

# BRIEFCASE

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## CLEANER WATER AT THE SOURCE

Protecting naturally occurring springs with simple infrastructure significantly improved source water quality and reduced the incidence of diarrhea in young children by one-quarter.



Each year more than one million children under the age of five die from diarrheal diseases, which are often caused by unsafe drinking water. Even when diarrheal episodes are not fatal, they can lead to severe dehydration and have long-term impacts on children's cognitive and physical development. Diarrheal diseases are often transmitted when a water supply is contaminated with fecal matter and bacteria are passed into the mouth either through drinking, bathing, or touching one's face with dirty hands.

Though the technology exists to deliver uncontaminated water to households through pipes, in developing countries such methods are prohibitively expensive in most rural settings where households are far apart. In areas where decentralized water sources such as wells, boreholes, or springs are the norm, local governments and donors commonly fund the construction of new or improved water sources to combat diarrheal disease.

J-PAL affiliate Michael Kremen, Jessica Leino, J-PAL affiliate Edward Miguel, and Ali Zwiwe implemented the first randomized evaluation of spring protection, an intervention already widely used throughout Africa to improve source water quality. Spring protection entails sealing off a spring's water source and encasing it in concrete so that water flows out from a pipe—and directly into a water collector's bucket—rather than seeping from the ground where it is vulnerable to contamination. The evaluation addressed several questions: Can protecting springs reduce diarrhea in children? Are local populations willing to pay for access to improved water sources?

- **Spring protection dramatically improved source water quality.** Protecting naturally occurring springs with a simple concrete base and pipe reduced fecal matter contamination by two-thirds at the water source and by nearly one-quarter in users' home water supply.
- **Spring protection can be a cost-effective option to reduce diarrhea in young children.** Although some of the water quality improvement was lost when households transported or stored water in dirty containers, spring protection nonetheless reduced reported diarrhea in children by one-quarter. Spring protection is also highly cost-effective when a sufficient number of users collect water from a common spring (Figure 2).
- **Despite the benefits, households are not willing to pay very much for cleaner water.** Researchers estimate that households in the study area were only willing to pay US\$2.96 for one year of spring protection, and US\$16.61 to avert one child diarrheal death—far less than the estimated values typically used by public health planners. Low valuation by households may present a rationale for governments to subsidize water treatment.

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