Household Water Connections in Tangier, Morocco

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Sector(s): Health

Fieldwork: Innovations for Poverty Action (IPA)

Location: Tangier, Morocco

Sample: 1,000 home owners in urban areas

Target group: Urban population Families and households

Outcome of interest: Citizen satisfaction Diarrhea Water quality

Intervention type: Housing and neighborhoods Water, sanitation, and hygiene

AEA RCT registration number: AEARCTR-0001649

Data: Download dataset from Open ICPSR

Partner organization(s): Amendis, Veolia Water

Most interventions to connect poor households to the drinking water network are primarily concerned with physical health, but improved water access may have other important effects on household well-being by reducing the amount of time spent fetching water. Researchers conducted a randomized evaluation to look at the effect of private connections in a setting where most households already had access to high-quality water through public taps. They found that households in Tangiers, Morocco had a high willingness to pay for piped water, and while home water connection had no impact on waterborne illness, households' self-reported happiness improved substantially.

Policy issue

Access to water is a critical factor in household welfare, in large part because of the well-established health benefits of a reliable, clean water supply. But it is difficult, in most settings, to separate the effects of clean water from the effects of increased quantity and convenience. A limited water supply affects the lives of the poor in many ways beyond health. Fetching water is time-and-labor-intensive, which could detract from education or productive activities, a burden which is thought to fall disproportionately on women and children. When a family's water supply is limited or contested, it can be a source of tension within and among households. And inconvenient access to water may contribute to stress or unhappiness.

Context of the evaluation

In urban Morocco, the setting of this study, households that rely on public taps spent more than seven hours a week collecting water, despite a relatively high density of water taps. In this sample, 65 percent of households without a water connection reported that water was a major source of concern: 16 percent had a water-related conflict within the family, and 12 percent had a conflict with their neighbors. Thus, both within the family and between families, water was an important source of stress and tension.



Women wash laundry outdoors.

Photo credit: Aude Guerrucci | J-PAL/IPA

Details of the intervention

In 2007, Amendis, the local affiliate of Veolia Environnement, an international, private utility company, launched a social program that offered low-income households in Tangier, Morocco a chance to get an in-home connection to the city water system. Amendis identified three zones to work in, and then a team surveyed households within those areas to find those that were not connected to the city water system. Almost 60 percent of unconnected households relied on public taps for their water. Of the households relying on the public taps, about one in five lived close enough to the public tap to use a hose to fill water containers, but the rest had to take their containers to the public tap. Households that filled containers at the public taps spent more than seven hours a week collecting water. The 40 percent of households not getting their water from the public taps were using a neighbor's connection; these informal connections are technically illegal, but often overlooked.

Amendis offered low-income households in the three zones a chance to buy a connection to the water and sanitation network at full price, but on interest-free credit. Depending on the zone's distance from the water grid, households in that zone were offered

a three, five, or seven-year loan that would be paid off at MAD 105 (US$15) per month with their monthly water bill. This is a substantial expense for these households: at the time, the minimum hourly wage in Morocco was MAD 9.6, and this likely overestimates the average wage among these low-income households as a majority of individuals were either casual workers or unemployed.

Group	Loan offer	Encouragement
Treatment	Interest-free loan from Amendis to buy a water connection, paid back at MAD 105 per month over three, five, or seven years	• Door-to-door awareness campaign to encourage households to buy a connection. • Pre-approval for the loan from the authorities. • Project officers assisted households in preparing all paperwork and identification documents required for the application. • Branch officer visited households to collect the downpayment.
Comparison	Interest-free loan from Amendis to buy a water connection, paid back at MAD 105 per month over three, five, or seven years	No application assistance given.

Because both the treatment and comparison groups were eligible for the loan program, the researchers used a randomized encouragement design to evaluate the impact of the program. The assistance that treatment group households received in applying for a connection made them much more likely to buy a water connection. The difference in the proportion of people that enroll in the program in the treatment and comparison groups enables researchers to estimate the impact of the program.

Households were surveyed in 2007, before the start of the program, and again in 2008, five months after the water connections were installed in treatment households that enrolled. Information was collected on household socioeconomic characteristics, health, hygiene practices, water collection, work and work-related conditions, time use, and social networks. In a random subset of households, the water was tested for levels of chlorine and the presence of *E. coli*. Households with children under 15 years old were asked to fill out a month-long "illness diary" to track instances of fever, vomiting, or diarrhea in the children, and children's school participation was also tracked with surveys.

In January 2009, all comparison-group houses were informed about the program, including information on the various procedures required to apply for it, as part of a survey debrief. Administrative data on in-home water connection applications was obtained in August of 2009 to find out whether comparison-group houses had subsequently applied for a connection.

Results and policy lessons

The awareness campaign coupled with application assistance dramatically increased the number of people who bought a connection. Six months after the awareness campaign, 69 percent of the treatment group had purchased a connection to the water system, compared to only 10 percent of comparison households.

Households valued their in-home water connection. The differential pricing between the zones had little effect on how many households bought a connection. Three years into the program, no households had been disconnected from the grid for defaulting on their loan or on water payments, and 44 percent of households had paid all installments to date.

Connecting houses to the water grid increased the quantity of water families consumed. Households in the treatment group were 20 percentage points more likely to report having enough water for bathing and 16 percentage points more likely to report having enough water for cleaning.

Getting connected had no effect on the quality of drinking water or household health. E. coli levels were the same in both treatment and comparison houses. Likely because of this, the program did not have any effect on incidences of water-borne illness in children or adults. These results suggest that water quantity alone plays a very small role in health in the context studied.

Household water connections saved families a significant amount of time; this extra time was spent primarily on leisure activities. The time that families in the treatment group spent fetching water decreased from half an hour per day to essentially zero. The time saved did not increase the time family members spent generating income, through working or starting a business, or the time that children spent studying. As a result, the program had no impact on household income or school completion. Overall, households used the time saved primarily for leisure activities, such as watching TV and socializing.

Getting connected to the water system reduced conflict and increased overall quality of life. In the comparison group, 16 percent of households were having conflict with family members over water-related issues, while 12 percent were in disagreement with neighbors. These tensions were almost completely eliminated in the treatment group. Connections also improved treatment households' perceived quality of life, with the number of households reporting that life had improved in the last year almost doubling (from 23 percent to 44 percent).

When comparison households saw their neighbors benefitting from a private water connection, they were more likely to buy one themselves. Eighteen months after the awareness campaign and eight months after a study debrief explaining the program, 33 percent of households with at least one treatment house within 20 meters had a connection, compared with only 15 percent

among households with no treatment houses nearby.

Families highly valued convenience and ease of access to water. Households in Tangier were willing to pay a lot for increased water quantity and convenience. Though people did not use the extra time generated for productive activities, the extra time and the decrease in stress levels related to water collection increased households' self-reported happiness. This may imply that, in cases where large investments are undertaken to connect villages to clean drinking water, households may be willing to pay for part of the "last mile" of individual connection, and this may greatly increase the social return of the fixed investment.

Facilitating access to credit could enable households to invest in costly quality-of-life improvements. Households would not be able to pay for the fee upfront but continued to pay in installments.

Information on what benefits are available, and help navigating administrative procedures, are important in ensuring access to services. Given the large increase in household well-being after tap installation, it is striking that the simple "nudge" of providing information and facilitating administrative procedures had such a large effect on the take-up of the credit offer from Amendis. This could be due either to a lack of information about the credit program or to the fact that households were not able to surmount the administrative barriers imposed by the program. This suggests that not only making credit available but also simplifying or assisting with the application process could greatly increase families' willingness to invest in water connections.

Social networks are an important channel for learning about new programs and benefits. Comparison households were more likely to buy a connection when they saw their neighbors benefiting from having a connection. Similarly, households given a free, long-lasting insecticidal bednet in Kenya were more likely to buy one later, as were their neighbors, presumably because they learned about the benefits of the product.

Devoto, Florencia, Esther Duflo, Pascaline Dupas, William Parientì©, and Vincent Pons. 2012. "Happiness on Tap: Piped Water Adoption in Urban Morocco." American Economic Journal: Economic Policy 4(4): 68-99.