_j + \epsilon_{3ij} \tag{3}$$

where i indexes individuals, j indexes villages, y_{3ij} is any of the outcomes of interest, T_{3ij} is a dummy variable that takes the value 1 for treated individuals (those randomly assigned to taste filtered water) and 0 for control individuals (those randomly assigned to taste chlorinated water), δ_j are village (strata) fixed effects, and ϵ_{2ij} is the usual error term. We report hetroskedasticity-robust standard errors, and in Table A4 in the appendix, we present results with clustering at village level (with bootstrapping), and randomization inference estimates with individual-level standard errors. Table A3 in the appendix reports balancing conditions for the experiment.

Columns (1) and (2) in Table 4 present the results of the third experiment. Our findings

[25] Indeed, both piped water and this new water exhibit high levels of NaCl (80 ppm for column (4) vs. 100 ppm for column (2)), comparable hardness (490 ppm vs. 420 ppm), and chlorine (0.4 ppm). However, in our new sample of column (4), the concentration of NaCl is intentionally adjusted to match the acceptable threshold set by the Egyptian Ministry of Health and WHO (WHO, 2006).

[26] Specifically, the script was: "In this experiment, we are going to present you with a cup of clean water to taste. It is important to notice that this is healthy water according to both scientific standards set by WHO and the Egyptian Ministry of Health. For instance, these samples of water are healthier than status-quo water (e.g. water from pipes or trombos).".

suggest that individuals perceive filtered water as having a superior taste and being healthier compared to chlorinated water. Given that water healthiness and information of water healthiness are held constant, the observed preference for filtered water is likely driven by its perceived better taste relative to chlorinated water.[27]

Familiarity Experiment. At this stage, the observed preference for filtered water could simply reflect a general dislike for chlorine or a taste for milder water—or, alternatively, an attachment to the familiar flavor of local water that our filtration preserves. In a fourth experiment (*Familiarity Experiment*), we further investigate the role of familiar taste as a potential explanatory factor for the earlier findings.

We replicate the *Taste Experiment* with an important twist. Participants in the control group are randomly assigned to taste and evaluate a water variant that provides the same health benefits as filtered but has a different taste, devoid of chlorine flavor. Considering the wide range of healthful, chlorine-free water options available, we selected Evian, a globally renowned commercial brand known for its mild taste. The crucial difference is that Evian lacks any local component, such as the natural local minerals that our filtration system reintroduces. This design allows us to hold constant both health and mildness while varying only the *familiarity* of taste.[28] Table 1, column (5), reports characteristics of an Evian water sample.

Mirroring the methodology of the preceding *Taste Experiment*, participants are prompted to evaluate taste and perceived healthiness, utilizing a scale ranging from 1 to 5.[29] Columns (3) and (4) in Table 4 display the results from the fourth experiment. Our findings indicate that individuals perceived filtered water as having superior taste and being healthier compared to Evian water. Although 60% of respondents in the control group find Evian tasty, filtered water is 27% more likely to be rated as tasty by respondents in the treatment group. This finding helps rule out the possibility that preferences are merely driven by a general liking for mild, chlorine-free water.[30]

To gain deeper insights into the factors driving our results, we asked participants to provide open-ended comments on the taste of the water. We grouped the feedback into several themes: whether the water tasted good, neutral/tasteless, or bad; familiar, or unfamil-

[27] All results from the taste experiment are robust to controlling for all the set of pre-treatment characteristics available, as shown in Table A5.

[28] Choosing Evian also sets a more conservative benchmark to test whether participants still prefer the filtered water's taste, given its widespread reputation for excellent taste.

[29] We provide the same health information indicated above for the *Taste Experiment*.

[30] As shown in Table 1, Evian (column 5), our filtered water (column 3), and the ancestral proxy—groundwater (column 1)—all share a neutral and mild flavor profile. However, Evian has a different mineral composition, with higher TDS and Total Hardness levels, suggesting that the preference for filtered water is rooted in its closer resemblance to locally familiar water rather than in its mildness alone.

iar/weird; healthy or unhealthy; or other comments that didn't fit these categories. Figure A4 displays the share of respondents reporting each category by treatment group. Notably, around 82% of respondents in the treatment group described filtered water as tasting good, compared to 57% for Evian in the control. This discrepancy is particularly interesting when considering the negative feedback. Many participants described Evian as having an unfamiliar or neutral taste, while filtered water was more likely, though in smaller proportions, to be described as having a familiar taste. This suggest that the gap in positive taste ratings between Evian and filtered water may, in part, stem from a sense of unfamiliarity with Evian's taste, highlighting how familiarity might shape taste preferences.

Water is not only consumed directly but also used as an input in the preparation of foods and beverages whose taste households may value. We observe that participants often associate better-tasting water with being culturally suitable for preparing traditional foods and beverages, echoing the idea of the "tea test." Indeed, in this experiment, we asked respondents to rate water on two additional characteristics: color and cultural suitability, defined as the suitability of the water to prepare traditional beverages, such as tea, and food. Results are shown in Table A6 in the Appendix. While reassuringly there is no effect on color, given that both waters are healthy and low in turbidity, we find that individuals perceived filtered water to be more culturally suited. This suggests that familiarity with water may, in part, stem from its perceived compatibility with local food practices.

We conclude that the primary driving force behind the preference for filtered water cannot be explained by a dislike for chlorine or a taste for mild water, but rather by perceptions of a familiar taste - reinforced, to some extent, by its cultural fit in daily consumption. Still, the coefficients in columns (3) and (4) of Table 4 are smaller than those in columns (1) and (2), suggesting that chlorine still plays a role in affecting preferences about water.

However, it is still possible that our filtered water is simply more palatable than Evian water, not only for people in Asyut due to familiarity but also for individuals from other regions. As a last proof of concept, we replicate the *Familiarity Experiment* in a setting outside of Asyut, with participants in Cairo, where local water tastes distinctively from Asyut's.[31] If our familiarity hypothesis is correct, we should not find a preference for our filtered water, which mimics the taste of Asyut's local water, in an area where the local water tastes different. Consistent with this prediction, columns (5) and (6) in Table 4 show that preferences were reversed: Cairo participants perceived Evian as tastier and healthier than filtered water from Asyut.[32]

[31] We provide the same health information indicated above for the *Taste Experiment*.

[32] All results from both the familiarity experiments are robust to controlling for all the set of pre-treatment characteristics available, as well as for unbalanced characteristics, as shown in Table A5.

Pooled Sample. Finally, we explore whether familiar taste influences health perceptions, pooling data from our three mechanisms experiments: the *Taste Experiment* and the *Familiarity Experiments* in Asyut and Cairo. These experiments share two key features: treatment and control water types are equally healthy and differ only in taste; and participants are explicitly informed that the water meets WHO and Egyptian safety standards. Using this combined sample, we regress our health perception variable, *Healthy*, on taste perception, *Tasty*. As shown in column (7) of Table 4, the coefficient on *Tasty* is positive and statistically significant, indicating that participants who found the water tasty were approximately 70 percentage points more likely to also perceive it as healthy. Because all waters are equally safe and participants receive full information, this difference can be attributed solely to taste. These findings suggest that taste strongly shapes perceptions of health benefits, even when individuals are fully informed, highlighting the limits of standard awareness campaigns and the potential value of behavioral interventions.

5 Conclusions

We present evidence from four randomized controlled trials in rural villages in Upper Egypt, focusing on addressing the seemingly paradoxical behavior of low adoption rates and minimal willingness to pay for chlorinated water among poor households. We introduced a novel "taste-preserving" technology that uses water treatment units to filter water and produce safe water while mimicking the flavor of local water.

We find that adoption and willingness to pay for filtered water are significantly higher compared to chlorinated water. Mechanism experiments show that the primary driving force behind the preference for filtered water lies in its particular *familiar* taste, reminiscent of traditional local water. Our results also suggest that taste of water serves as a signal of its quality, influencing perceptions of healthiness.

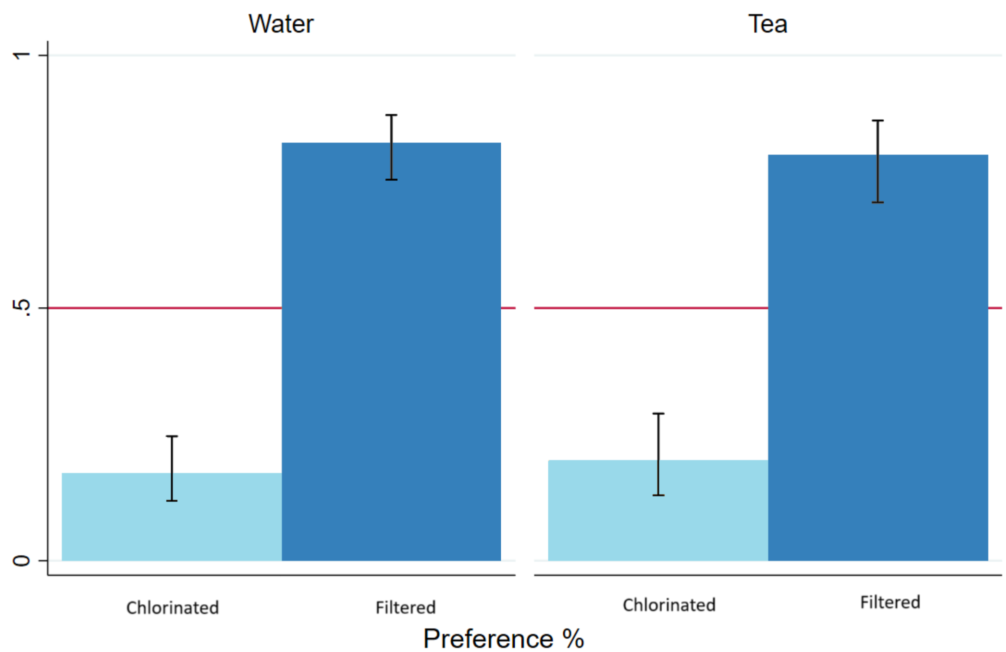
Our findings carry significant implications across several dimensions. First, they highlight the importance of incorporating taste-based preferences and sensory expectations into the design of health interventions in developing countries. Second, our results suggest that policymakers should reconsider the prevailing strategy of subsidizing chlorine in favor of exploring alternative approaches that account for the preferences of local communities. Third, our research hints at possible limitations of information campaigns about health, particularly in contexts with low literacy or trust, where sensory heuristics shape perceptions of health even in the presence of information.

Future research could explore the conditions under which sensory cues guide health decisions, providing insight into how these heuristics emerge and persist in certain societies.

Finally, additional work is needed to examine how environmental changes, including those driven by climate change, affect such sensory cues and the extent to which societies adapt to shifting conditions.

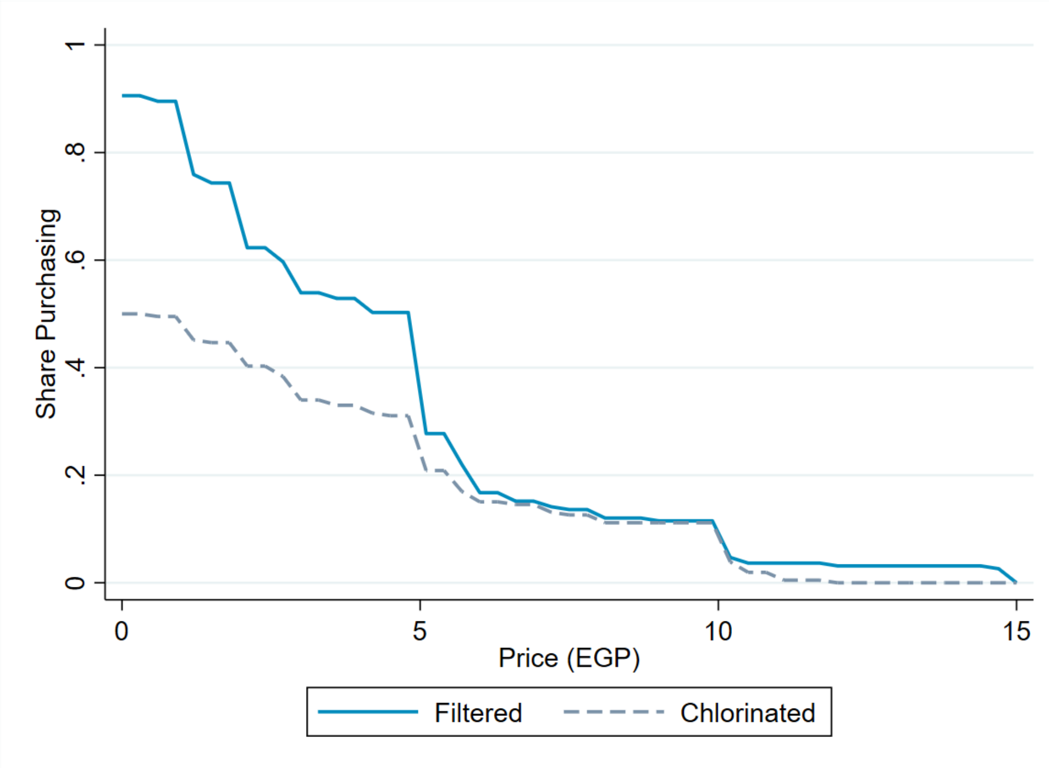
Figures and Tables

Figure 1. Preferences for Filtered or Chlorinated Water in Blind Taste Test



Note: This figure shows the proportion of respondents in the raw data preferring filtered or chlorinated water, according to whether they tasted plain water or tea. Wilson confidence intervals at 95% are reported.

Figure 2. Inverse Demand Curve for Filtered and Chlorinated Water



Note: The graph shows the demand curve for filtered water (solid line) and chlorinated water (scattered line) obtained from the willingness to pay experiment that uses the Becker, Degroot, and Marschak (1964) auction. The horizontal axis shows the price in Egyptian Pounds. The vertical axis indicates the share of respondents with a bid greater than or equal to the indicated price.

Table 1. Characteristics of Water Samples

	Groundwater (1)	Piped *+ Chlorine* (2)	Filtered (3)	Filtered *Chlorine + Salt* (4)	Evian (5)
Ph	7.6	7.9	7.6	7.66	7.4
TDS	176	522	42	699	409
Total Hardness	180	420	5	490	420
NaCl	41	100	20	80	40
Chlorine	0	0.4	0	0.4	0
Fe	0.2	0.41	0	0.18	0
Turbidity	4	16	0	0	0

Note: We focus on the following characteristics of water (WHO, 2011). *Ph:* measures the acidity or alkalinity of water on a scale from 0 to 14, where 7 is neutral; *Total Dissolved Solids (TDS):* represents the concentration of dissolved substances, such as salts and minerals, in water (measured in ppm); *Total Hardness:* indicates the concentration of calcium and magnesium in water, measured in ppm; *Sodium Chloride (NaCl):* reflects the salt content in water, measured in ppm; *Chlorine:* shows disinfectant added to kill harmful bacteria, measured in ppm; *Iron (Fe):* indicates the presence of dissolved iron in water, measured in ppm; *Turbidity:* measures the cloudiness or haziness of water due to suspended particles, reported in Nephelometric Turbidity Units (NTU).

Table 2. Preference for Filtered Water in Blind Taste Test

	Prefer filtered water		
	All (1)	Water (2)	Tea (3)
Constant	0.796***	0.821***	0.760***
	(0.027)	(0.033)	(0.044)
F-statistic (Ho: constant=0.5)	123.11***	93.15***	35.36***
Obs.	230	134	96

Note: The table shows estimated coefficients from equation 1. Column (1) reports results for the entire sample. Column (2) reports results for the subsample tasting (filtered and chlorinated) plain water. Column (3) reports results for the subsample tasting (filtered and chlorinated) tea. All regressions are estimated using Ordinary Least Squares. Robust standard errors are in parentheses. F-statistic corresponds to a test that the constant is equal to 0.5. *p<0.10,**p<0.05,***p<0.01

Table 3. Willingness to Pay and Adoption Rates for Filtered and Chlorinated Water

	Willingness-to-Pay Experiment	
	WTP	Positive WTP
	(1)	(2)
Treatment	1.646***	0.417***
	(0.320)	(0.038)
Constant	2.660***	0.495***
	(0.206)	(0.029)
Obs.	397	397
Village FE	Yes	Yes

Note: The table shows estimated coefficients from equation 2. *Treatment* is a dummy variable that takes the value 1 for individuals who taste filtered water and 0 for those who taste chlorinated water. The outcome in column (1), *WTP*, is the final bid of the woman in the BDM procedure. The outcome in column (2), *Positive WTP*, is a dummy equal to 1 if the woman bid any positive amount in the BDM procedure. All regressions are estimated using Ordinary Least Squares and include village (strata) fixed effects. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table 4. Mechanisms - Perceptions on Filtered and Chlorinated Water

	Taste Experiment		**Familiarity Experiment**				**Pooled**
	Asyut		*Asyut*		*Cairo*		*All*
	Tasty	Healthy	Tasty	Healthy	Tasty	Healthy	Healthy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment	0.535***	0.554***	0.164**	0.120*	-0.145**	-0.165***	
	(0.058)	(0.057)	(0.064)	(0.066)	(0.064)	(0.061)	
Tasty							0.707***
							(0.032)
Obs.	205	205	200	200	204	204	609
Mean	0.31	0.33	0.61	0.56	0.79	0.83	0.28
Village FE	Yes	Yes	Yes	Yes	-	-	-
Control has chlorine	Yes	Yes	No	No	No	No	All
Treatment tastes local	Yes	Yes	Yes	Yes	No	No	All

Note: The table shows estimated coefficients from equation 3. *Treatment* is a dummy variable that takes the value 1 for individuals who taste filtered water and 0 for those who taste: chlorinated water (columns (1)-(2)); Evian water (columns (3)-(6)). *Tasty* is a variable equal to 1 if the individual perceived the tasted water to be *very tasty* or *tasty*. *Healthy* is a variable equal to 1 if the individual perceived the tasted water to be *very healthy* or *healthy*. All regressions are estimated using Ordinary Least Squares and include village (strata) fixed effects. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Appendix A Additional Figures and Tables

Table A1. Summary Statistics

	Mean (1)	SD (2)	Min. (3)	Max. (4)
Panel A: Pooled Sample				
Female	0.599	0.49	0	1
Age	38.86	12.64	18	80
Head of household	0.20	0.40	0	1
Married	0.76	0.43	0	1
Formal education	0.32	0.47	0	1
Household size	6.17	3.12	1	25
Number of children	3.01	2.14	0	12
Tap in house	70.12	0.46	0	1
Filter at home	0.17	0.38	0	1
Diarrhea	0.52	0.50	0	1
Vomits	0.42	0.49	0	1
Fever	0.63	0.48	0	1
Obs.	1,244			
Panel B: Blind Taste Test				
Prefer filtered	0.79	0.40	0	1
Filtered First	0.53	0.50	0	1
Tea	0.42	0.49	0	1
Obs.	230			
Panel C: Willingness to Pay				
Treatment	0.48	0.50	0	1
WTP	3.45	3.55	0	15
Positive WTP	0.68	0.47	0	1
Obs.	405			
Panel D: Taste Exp.				
Treatment	0.49	0.50	0	1
Tasty	0.59	0.49	0	1
Healthy	0.60	0.49	0	1
Obs.	205			
Panel E: Familiarity Exp. 1				
Treatment	0.49	0.50	0	1
Tasty	0.69	0.46	0	1
Healthy	0.64	0.48	0	1
Obs.	200			
Panel F: Familiarity Exp. 2				
Treatment	0.42	0.49	0	1
Tasty	0.74	0.44	0	1
Healthy	0.77	0.42	0	1
Obs.	204			

Note: Panel A reports descriptive statistics on controls for the pooled sample, which combines participants from all the experiments. Panel B through F report descriptive statistics on main outcomes and treatment variables for the corresponding experiment.

Table A2. Preference for Filtered Water in Blind Taste Test - Ordering

	Prefer filtered water		
	All (1)	Water (2)	Tea (3)
Constant	0.769***	0.821***	0.68***
	(0.04)	(0.033)	(0.044)
Filtered first	0.051	0.000	0.135
	(.054)	(0.067)	(0.09)
Obs.	230	134	96
Village FE	Yes	Yes	Yes

Note: The table shows estimated coefficients from equation 1. Column (1) reports results for the entire sample. Column (2) reports results for the subsample tasting (filtered and chlorinated) plain water. Column (3) reports results for the subsample tasting (filtered and chlorinated) tea. *Filtered first* is a dummy variable equal to 1 if the individual tasted the filtered sample first and the chlorinated sample second. Robust standard errors are in parentheses. All regressions are estimated using Ordinary Least Squares. F-statistic corresponds to a test that the constant is equal to 0.5. *p<0.10,**p<0.05,***p<0.01

Table A3. Balancing Conditions

	Willingness-to-Pay			Taste Experiment			Familiarity Experiment: Asyut			Familiarity Experiment: Cairo		
	Control (1)	Treatment (2)	Diff. (3)	Control (4)	Treatment (5)	Diff. (6)	Control (7)	Treatment (8)	Diff. (9)	Control (10)	Treatment (11)	Diff. (12)
Female				0.533	0.550	-0.016	0.515	0.577	0.002	0.483	0.547	-0.013
				(0.501)	(0.500)	(0.768)	(0.502)	(0.497)	(0.968)	(0.502)	(0.501)	(0.845)
Age	37.738	40.188	2.564**	36.133	36.020	-0.338	37.553	36.351	-1.125	33.517	33.384	-0.708
	(11.920)	(13.301)	(0.046)	(14.245)	(14.170)	(0.862)	(13.920)	(12.458)	(0.532)	(10.932)	(12.270)	(0.667)
Household Head	0.170	0.241	0.068*	0.362	0.390	0.043	0.301	0.175	-0.108*			
	(0.376)	(0.429)	(0.095)	(0.483)	(0.490)	(0.508)	(0.461)	(0.382)	(0.076)			
Married	0.786	0.717	-0.064	0.676	0.660	-0.006	0.738	0.711	-0.040			
	(0.411)	(0.452)	(0.136)	(0.470)	(0.476)	(0.932)	(0.442)	(0.455)	(0.535)			
Formal education	0.311	0.309	0.006	0.467	0.490	0.044	0.563	0.526	-0.014			
	(0.464)	(0.463)	(0.895)	(0.501)	(0.502)	(0.490)	(0.498)	(0.502)	(0.838)			
Household size	6.272	6.021	-0.263	6.676	6.420	-0.203	6.650	6.237	-0.336			
	(3.088)	(3.177)	(0.392)	(3.071)	(3.022)	(0.632)	(3.226)	(2.549)	(0.400)			
N. children	3.049	2.937	-0.120	3.048	2.850	-0.159	3.194	2.897	-0.319			
	(2.163)	(2.119)	(0.565)	(2.073)	(2.162)	(0.598)	(1.981)	(1.788)	(0.235)			
Tap water	0.705	0.697	0.005	0.905	0.850	-0.057	0.641	0.588	-0.081			
	(0.457)	(0.461)	(0.865)	(0.295)	(0.359)	(0.205)	(0.482)	(0.495)	(0.143)			
Filter at home	0.175	0.178	0.001	0.267	0.250	-0.014	0.301	0.175	-0.079			
	(0.381)	(0.384)	(0.978)	(0.444)	(0.435)	(0.807)	(0.461)	(0.382)	(0.130)			
Had diarrhea	0.529	0.508	-0.016									
	(0.500)	(0.501)	(0.750)									
Had vomit	0.422	0.419	-0.002									
	(0.495)	(0.495)	(0.965)									
Had fever	0.621	0.634	0.017									
	(0.486)	(0.483)	(0.720)									
Observations	206	191	397	105	100	205	103	97	200	118	86	204

Note: The table reports means and robust standard errors from OLS regressions in parentheses with village level (strata) fixed effects. Column (3), (6), (9) and (12) report the T-test of equality of means and stars correspond to the test of whether control and treatment groups have the same population mean. Columns (1)–(3) consider the sample of women participating to the *Willingness-to-pay Experiment.* Columns (4)–(6) consider the sample of individuals participating to the *Taste Experiment.* Columns (7)–(9) consider the sample of individuals participating to the *Familiarity Experiment* in Asyut. Columns (10)–(12) consider the sample of individuals participating to the *Familiarity Experiment* in Cairo. *Female* (takes the value 1 if the respondent is a woman), *Age* (of the respondent), *Head of household* (takes the value 1 if the respondent is the head of the household), *Married* (takes the value 1 if the respondent is married), *Formal education* (takes the value 1 if the individual has at least one year of formal education), *Household size* (including the respondent), *Number of children* (in the household), *Filter at home* (takes the value 1 if the household has a filter), *Had Diarrhea* (takes the value 1 if someone in the household experienced diarrhea in the last four weeks), *Had Vomit* (takes the value 1 if someone in the household experienced vomiting in the last four weeks), and *Had Fever* (takes the value 1 if someone in the household experienced fever in the last four weeks). *p<0.10,**p<0.05,***p<0.01

Table A4. Robustness of Main Results - Inference

Robustness - Inference

	Willingness to Pay		*Taste Experiment*		*Familiarity Experiment*			
	WTP (1)	Positive WTP (2)	Tasty (3)	Healthy (4)	Tasty (5)	Healthy (6)	Tasty (7)	Healthy (8)
A Cluster: Village	1.6***	.42***	.55***	.54***	.16*	.12		
	(.5)	(.13)	(.066)	(.071)	(.095)	(.087)		
B Randomization Inference	1.64***	0.42***	0.55***	0.54***	0.16**	0.12*	-0.17***	-0.18***
	(.04)	(.13)	(.066)	(.07)	(.095)	(.087)	(.041)	(.039)
Obs	397	397	205	205	200	200	204	204
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (2) show estimated treatment effects from equation 2. Columns (3)-(8) show estimated treatment effects from equation 3. Columns (1) and (2) reports results on the *Willingness to Pay Experiment.* Columns (3) and (4) reports results on the *Taste Experiment.* Columns (5) and (6) reports results on the *Familiarity Experiment* in Asyut. Columns (7) and (8) reports results on the *Familiarity Experiment* in Cairo. Panel (a) reports standard errors clustered at the village level, calculated by bootstrapping (resampling villages) over 2,000 replications. The exercise cannot be performed for *Familiarity Experiment* in Cairo since sampling is at the individual level. Panel (b) reports standard errors calculated using randomization inference following Athey and Imbens (2017). *p<0.10,**p<0.05,***p<0.01.

Table A5. Robustness of Main Results - Controls

	Robustness - Controls							
	Willingness to Pay		*Taste Experiment*		*Familiarity Experiment*			
	WTP	Positive WTP	Tasty	Healthy	Tasty	Healthy	Tasty	Healthy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A All Controls	1.7***	.42***	.56***	.54***	.16**	.11	-.18***	-.18***
	(.32)	(.038)	(.056)	(.056)	(.063)	(.069)	(.066)	(.064)
B Unbalanced Vars	1.7***	.41***			.17***	.11*		
	(.32)	(.038)			(.065)	(.067)		
Obs	397	397	205	205	200	200	204	204
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) and (2) report results on the *Willingess to Pay Experiment*. Columns (3) and (4) report results on the *Taste Experiment*. Columns (5) and (6) reports results on the *Familiarity Experiment* in Asyut. Columns (7) and (8) reports results on the *Familiarity Experiment* in Cairo. In Panel A, we augment the main specification by incorporating all available control variables. In Panel B, we control for unbalanced characteristics at baseline.*p<0.10,**p<0.05,***p<0.01.

Table A6. Familiarity Experiment - All Outcomes

	Tasty	Healthy	Color	Cultural Suitability
	(1)	(2)	(3)	(4)
Treatment	.16**	.12*	.045	.16***
	(.064)	(.066)	(.044)	(.058)
Obs.	200	200	200	200
Mean	.61	.56	.86	.69
Village FE	Yes	Yes	Yes	Yes

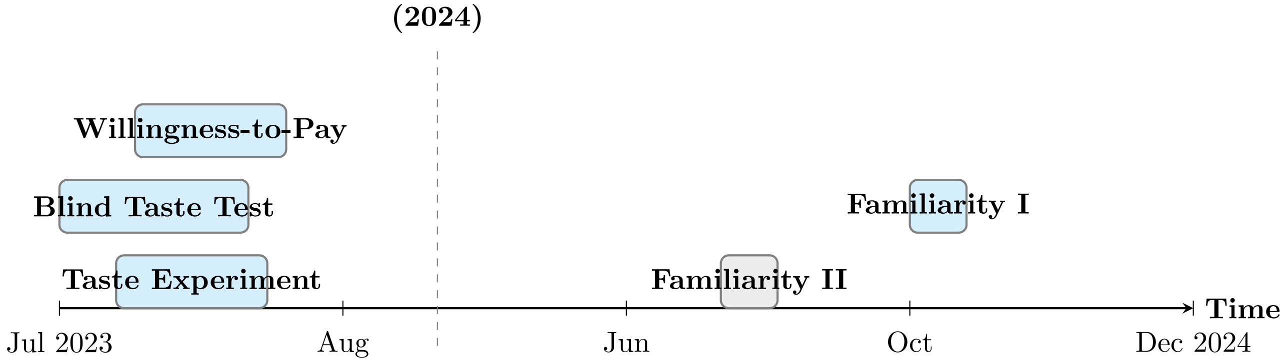
Note: The table shows estimated coefficients from equation 3, for the *Familiarity Experiment* in Asyut. *Treatment* is a dummy variable that takes the value 1 for individuals who taste filtered water and 0 for those who taste Evian water. *Tasty* is a variable equal to 1 if the individual perceived the tasted water to be *very tasty* or *tasty*. *Healthy* is a variable equal to 1 if the individual perceived the tasted water to be *very healthy* or *healthy*. *Color* is a variable equal to 1 if the individual perceived the color of the water to be *very good* or *good*. *Cultural Suitability* is a variable equal to 1 if the individual perceived the tasted water to be *very suitable* or *suitable* to prepare her/his traditional beverages and food. All regressions are estimated using Ordinary Least Squares and include village (strata) fixed effects. Robust standard errors are in parentheses. *p<0.10,**p<0.05,***p<0.01

Table A7. Willingness to Pay for Safe Water: Cross-Study Comparison

Study	**Country**	**Technology**	**Elicitation**	**WTP (USD)**	**WTP/ Cost**	**Adoption**
This paper	Egypt (Asyut)	Taste-preserving filtration	BDM	0.14 / 20L bucket	∼0.88	91% at zero price; ∼50% at full cost
Burlig, Jina & Sudarshan (2026)	India (Odisha)	Decentralized filtration + delivery	Demand curve (price RCT)	20 / year (∼0.012/L)	>1	>90% at low price; privately profitable at full cost
Berry, Fischer & Guiteras (2020)	Ghana (north)	In-home ceramic filter	BDM	1.75 / filter (durable)	0.10–0.15	∼0% at full cost
Ashraf, Berry & Shapiro (2010)	Zambia	Chlorine (Clorin)	Take-it-or-leave-it	0.11 / bottle	<1	Low
Dupas et al. (2016)	Kenya	Free chlorine coupons	—	—	—	≤50%
Dupas et al. (2023)	Malawi	Free chlorine dispensers	—	—	—	46%
Haushofer et al. (2021)	Kenya	Community chlorine dispensers	—	—	—	∼50%
Kremer et al. (2011)	Kenya	Spring protection	Travel cost / revealed preference	2.96 / household-year	—	—
Null et al. (2012) review	Multiple LICs	Chlorine, filters	Meta-review	Low	<1	<50% (most studies); near zero at full cost

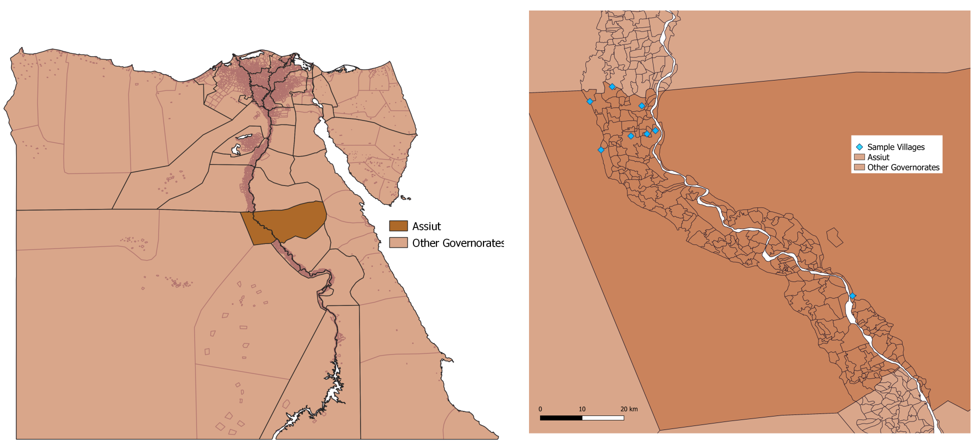
Notes: The table compares willingness-to-pay (WTP) estimates and adoption rates for safe-water technologies across major experimental and quasi-experimental studies in developing countries. WTP figures are in USD at the exchange rate prevailing at the time of each study, and are not adjusted for purchasing power parity. "WTP/Cost" is the ratio of estimated WTP to the marginal cost of provision. "Adoption" refers to take-up rates at zero or low prices (full subsidy) and, where available, at full cost. "—" indicates the measure is not reported or not applicable. For this paper, WTP for filtered water (4.31 EGP per 20L bucket) is converted at the 2023 average exchange rate of approximately 30.7 EGP/USD; production plus delivery cost is approximately 4.9 EGP per bucket. See cited studies for details on each elicitation procedure and cost calculation.

Figure A1. Timeline of field experiments: Asyut (light blue) and Cairo (light gray)



Note: This figure summarizes the timing of all field experiments conducted as part of the study. Experiments in Asyut are shown in light blue; the Cairo experiment in light gray. The *Blind Taste Test* took place July 15–25, 2023; the *Taste Experiment*, July 18–25, 2023; and the *Willingness-to-Pay Experiment*, July 19–27, 2023. The *Familiarity I* experiment was conducted October 7–14, 2024, in Asyut, while *Familiarity II* ran June 7–13, 2024, in Cairo.

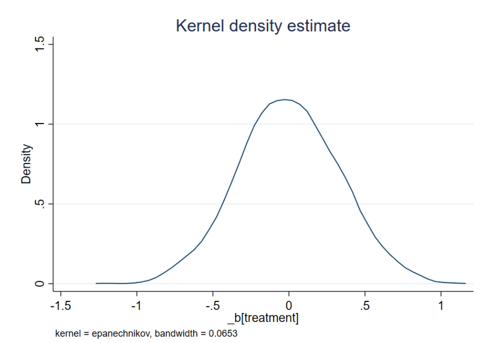
Figure A2. Study Village Locations



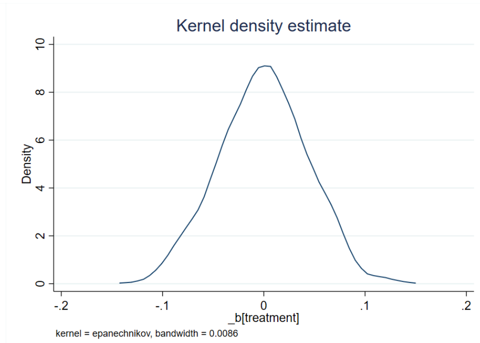
Note: This figure plots the location of our eight study villages.

Figure A3. Density - Randomization Inference

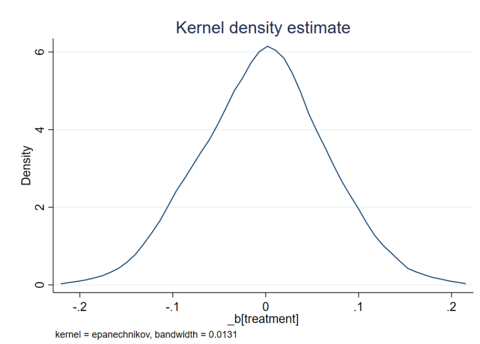
(a) WTP



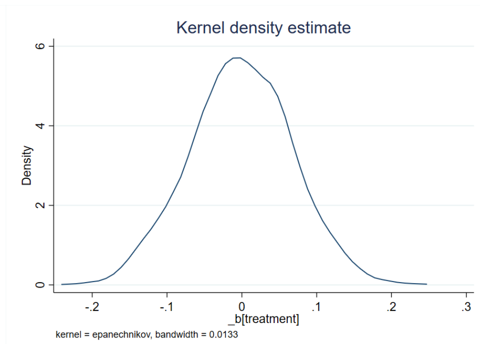
(b) Positive WTP



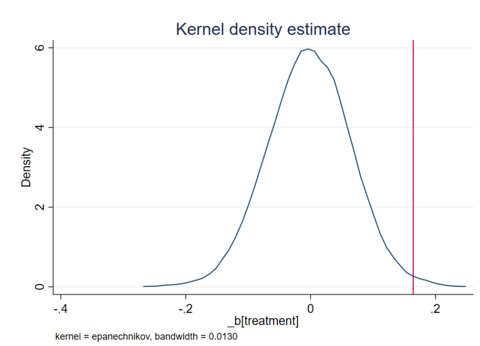
(c) Tasty - *Taste Exp.*



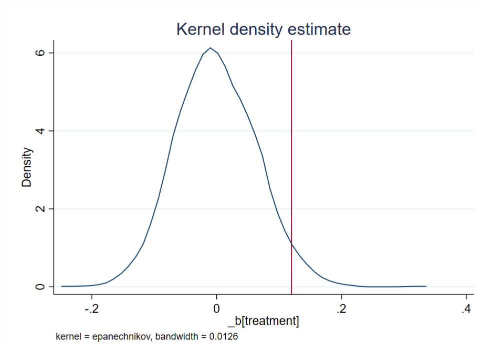
(d) Healthy - *Taste Exp.*



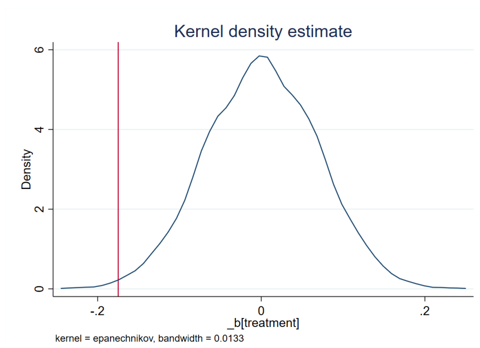
(e) Tasty -*Familiarity Exp. 1*



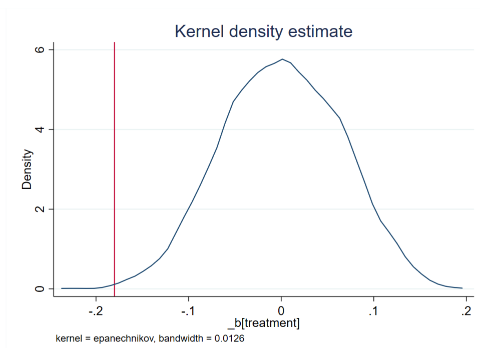
(f) Healthy - *Familiarity Exp. 1*



(g) Tasty -*Familiarity Exp. 2*

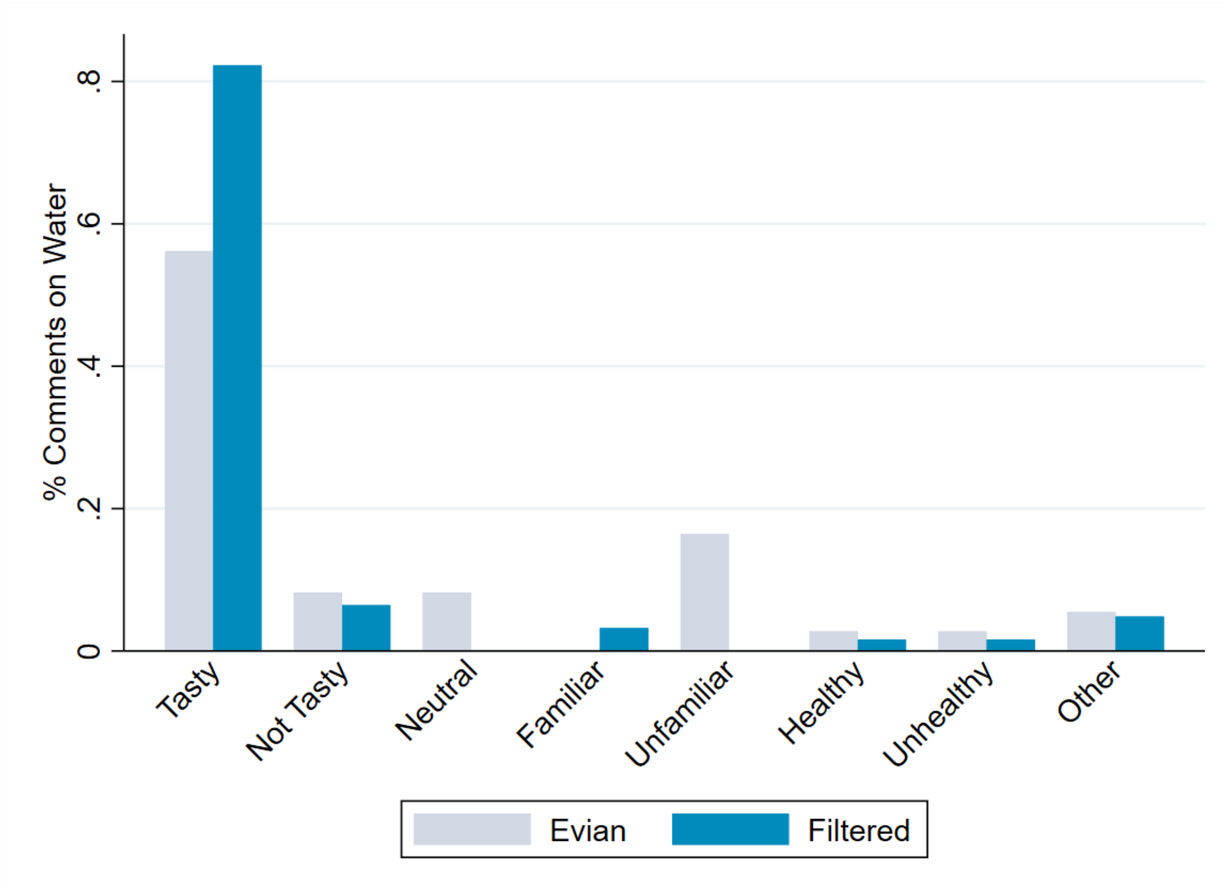


(h) Healthy - *Familiarity Exp. 2*



Note: The figure shows a simulation exercise following Athey and Imbens (2017). Each simulated treatment effect comes from randomly assigning individuals, within villages, to treatment using the same randomization algorithm used for the true assignment and then running a regression of the outcome on the treatment status, including village fixed effects. The red line is the estimated effect when not out of scale.

Figure A4. Open-Ended Comments on Filtered Water and Evian



Note: The figure shows the proportion of respondents reporting each characteristic in open-ended comments on the tasted sample of water in the *Familiarity Experiment* in Asyut.

Appendix B Experimental Setting

Figure B1. Water Treatment Units

Note: Examples of Water Treatment Units (WTUs) owned by Life from Water. Filtration takes place in compact rooms, as shown in the picture, where water pumps draw water into the system. The filtered water is dispensed through outdoor taps, and residents bring their tanks to fill them up, as illustrated.

Figure B2. WTU Components

Note: The figure shows the main components used to filter the water in our NGO's multi-stage filtration process. Water pumps draw water into the system, and water is stored in tanks (left). The water passes through fiberglass vessels containing filtration media to remove impurities (center). The core purification stage employs Reverse Osmosis technology (right).

Figure B3. Example of Blind Taste Test

Note: Example of experimental setting to perform the *Blind Taste Test* (left). Respondent tastes two sample of water and indicates the preferred one (right).

Figure B4. Example of Willingness-to-Pay Experiment

Note: Example of experimental setting to perform the *WTP Experiment*.

Appendix C Survey-based Variable Descriptions

1. *Gender.* This is a variable reporting the respondent's gender. It was recorded in the survey in response to the prompt: 'Is respondent male or female?'

2. *Age.* This is a variable reporting the respondent's age. It was recorded in the survey in response to the prompt: 'How old were you at your last birthday?'

3. *Relation to household head.* This is a variable reporting the respondent's relation to the household head. It was recorded in the survey in response to the prompt: 'What is your relationship with the household head?' [Household head, Husband/Wife, Son/Daughter, Mother/Father, Sister/Brother, Other]

4. *Household Size.* This is a variable reporting the respondent's household size. It was recorded in the survey in response to the prompt: 'How many people live in your house? (counting yourself)'

5. *Number of children.* This is a variable reporting the number of children, aged 0-18, living in the respondent's household. It was recorded in the survey in response to the prompt: 'How many children do you have living in your household?'

6. *Water Source.* This is a variable reporting the respondent's main water source. It was recorded in the survey in response to the prompt: 'Which is your main water drinking source?' [Water from Government outside your house, Water from Government inside your house, Well (trombo), WTU, Bottled Water, Other]

7. *Filter at home.* This is a variable reporting if the respondent has a filter at home. It was recorded in the survey in response to the prompt: 'Do you have a water filter at home?'

8. *Diarrhea.* This is a variable reporting if somebody in the respondent's household experienced diarrhea in the last 4 weeks. It was recorded in the survey in response to the prompt: 'In the last 4 weeks, has somebody in your household experienced diarrhea?'

9. *Vomits.* This is a variable reporting if somebody in the respondent's household experienced vomiting in the last 4 weeks. It was recorded in the survey in response to the prompt: 'In the last 4 weeks, has somebody in your household experienced vomiting?'

10. *Fever.* This is a variable reporting if somebody in the respondent's household experienced fever in the last 4 weeks. It was recorded in the survey in response to the prompt: 'In the last 4 weeks, has somebody in your household experienced fever?'

11. *Preference.* This is a variable reporting which sample of water the respondent prefers in the *Blind Taste Test*. It was recorded in the survey in response to the prompt: 'Which sample did you prefer?' [Chlorinated, Filtered, Both]

12. *Order.* This is a variable reporting what sample of water the respondent tastes first in the *Blind Taste Test*. [Chlorinated first, Filtered first]

13. *Water or tea.* This is a variable reporting which sample of water the respondent tastes between water and tea in the *Blind Taste Test*. [Water, Tea]

14. *Willingness to Pay.* This variable is measured following the standard protocol used in the literature to realize the BDM procedure (Becker et al., 1964).

15. *Taste scale.* This is a variable reporting how much, on a scale from 1 to 5, the respondent likes the taste of water (in both the *Taste Experiment* and *Familiarity Experiments*). It was recorded in the survey in response to the prompt: 'On a scale from 1 to 5, how much do you think this water is tasty, where 1 is very bad tasting and 5 is very good tasting?' [Very bad taste, Bad taste, neutral, Good taste, Very good taste]

16. *Health scale.* This is a variable reporting how much, on a scale from 1 to 5, the respondent believes the water to be healthy (in both the *Taste Experiment* and *Familiarity Experiments*). It was recorded in the survey in response to the prompt: 'On a scale from 1 to 5, how much do you think this water is healthy, where 1 is very unhealthy and 5 is very healthy?' [Very unhealthy, Unhealthy, Neutral, Healhty, Very healthy]

17. *Color scale.* This is a variable reporting how much, on a scale from 1 to 5, the respondent believes the water to have a good color in the *Familiarity Experiment* in Asyut. It was recorded in the survey in response to the prompt: 'On a scale from 1 to 5, how much do you think this water has a good color, where 1 is very bad and 5 is very good?' [Very bad color, Bad color, Neutral, Good color, Very good color]

18. *Culture scale.* This is a variable reporting how much, on a scale from 1 to 5, the respondent believes the water to be culturally suitable in the *Familiarity Experiment* in Asyut. It was recorded in the survey in response to the prompt: 'On a scale from 1 to 5, how much do you think this water is suitable to prepare your traditional drinks (e.g. tea) and cook your traditional dishes, where 1 is extremely unsuitable and 5 is

extremely suitable?' [Extremely unsuitable, Unsuitable, Neutral, Suitable, Extremely Suitable]

Appendix D Cost-Benefit Analysis

We assess the cost-effectiveness of providing safe water through chlorination and filtration over a four-year period, based on observed adoption rates in our study and health impact estimates from Haushofer et al. (2021). That study finds that four years of community-wide provision of chlorinated water in rural Kenya reduced all-cause under-5 mortality by 1.4 percentage points, from a baseline of 2.2%. We linearly scale this estimate according to observed adoption rates in our context: 49.5% for chlorinated water and 91.2% for filtered water.

Each household consumes 20 buckets of 20-liter water per month (five per week). We estimate costs both with and without transportation for filtered water, as households may choose to pay for delivery from the nearest treatment unit. In contrast, chlorine can be added on-site using tablets.[33] We use the following per-bucket prices:

- Chlorinated water: $0.017
- Filtered water (no delivery):$0.04
- Filtered water (with delivery):$0.20; we assume a conservative cost, while on average the cost of delivery is around $0.10

Assuming 12 months per year for 4 years, this implies a total of 960 buckets per household. We compute:

1. Total cost per household over four years.
2. Expected reduction in under-5 mortality (scaled by adoption).
3. Cost per life saved for 1,000 households, assuming one child under 5 per household (conservative estimate for rural Egypt) and a baseline mortality of 2.2%.

We further assume that: (i) the relationship between adoption and impact is linear; (ii) the estimates from Haushofer et al. (2021) are fully transferable (although these are conservative, since filtered water is healthier than chlorinated water and removes excess salts); and (iii) there are no economies of scale in delivery.

[33] In this model, we do not consider chlorine delivery, as people in the area typically purchase it directly from stores.

Results

Costs per Household (4 years)

Water Type	Cost per Bucket	Total Cost (4 yrs)
Chlorinated (no delivery)	\$0.017	\$16.32
Filtered (no delivery)	\$0.04	\$38.40
Filtered (with delivery)	\$0.20	\$192.00

Adjusted Mortality Reduction.

Water Type	Adoption Rate	Δ Under-5 Mortality (pp)
Chlorinated	49.5%	0.693 pp
Filtered	91.2%	1.277 pp

Cost per Life Saved (1,000 Households) Assuming 1 child under age 5 per household and a baseline mortality of 2.2%, we expect 22 deaths in 1,000 households over 4 years without intervention. Applying the adjusted mortality reductions:

Water Type	Delivery?	Total Cost	Lives Saved	Cost per Life Saved
Chlorinated	No	\$16,320	6.93	\$2,356
Filtered	No	\$38,400	12.77	\$3,007
Filtered	Yes	\$192,000	12.77	\$15,036

Benchmark Comparison

Benchmark	Cost per Life Saved
WHO "highly cost-effective" (LICs)	\$1,000–3,000
GiveWell median top charity (AMF)	\$5,000–7,500
GAVI (vaccines)	\$1,000–3,500

Filtered water without delivery appears extremely cost-effective, exceeding most global health benchmarks. Including delivery costs increases total costs, but it is important to note that the health effects may be underestimated compared to chlorinated water.

References

African Development Bank (2015). Environmental and social management framework (esmf). national drainage programme egypt.

Ahuja, A., M. Kremer, and A. P. Zwane (2010). Providing safe water: Evidence from randomized evaluations. *Annu. Rev. Resour. Econ. 2*(1), 237–256.

Alia, T. (2019). Potable water quality issues in upper egypt: a comparative qualitative study on drinking water quality in the rural villages of minya, upper egypt. *AUC Knowledge Fountain*.

Alsan, M., O. Garrick, and G. Graziani (2019). Does diversity matter for health? experimental evidence from oakland. *American Economic Review 109*(12), 4071–4111.

Ashraf, N., N. Bau, N. Nunn, and A. Voena (2020). Bride price and female education. *Journal of Political Economy 128*(2), 591–641.

Ashraf, N., J. Berry, and J. M. Shapiro (2010). Can higher prices stimulate product use? evidence from a field experiment in zambia. *American Economic Review 100*(5), 2383–2413.

Athey, S. and G. W. Imbens (2017). The econometrics of randomized experiments. In *Handbook of economic field experiments*, Volume 1, pp. 73–140. Elsevier.

Atkin, D. (2016). The caloric costs of culture: Evidence from indian migrants. *American Economic Review 106*(4), 1144–1181.

Banerjee, A. V., E. Duflo, R. Glennerster, and D. Kothari (2010). Improving immunisation coverage in rural india: clustered randomised controlled evaluation of immunisation campaigns with and without incentives. *Bmj 340*.

Bau, N. (2021). Can policy change culture? government pension plans and traditional kinship practices. *American Economic Review 111*(6), 1880–1917.

Bau, N., D. J. Henning, C. Low, and B. Steinberg (2024). Family planning, now and later: Infertility fears and contraceptive take-up. Technical report, National Bureau of Economic Research.

Beauchamp, G. K. and J. A. Mennella (2009). Early flavor learning and its impact on later feeding behavior. *Journal of pediatric gastroenterology and nutrition 48*, S25–S30.

Becker, G. M., M. H. DeGroot, and J. Marschak (1964). Measuring utility by a single-response sequential method. *Behavioral science 9*(3), 226–232.

Berry, J., G. Fischer, and R. Guiteras (2020). Eliciting and utilizing willingness to pay: Evidence from field trials in northern ghana. *Journal of Political Economy 128*(4), 1436–1473.

Birch, L. L. (1999). Development of food preferences. *Annual review of nutrition 19*(1), 41–62.

Bronnenberg, B. J., J.-P. H. Dubé, and M. Gentzkow (2012). The evolution of brand preferences: Evidence from consumer migration. *American Economic Review 102*(6), 2472–2508.

Buccione, G. (2026). Religious messaging and adaptation to water scarcity: Evidence from jordan. Technical report, Working paper.

Buccione, G. and M. Rossi (2024). Tasty, traditional, and healthy water: The impact of novel technologies that consider local culture on safe water adoption. *AEA RCT Registry*.

Burlig, F., A. Jina, and A. Sudarshan (2026). The value of clean water: Experimental evidence from rural india. *American Economic Review 116*(3), 1148–1187.

CAPMAS (2023). Central agency for public mobilization and statistics report 2020.

Cohen, J., P. Dupas, and S. Schaner (2015). Price subsidies, diagnostic tests, and targeting of malaria treatment: evidence from a randomized controlled trial. *American Economic Review 105*(2), 609–645.

de França Doria, M. (2010). Factors influencing public perception of drinking water quality. *Water policy 12*(1), 1–19.

de França Doria, M., N. Pidgeon, and P. R. Hunter (2009). Perceptions of drinking water quality and risk and its effect on behaviour: A cross-national study. *Science of the total environment 407*(21), 5455–5464.

De Guzman, A., V. C. de los Reyes, M. N. Sucaldito, and E. Tayag (2015). Availability of safe drinking-water: the answer to cholera outbreak? nabua, camarines sur, philippines, 2012. *Western Pacific Surveillance and Response Journal: WPSAR 6*(3), 12.

Devoto, F., E. Duflo, P. Dupas, W. Parienté, and V. Pons (2012). Happiness on tap: Piped water adoption in urban morocco. *American Economic Journal: Economic Policy 4*(4), 68–99.

Duflo, E., P. Dupas, T. Ginn, G. M. Barasa, M. Baraza, V. Pouliquen, and V. Sharma (2019). Hiv prevention among youth: A randomized controlled trial of voluntary counseling and testing for hiv and male condom distribution in rural kenya. *PloS one 14*(7), e0219535.

Dupas, P., V. Hoffmann, M. Kremer, and A. P. Zwane (2016). Targeting health subsidies through a nonprice mechanism: A randomized controlled trial in kenya. *Science 353*(6302), 889–895.

Dupas, P. and E. Miguel (2017). Impacts and determinants of health levels in low-income countries. In *Handbook of economic field experiments*, Volume 2, pp. 3–93. Elsevier.

Dupas, P., B. Nhlema, Z. Wagner, A. Wolf, and E. Wroe (2023). Expanding access to clean water for the rural poor: experimental evidence from malawi. *American Economic Journal: Economic Policy 15*(1), 272–305.

Egyptian Organization For Human Rights (2009). Water pollution: a time bomb threatening the life of egyptians.

FAO (2022). *The state of the world's land and water resources for food and agriculture: ystems at breaking point.*

Foster, A. D. and M. R. Rosenzweig (2010). Microeconomics of technology adoption. *Annu. Rev. Econ. 2*(1), 395–424.

Giuliano, P. and N. Nunn (2021). Understanding cultural persistence and change. *The Review of Economic Studies 88*(4), 1541–1581.

Haushofer, J., M. Kremer, R. Maertens, and B. J. Tan (2021). Water treatment and child mortality: Evidence from kenya. Technical report, National Bureau of Economic Research.

Jalan, J. and E. Somanathan (2008). The importance of being informed: Experimental evidence on demand for environmental quality. *Journal of development Economics 87*(1), 14–28.

Jaravani, F. G., P. Massey, J. Judd, J. Allan, and N. Allan (2016). Closing the gap: the need to consider perceptions about drinking water in rural aboriginal communities in nsw, australia. *Public Health Research & Practice 26*, 1–5.

Kipsang, N. K., J. K. Kibet, and J. O. Adongo (2024). A review of the current status of the water quality in the nile water basin. *Bulletin of the National Research Centre 48*(1), 1–20.

Logan, T. D. and P. W. Rhode (2010). Moveable feasts: A new approach to endogenizing tastes. *manuscript (The Ohio State University).*

Lowes, S. (2022). Culture in historical political economy. Technical report, National Bureau of Economic Research.

Lowes, S. and E. Montero (2021). The legacy of colonial medicine in central africa. *American Economic Review 111*(4), 1284–1314.

Luoto, J., M. Mahmud, J. Albert, S. Luby, N. Najnin, L. Unicomb, and D. I. Levine (2012). Learning to dislike safe water products: results from a randomized controlled trial of the effects of direct and peer experience on willingness to pay. *Environmental science & technology 46*(11), 6244–6251.

Milkman, K. L., J. Beshears, J. J. Choi, D. Laibson, and B. C. Madrian (2011). Using implementation intentions prompts to enhance influenza vaccination rates. *Proceedings of the National Academy of Sciences 108*(26), 10415–10420.

Mokyr, J., C. Vickers, and N. L. Ziebarth (2015). The history of technological anxiety and the future of economic growth: Is this time different? *Journal of economic perspectives 29*(3), 31–50.

Null, C., M. Kremer, E. Miguel, J. G. Hombrados, R. Meeks, and A. P. Zwane (2012). Willingness to pay for cleaner water in less developed countries: systematic review of experimental evidence. *The International Initiative for Impact Evaluation (3iE).*

Nunn, N. (2019). Rethinking economic development. *Canadian Journal of Economics/Revue canadienne d'économique 52*(4), 1349–1373.

Nunn, N. (2021). History as evolution. In *The handbook of historical economics*, pp. 41–91. Elsevier.

Owen, A., J. Colbourne, C. Clayton, and C. Fife-Schaw (1999). Risk communication of hazardous processes associated with drinking water quality—a mental models approach to customer perception, part 1—a methodology. *Water science and technology 39*(10-11), 183–188.

Pooi, C. K. and H. Y. Ng (2018). Review of low-cost point-of-use water treatment systems for developing communities. *npj Clean Water 1*(1), 11.

Said, I., A. N. Abd-Elgawad, E.-M. M. Seleem, S. A. Zeid, and S. A. Salman (2022). Multivariate statistics explaining groundwater chemistry, asyut, egypt. *Environmental Monitoring and Assessment 194*(9), 669.

Said, I., S. A. Salman, and A. A. Elnazer (2022). Salinization of groundwater during 20 years of agricultural irrigation, luxor, egypt. *Environmental geochemistry and health 44*(11), 3821–3835.

Staehle, H. (1934). The reaction of consumers to changes in prices and income: a quantitative study in immigrants' behavior. *Econometrica: Journal of the Econometric Society*, 59–72.

Strang, V. (2001). *Evaluating water: cultural beliefs and values about water quality, use and conservation*. Water UK publications.

Thornton, R. L. (2008). The demand for, and impact of, learning hiv status. *American Economic Review 98*(5), 1829–1863.

Tversky, A. and D. Kahneman (1974). Judgment under uncertainty: Heuristics and biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *science 185*(4157), 1124–1131.

UNICEF (2023). Triple threat: How disease, climate risks, and unsafe water, sanitation and hygiene create a deadly combination for children. Report, UNICEF, New York: United Nations Children's Fund.

Ventura, A. K. and J. Worobey (2013). Early influences on the development of food preferences. *Current biology 23*(9), R401–R408.

WHO (2006). A compendium of drinking water quality standards in the eastern mediterranean region. Technical report, WHO.

WHO (2011). Guidelines for drinking-water quality. *WHO chronicle 38*(4), 104–8.

WHO (2020). World health statistics 2020.

World Bank (2017). Reducing inequalities in water supply, sanitation, and hygiene in the era of the sustainable development goals: Synthesis report of the wash poverty diagnostic initiative. Technical report, World Bank.

Wright, J. A., H. Yang, U. Rivett, and S. W. Gundry (2012). Public perception of drinking water safety in south africa 2002–2009: a repeated cross-sectional study. *BMC public health 12*, 1–9.