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Behavioral Insights for the Water Sector: Improving Outcomes by Changing Mindsets

George Joseph, Sophie Ayling, and Alejandra Quevedo Cardona



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Preface

Renewed energy for experimental approaches, inspired by behavioral economics, have led to increased use of evidence in development policy and practice. Some Nobel Prize winners in economics—Richard Thaler in 2017 and Abhijit Banerjee and Esther Duflo in 2019—were inspiring leaders in this respect. Thaler’s central thesis—that humans can be driven by “automatic” thinking in their decision making that is often more intuitive, emotional, and heuristic-based than rational or reasoned—has inspired policy makers around the world. In 2017, the Organization for Economic Co-operation and Development (OECD) conducted a survey collecting examples of the application of behavioral insights in public policy across 159 case studies in 23 countries, as well as in international organizations such as the United Nations (UN) and the World Bank. In the World Bank, behavioral thinking resulted in the creation of the Mind, Behavior, and Development Unit (eMBeD), which is now working with World Bank clients in more than 50 countries and 80 projects around the developing world to apply and test behavioral insights.

Methods such as randomized control trials (RCTs) and nimble evaluations can help test the effects of different types of interventions. Banerjee and Duflo won the Nobel Prize for their experimental approach to alleviating global poverty. Their thinking has called for the need to test what works in development policy before a large-scale rollout through the adoption of rigorous evaluation methods, primarily RCTs. Since then, other pioneers, such as Dean Karlan, the founder of Innovations for Poverty Action (IPA), have sought to find ways to combine elements of these two approaches through the promotion of nimble evaluations. These seek to apply small-scale, often more behaviorally inspired, light-touch interventions coupled with rigorous but low-cost evaluations. Nimble evaluations could still potentially hold a large-scale impact while producing a noticeable change in a short period of time.

In 2018 Nimble Pilots for Effective Water Operations was initiated as advisory services and analytics (ASA) to streamline efforts to design and implement impact evaluations, both traditional and nimble, to test the influence of interventions in the water sector. On a global level there had been similar evaluations across multiple sectors, but only a few within this sector specifically and several questions remained, not just unanswered but also unaddressed. Within the Water Global Practice at the World Bank, the team saw the opportunity to deepen the focus of such approaches.

There has been renewed energy for experimental approaches inspired by behavioral economics to increase the use of evidence in the formation of development policy and practice. The main purpose of this report is to (a) give the reader an understanding of how behaviorally informed interventions and impact evaluations can be useful in the water and other infrastructure sectors with examples from literature; (b) highlight the lessons from work conducted as part of this ASA, specifically

on nimble and traditional impact evaluations in water supply and sanitation (WSS); and finally (c) draw attention to unanswered questions that remain.

Chapter 1 posits that many of the challenges that the infrastructure sectors face could benefit from the use of a behavioral lens. It outlines a theoretical framework on how to do this, explains why it is useful for the task team leader to use such an approach, and outlines the manifestations of these challenges with concrete examples from WSS. It also briefly describes what nimble versus traditional evaluations are.

Chapter 2 summarizes some of the key lessons from work that this ASA has enabled in rapid or nimble evaluations and traditional evaluations to address WSS challenges using behavioral approaches. Topics include pilot behavioral interventions to get customers to connect to the sewer network, willingness-to-pay experiments for onsite sanitation promotion, experiments to get customers to save water, and an experiment at the service provider level to improve utility staff performance and motivation in service delivery. In addition, results from traditional impact evaluations that look at the effects of longer-term projects will be shared, including studies from Lao People’s Democratic Republic and Cambodia comparing social marketing and targeted subsidies for sanitation; a study in Punjab on the effect of the Swachh Bharat intervention on toilet construction and use and hygiene behavioral change; and a large-scale rural intervention in Nicaragua focused on capacity building of municipal and community-level water administrations to promote water conservation.

In the third and final chapter, the report will articulate the questions that remain underexplored in the sector from a behavioral approach. This includes issues of water quality and conservation, improving safe fecal sludge management, and empowering women and girls to take care of their menstrual hygiene. It highlights evaluations that have addressed some of these questions yet show more evidence is needed. Most of the studies present conclusions on willingness to pay for water and sanitation services and highlight behavioral issues that affect adoption and sustained use of such services.

Box P.1 What Is Behavioral Economics?

The idea of a *homo economicus*—a rational and self-interested individual with stable preferences and linear and controlled processes—was for a long time the dominant theory of human behavior in economics. More recently, psychologists have offered an outside-in reality check to the prevailing economic doctrine.

Kahneman, Slovic, and Tversky (1982) challenged ideas about human nature held by mainstream economics, showing that human decision making is not always driven by rational thought. Although their ideas about the limits of rationality were not new thoughts in economics, the research program of heuristics and biases made key methodological contributions as it advocated for an experimental approach. Kahneman, Slovic, and Tversky (1982) used a dual-system theoretical framework (system 1 versus system 2 thinking) to explain how judgment and decisions that people make in their daily lives often do not conform with notions of rationality. On one hand, system 1 is composed by the thinking processes that are intuitive, automatic, and relatively unconscious. On the other hand, system 2 is more reflective, controlled, and analytical. Richard Thaler, known as the founder of behavioral economics, was inspired by these authors and the aforementioned theories to coin the concept of mental accounting (Samson 2014).

Behavioral economics suggests that human decisions are strongly influenced by context, whereas behavior itself varies across time, space, and cognitive biases. It uses psychological experimentation to understand behavioral regularities in human decision making to identify the biases people may have. New tools brought by behavioral economics enhance the understanding of the development process and the way policies and interventions are both designed and implemented to be more efficient.

Over the past two decades, behavioral economics has moved from a purely academic point of interest to the forefront of mainstream policy in institutions around the world. It has become more prominent in public and international organizations, some of which have developed their own units dedicated to behavioral analysis. According to the Organization for Economic Co-operation and Development (OECD 2018), there are now 202 institutions around the world applying behavioral insights to public policy. Some examples include the Mind, Behavior, and Development unit within the World Bank, Behavioural Insights Team of the UK, and Nudge Unit of Belgium.

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The authors of this book are George Joseph (Senior Economist), Sophie Ayling (Data Specialist, Consultant), and Alejandra Quevedo (Research Assistant, Consultant) with the World Bank. Work on this book commenced in January 2021 to synthesize several research initiatives since 2018. Team members who made substantial contributions to the analysis outlined in this work include Yi Rong Hoo (Data Analyst, Consultant), Pepita Miquel-Florensa (Associate Professor, Toulouse School of Economics), and Hernan Bejarano (Assistant Professor, Center for Research and Teaching in Economics).

This work was completed under the guidance of Soma Ghosh Moulik (Practice Manager,) and Richard Damania (Chief Economist) of the World Bank. The team also thanks peer reviewers Dominick Revell de Waal (Senior Economist), Pratibha Mistry (Senior Water Supply and Sanitation Specialist), and Aidan Coville (Senior Economist, Development Impact Evaluation) for their insightful comments and suggestions. Other colleagues from operations whose support made this work possible include Josses Mugabi (Senior Water Supply and Sanitation Specialist), Habab Taifour (Senior Water Resource Management Specialist), Yitbarek Tessema Mammo (Senior Water Supply and Sanitation Specialist), Antonio Rodriguez Serrano (Senior Water Supply and Sanitation Specialist), Christian Borja-Vega (Senior Economist), Alona Daniuk (Program Assistant), Jonathan Grabinsky Zabludovsky (consultant), Nishtha Mehta (Water Supply and Sanitation Specialist), Lilian Pena Pereira Weiss (Senior Water Supply and Sanitation Specialist), Odete Duarte Muximpua (Water Supply and Sanitation Specialist), Ruth Kennedy Walker (Water Supply and Sanitation Specialist), Sanjay Pahuja (Lead Water Resource Management Specialist), Luis Alberto Andres (Sector Leader), and Amanuel Teshome Woldetsadik (ET Consultant). The team also thanks Practice Managers Catherine Tovey and Maria Angelica Sotomayor Araujo.

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Executive Summary

Infrastructure challenges need to be addressed with a fresh perspective. Incorporating behavioral insights and experimental approaches offer a means to do so.

Challenges in infrastructure sectors go beyond financing and could benefit from a rethink. Infrastructure—including water, sanitation, transport, and energy—is a key driver of economic growth. Despite this, most infrastructure sectors suffer from significant challenges. The most obvious is the investment gap, but beyond this, inefficiencies stem from suboptimal use of available inputs, limited exploitation of scale economies in service provision, and intended consumers underutilizing the existing infrastructure stock. Infrastructure sectors, including water, have several public good characteristics and externalities on others, which mean the private sector alone cannot meet the required demand. In this sense, there is a strong case for public spending on infrastructure, even in the neoclassical economics tradition. Moreover, because of large initial investments and declining marginal costs, infrastructure service provision also shows monopolistic characteristics, which in turn poses constraints on relying on demand and supply as the drivers of consumption and investment decisions. All these call for a rethinking on how to address the challenges infrastructure sectors face. Incorporating behavioral insights and experimental approaches opens an avenue by which to do so, as the present report shows.

The winners of Nobel Prizes in the past five years have renewed energy for experimental approaches to increase the use of evidence in development policy and practice. Specifically, Thaler's contributions to behavioral economics in 2017 and Banerjee, Duflo and Kremer's recognition for their use of experimental approaches in 2019. The main purpose of this report is to (a) provide the reader with an understanding of how experimental evaluations of behavioral interventions can be useful with examples drawn from literature; (b) highlight the lessons from analytical work conducted as part of this advisory services and analytics (ASA), specifically on nimble and traditional impact evaluations in water supply and sanitation (WSS); and finally (c) draw attention to unanswered questions that can be addressed by behavioral approaches.

Behavioral economics has encouraged a broader understanding of human decision making that can be applied to bottlenecks in infrastructure. It has contributed to a departure from the understanding that rational self-interest and profit-maximizing goals largely drive human motivation. Instead, it leads to the characterization of humans as having bounded rationality and regularly taking mental shortcuts to make decisions based more on intuition, emotion, or heuristics. These behavioral regularities often interact with market imperfections and market failures to exacerbate or diminish their impacts. Like all facets of human decision making, these have led to specific bottlenecks for decision making in infrastructure investment and its efficient utilization.

The first chapter posits that many of the challenges that the infrastructure sectors face could benefit from the use of a behavioral lens. It uses the *behavioral infrastructure triad* framework—constituted by policy makers, service providers, and customers—to describe how behavioral barriers can come into play at each step of the service delivery chain. Many of the challenges highlighted are difficult to explain from conventional economics models based on *homo economicus* agents. The policy maker has to make choices regarding infrastructure investments within the context of multiple competing interests, and time horizons of political terms may skew their decisions toward visible short-term gains. If there is no salient demand from the public to invest in WSS, the sector is also more likely to face investment neglect. For the service provider, employee motivation and capacity are central to service delivery quality. Yet very little is known about how to address motivational issues and where and when capacity-building initiatives affect service quality improvement. Additionally, behavioral interventions can be used to inform the design of nonfinancial incentives. There is evidence that nonfinancial incentives can be more effective in public sector institutions in which employees are pro-socially motivated from other sectors, but there are few examples this being applied in WSS. The most well-known area of behavioral interventions being used across the board is to change the behavior of the end user or customer. This is also where consumer perceptions, attitudes, and behaviors play the most obvious role. Sanitation marketing and community-led total sanitation (CLTS) are the best examples of providers seeking to influence household behavior through leveraging social norms or aspirational principles.

The second chapter compiles seven overarching lessons from studies conducted within the Water Global Practice showing how behavioral interventions can make a difference to service provider and consumer behaviors. The studies drawn upon were largely supported by this ASA and addressed questions such as how to encourage better maintenance of WSS infrastructure in both rural areas (Nicaragua) and urban utilities (Ethiopia); how to incentivize workers to improve the quality of service in a utility (Ethiopia); how to encourage connection to newly constructed sewer lines (Zambia) or adoption of improved onsite sanitation (Zambia, Lao People's Democratic Republic, and Cambodia); and how to encourage construction and use of toilet facilities and better hygiene practices (Punjab, India). The key lesson to be drawn from these studies is that for the service provider, capacity building and improving employee motivation can make a difference to service delivery. To encourage adoption and sustained, responsible use of WSS by the customer, the research recommends to (a) harness social influence and norms, (b) provide information and reduce hassle factors, (c) recognize customer competing priorities and natural inertia for change, (d) recognize loss aversion and the pain of paying, (e) encourage champions and aspirational leadership, and (f) recognize customer diversity and segmentation. All interventions described use a combination of nimble evaluation and traditional impact evaluation methods and simple structured survey approaches.

The third and final chapter addresses remaining questions that could be further explored using the behavioral and nimble approaches outlined in this report. The chapter explores potential questions on encouraging collection rates for water services, ensuring good-quality last-mile connections, and encouraging trust in utilities. Several studies showed the importance of behavioral factors, such as social norms and framing, on these problems. Regarding safe water, the report touches on an approach of community participation to put pressure on providers to improve water quality; benchmarking of utility performance to include reaching poorer communities in terms of access; and how to encourage water treatment at the household level, where such practices are needed. On water conservation, it explores the possibility of how to encourage water conservation with perceived social rank (United States), with a reward scheme under a free basic water policy (South Africa), by encouraging water reuse in water-stressed regions, and through collective action regarding irrigation and management of groundwater by small farmers. For water conservation issues, nudges have been widely used; however, there are several matters that require further investigation and fine-tuning. Concerning the provision of sanitation services, it studies how to encourage service providers to safely transport and dispose of fecal sludge, for which CLTS approaches coupled with monetary incentives and information disclosure may be useful if encouraged by service providers. Also, it reviews how to encourage households to use safely managed fecal sludge management services citing behavioral barriers, such as diffusion of responsibility, status quo bias, and negative reciprocity. Finally, regarding hygiene, it studies how to support and increase awareness of menstrual hygiene among adolescent girls and women, where social norms play a crucial role in adoption.

Table ES.1 summarizes challenges discussed in chapter 2 and 3, focusing on the behavioral approaches used and highlighting the potential of these approaches.

TABLE ES.1
CHALLENGES ADDRESSED AND TO BE ADDRESSED IN THE WATER SECTOR
THROUGH A BEHAVIORAL LENS

Challenges	Behavioral approaches
Piped network	
✓ Main barriers to getting households to connect to the sewer network	Adoption, social norms, status quo bias
✓ Encouraging customers to pay their sewer connection fees	Consumption/willingness to pay, valuation
Ensuring good-quality last-mile connections	Willingness to pay, present bias, intertemporal choice
Encouraging collection rates for water services	Reciprocity, unperceived threat of punishment, negative descriptive norms
Encouraging trust in utilities	Trust, willingness to pay, commitment
Encouraging water point insurance	Risk aversion, discounting, intertemporal choice

Safe water	
✓	Incentivizing workers to improve their service delivery in a utility Motivation, capabilities
✓	Encourage better maintenance of water points in rural communities Motivation, awareness, capabilities
	Incentivizing providers to deliver safe water Preferences, projection bias, sunk cost fallacy
	Encouraging water treatment at the household level Social norms, social proof, inertia
Water conservation	
	Encouraging collective action among farmers in irrigation Gender biases, trust, bounded rationality
	Water conservation under social norms information treatment Social norms, inertia, habits
	Encouraging water reuse and rainwater harvesting systems Habits, inertia, availability bias
	Encouraging water conservation by farmers Priming, commitment effect, social identity
	Discouraging overuse of groundwater by small farmers Trust, social norms, commitment
Sanitation service provision	
✓	Encouraging households to adopt better onsite sanitation options Adoption, hassle factors, social norms, valuation
	Encouraging providers to safely transport and dispose of fecal sludge Affect heuristic, availability bias, possibility effect
	Encouraging households to use safely managed fecal sludge services Values, culture, negative reciprocity, lack of trust, status quo bias, low perceived benefits
Hygiene	
	Encouraging adolescent girls and women to take care of their menstrual hygiene Gender inequality, discriminatory norms, culture, lack of basic services

Note: Rows with checkmark means that the issue is addressed in one of the studies presented in the report, rows without checkmark refers to issues that haven't been widely addressed within the Water Global Practice.

Box ES.1 How Can Nimble Evaluations Be Useful for the Task Team Leaders of Investment Projects?

It is important to point out the usefulness of the impact evaluations, particularly the Nimble Evaluations, for the operational task team leaders (TTLs) of investment projects. The costs of conducting a Nimble Evaluation are just a small fraction of operational costs. But the insights from them can help at various stages along the project cycle. The potential benefits of a small change in program delivery far outweigh the cost of implementation. First, at the preparation stage, they can help the TTL on the effective design of soft components like capacity-building. Evaluating a capacity building initiative while isolating behavioral interventions in the design would help to identify what aspects of a capacity building should be taken forward. Second, at **Mid-Term Review stage**, such approaches can help the TTL evaluate where and why the project is (or is not) meeting its desired outcomes and inform any restructuring that might need to take place. They will give the TTL evidence for how to turn the course if needed and be less path dependent. For example, in chapter 2 we see how collecting data with the Lusaka Sanitation Program in Zambia is identifying where households are not taking up the newly constructed sewer network. Nimble approaches are giving us the opportunity to test out different mechanisms to improve uptake while the operation still has time to course correct. Finally, at **Implementation Completion Review (ICR) stage**, it can help the TTL to understand the reasons behind the main successes and lessons from the operation.

This report concludes with an overview of the main findings from each section and shares areas in which more research is needed. Nimble evaluations have a lot to offer in answering some of the more difficult questions in the water and sanitation sector. The chapters in this report aim to give insights into what is possible and what more can be done.

Abbreviations

AAWSA	Addis Ababa Water and Sewerage Authority
ARAS	water and sanitation regional advisors
ASA	advisory services and analytics
BCC	behavior change communication
BIT	Behavioural Insights Team
CAPS	water and sanitation committees
CHOBA	Community Hygiene Output-Based Aid
CLTS	community-led total sanitation
CPR	common pool resources
DWSS	Department of Water Supply and Sanitation
eMBeD	Mind, Behavior, and Development Unit, World Bank
FAO	Food and Agriculture Organization
FISE	Emergency Social Investment Fund, Nicaragua
FLL	field-level leadership
FMIS	farmer-management irrigation systems
FSM	fecal sludge management
HWTS	Household Water Treatment and Storage
IPA	Innovations for Poverty Action
KPI	Key Performance Indicators
Lao PDR	Lao People's Democratic Republic
LSP	Lusaka Sanitation Program
LWSC	Lusaka Water and Sanitation Company
NGO	Nongovernmental Organization
NL	Natural leaders
ODF	open defecation-free
OECD	Organization for Economic Co-operation and Development
PROSASR	Sustainability Project of the Rural Water and Sanitation Sector
RCT	Randomized Control Trial
RHS	Rainwater Harvesting Systems

SanMark	Sanitation Marketing
SBMG	Swachh Bharat Mission–Gramin
SDGs	Sustainable Development Goals
SIASAR	Rural Water and Sanitations Information System
SME	Small and medium enterprise
SNITS	Social Norms Information Treatment
TTL	Task Team Leaders
UMAS	Water and Sanitation Municipality Units
UN	United Nations
UNICEF	United Nations International Children’s Emergency Fund
US\$	United States Dollars
WASH	Water supply, Sanitation, and Hygiene
WHO	World Health Organization
WSS	Water Supply and Sanitation
ZMK	Zambian kwacha

CHAPTER 01

Infrastructure Challenges Through a Behavioral Lens



SERVICE
PROVIDERS
POLICYMAKERS
CUSTOMERS

01. Infrastructure Challenges through a Behavioral Lens

Why View Infrastructural Challenges through a Behavioral Lens?

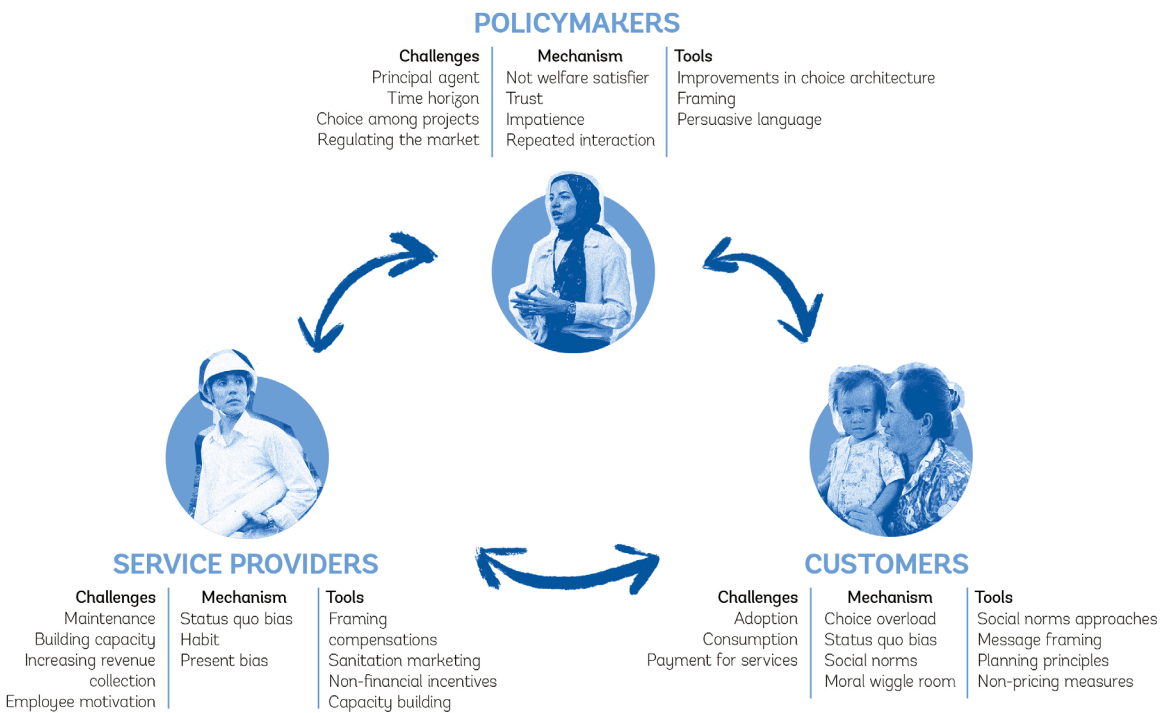
Infrastructure is a key driver of economic growth, whether it be in transport (Cantu 2017), energy (Sahin, Can, and Demirbas 2014), or water and sanitation (Frone and Frone 2014). In 2019, the total infrastructure investment globally stood at US\$2.7 trillion (Global Infrastructure Hub 2019). Although this may sound like a substantial sum, there is a pronounced infrastructure gap in developing countries. Governments are called upon to extend, improve, and better maintain existing infrastructure, but real investment does not match estimated needs. Real investments in Africa, South Asia, and Latin America are 3.5, 4.7, and 3.2 percent, respectively, though needs are estimated at 9.2, 7.5, and 4.5 percent of gross domestic product (Rozenberg and Fay 2019).

But in addition to the investment gaps and financial constraints, behavioral barriers result in challenges along the delivery chain for success in infrastructure projects. Conventional challenges in the infrastructure sector, such as choices among projects, performance and monitoring, and principal-agent problems, can (and should) be studied from a behavioral science perspective. Challenges in infrastructure are all addressed by decision-making agents—from policy makers to service provider managers and staff down to customers. The collective, organizational culture and choice architecture these parties operate in may further affect the decisions they make, in addition to their individual biases. For this reason, this chapter studies from a behavioral perspective the decisions of policy makers, service providers, and customers.

The chapter examines the decisions that characterize the investment, the management of the services provided, and users' adoption and consumption decisions (figure 1.1). First, the policy maker (principal) may not be able to observe whether the agent (service provider) follows the agreements and acts as planned in the contract. Therefore, differences between principals' and agents' time horizons can lead to suboptimal outcomes. The policy maker must balance needs, political pressures, and financial constraints when choosing projects. Behavioral tools, such as framing, persuasive language, and improvements on agent choice architecture, could help achieve better outcomes. Second, the service providers deal with employee motivation, good service performance, and capacity to adopt new practices. A behavioral

approach argues that barriers such as status quo bias, habits, and present bias can act as deterrents to change employee behaviors. Moreover, private and public employees respond differently to certain incentives. In this sense, tools such as extrinsic rewards, enhancement of managerial practices, and framing compensations can be key. Third, the customers' needs are related to adoption and sustained use. In terms of adoption, prevailing social norms, status quo bias, and choice overload affect customers' motivation to adopt new technology or services. Regarding consumption, the impression on "moral wiggle room" can lead to reducing sense of payment obligations. These challenges can be addressed using social norms approaches and planning principles or by paying attention to message framing.

FIGURE 1.1
INFRASTRUCTURE SERVICE DELIVERY TRIAD



The Policymaker's Role

Policymaker and government agent behaviors may be plagued by behavioral biases, heuristics, or social preferences guided by their environments, just like anybody else. For example, policy makers must make investment choices in the context of multiple competing interests. Time horizons of political terms may skew their decisions toward a focus on visible short-term gains. If there is no salient demand from the public to invest in water supply and sanitation (WSS) versus transport, for exam-

ple, the sector is also more likely to face investment neglect. Similarly, the context in which the choices are presented affects the likelihood of the selected option—that is, choice architecture—and this may have direct implications on the infrastructure project choice. Given the complexity, magnitude, and long-term nature of infrastructure projects, procuring authorities should conduct their due diligence and perform assessments to determine the viability of the projects (World Bank 2018). Officers may estimate that the time required to complete a task is shorter than the actual time required, or *planning fallacy*, in which the preparation phase can be incomplete, affecting the performance of the rest of the project. The process for selecting the service providers must include fairness, neutrality, and transparency (World Bank 2018). However, behaviors of procurement officers that follow some kind of present bias¹ may relate to corruption with direct implications on the way that bidders act in the procurement process.

The Service Provider

Employee motivation lies at the heart of service provision in infrastructure as it is linked to monetary and nonmonetary rewards systems and public employees' decisions. Before deciding on the type of rewards, it is relevant to acknowledge the possible selection of employees toward the public sector. As Besley and Ghatak (2018) showed, public agents may have prosocial motivation, which makes them less sensitive to monetary rewards and more sensitive to the social outcomes of their work. This implies that organizations can benefit from motivated employees because effort can be elicited at a lower cost. Therefore, the discussion of employee selection in the public sector should focus on designing contracts to elicit acceptance from the most motivated employees. The importance of incentive design cannot be underestimated as financial rewards may have perverse effects in the public sector. For example, Belle (2015) conducted an experiment in the health sector of Italy and found that, in that case, monetary incentives for activities with a prosocial impact may crowd out employee motivation.

Interventions to enhance employee motivation have taken different forms. Some include social recognition interventions (Gauri et al. 2019), the study of prosocial motivation with financial and nonfinancial rewards (Ashraf, Bandeira, and Jack 2014), and performance-related pay (Belle 2015). Results showed that interventions that incorporated social recognition in Nigeria were able to improve performance in selected contexts (Gauri et al. 2019), and in Zambia those nonfinancial rewards were effective in settings in which the power of financial incentives was limited (Ashraf, Bandeira, and Jack 2014). Moreover, Belle (2015) proved that monetary incentives can crowd out employee motivation in activities with prosocial impact, such as in the health sector.

1. Higher likelihood of selecting choice options whose payoffs are nearer in time.

Regarding good service delivery, some studies have looked at the causal impact of competition, the effect of autonomy, and managerial practices. A study in the health sector of the United Kingdom showed that the existence of rival hospitals increased managerial quality, which is associated with better hospital outcomes (Bloom, Propper et al. 2015). Also, performance under autonomy was positively associated with completion rates among bureaucrats in Nigeria (Rasul and Rogger 2018), and the allocation authority within organizations must balance agency issues (Bandeira et al. 2020). In addition, better management practices are associated with better educational outcomes in schools (Bloom, Lemos et al. 2015). Table 1.1 presents a summary of several behavioral interventions and their results. In general, the literature on providing incentives for public servants is extensive, but the main behavioral issues that can be identified are in areas of (a) employee motivation, (b) good service delivery, and (c) adoption of new practices. Table 1.1 lists a few studies that show such interventions.

TABLE 1.1
SERVICE PROVIDER BEHAVIORAL INTERVENTIONS

Authors	Country	Sector	Intervention	Results
Bloom, Propper et al. (2015)	England	Health	Study of causal impact of competition on managerial quality and hospital performance	Adding rival hospital increased managerial quality, and higher management scores are associated with better hospital outcomes.
Gauri et al. (2019)	Nigeria	Health	Social recognition intervention	Social recognition improved performance in one state but had no effect on the other.
Rasul and Rogger (2018)	Nigeria	Civil servants	Performance under autonomy, incentives, and/or monitoring	Increasing bureaucrats' autonomy is positively associated with completion rates, yet practices related to incentives/monitoring of bureaucrats are negatively associated with completion rates.
Ashraf, Bandeira, and Jack (2014)	Zambia	Health	Prosocial motivation with financial and nonfinancial rewards	Extrinsic rewards can improve the performance of agents engaged in public service delivery, and non-financial rewards can be effective in settings in which the power of financial incentives is limited.
Bandeira et al. (2020)	Pakistan	Civil servants	Effect of allocation of authority between frontline officers and their monitors	Organization design and anticorruption policies must balance agency issues at different levels of the hierarchy.
Bloom, Lemos et al. (2015)	UK, Sweden, Canada, US, Germany, Italy, Brazil, India	Education	Study of the effect of management practices in schools	Higher management quality is strongly associated with better educational outcomes.

Patel and Volpp (2012)	United States	Health	Effect of efforts of transparency and default options	Changing default options and presenting information in a better way is better for reducing calorie consumption compared to just displaying calorie information.
Álpizar et al. (2019)	Costa Rica	Water	Adaptation initiatives to change behaviors related to action against climate change in the water sector	Evidence suggests weakness in the common practice of using simple workshops for delivering capacity building and climate science.
Belle (2015)	Italy	Health	Performance-related pay effects in prosocial motivation in the public sector	Monetary incentives for activities with prosocial impact may crowd out employee image motivation. There were no crowding-out effects when a symbolic reward was substituted for the monetary incentive.

The Customer

At the customer level are two main issues: adoption and consumption/use of the service. For instance, in the water and sanitation sector, when facing an adoption decision, potential users must ponder costs and benefits of the new service or good. In this kind of environment, information can become overwhelming. The framing and type of message provided—and the attention paid to attitudes, identity, and beliefs—could play a crucial role in adoption. A good example is status quo bias, in which people are inclined to make the same or similar decisions in the future as they made in the past. Once the service is adopted, users quickly become accustomed to usage and cannot imagine their lives without the service. By this point, consumption, or use of the service, becomes influenced by several behavioral factors, such as other-regarding preferences, social norms, and habits.

Traditional factors, such as prices, costs, and credit constraints, might fail to paint a complete picture of the adoption problem. In fact, evidence has shown that factors such as wording in informational brochures, nonmonetary costs (time costs), and attitudes toward ambiguity and governments affect the adoption decision. For instance, Devoto et al. (2012) showed that willingness to pay for a private water connection is high when it can be purchased on credit because it increases the time available for leisure and reduces inter- and intrahousehold conflicts on water, eventually leading to sustained improvements in well-being. Delaire et al. (2020) showed that willingness to pay for high-quality pour-flush latrines in Kenya was much lower than the estimates of market prices. These results suggest that traditional methods—focusing on price-based incentives alone—may not provide accurate estimates of consumer demand among low-income populations. Highlighting the importance of framing, Toledo (2016) found that persuasive wording was as crucial as subsidies in affecting the adoption rates of energy-efficient light bulbs in Brazilian favelas. Also, subsidies can be targeted in a more efficient way when considering behavioral aspects. In India, monetary incentives were a valid variable to screen out the richest

individuals who were willing to pay for a water filter; however, time was a more valuable factor to assess the valuation of poorer individuals (Hoffmann 2018). Guiteras, Levinsohn, and Mobarak (2019) found that sanitation adoption may be interdependent across households with social norms, generating spillovers. In this case, subsidies in more demographically dense areas, where people were interacting more, had a bigger effect.

Overconsumption of water is an area in which behavioral approaches can induce customers to adopt new habits. Several behavioral interventions seeking to reduce consumption have taken place in different parts of the world. Datta et al. (2020) conducted a social norm intervention using neighborhood comparisons and descriptive social norms to reduce average water consumption in Belen, Costa Rica. This simple, inexpensive, and non-personalized behavioral intervention was able to reduce average water consumption by 4.9 percent with the neighborhood comparisons and by 3.2 percent with descriptive social norms. Additionally, the use of social comparisons in three water utilities in the United States showed significant decreases in consumption in two of them (Brent, Cook, and Olsen 2015). Nemati and Penn (2018) in a meta-analysis found that the effects of behavioral interventions in the water sector span from 14.8 percent in Australia to -2.80 percent in the Netherlands. In general, the information strategies reduce consumption by 5 percent. These are just a subset of examples (detailed in Joseph et al (2021)) in which behavioral approaches have been used to address consumer-level challenges. More examples of where these have been applied as part of this advisory services and analytics (ASA) are detailed in chapter 2.

Methods: Traditional Evaluations Versus Nimble Evaluations

There is an ongoing need to create robust evidence on the effects of interventions in infrastructure service delivery. Knowing the nature of the challenges to be addressed, this chapter will expand on the methods used for conducting and evaluating the interventions. Across the World Bank client countries, there is a lack of adequate data, which is an impediment to making meaningful policy assessments of service provision, formulating targets, designing incentives for improved performance, and enforcing accountability of service providers (International Evaluation Group 2017). The World Bank has an important role in generating and sharing knowledge, including innovation in the water sector through analytical work. More concretely, to reach the objectives established in the United Nations Sustainable Development Goal 6 (SDG),² an investment of US\$1.7 trillion is needed in the next 15 years, which is three times the levels estimated for previous targets. This calls for new approaches to generate and consolidate reliable and systematic evidence on the most cost-effective interventions.

2. Sustainable Development Goal 6 seeks to ensure availability and sustainable management of water and sanitation for all.

Traditional impact evaluations and nimble evaluations have become key for evidence-based policy making, in which decisions are based on outcomes and results rather than inputs. Traditional impact evaluations assess the changes in the well-being of individuals that can be attributed to a particular intervention or policy, mostly focusing on long-term outcomes. These have served to build knowledge about the effectiveness of development programs, leading to a better understanding of what does and does not work to reduce poverty and welfare (Gertler et al. 2016). However, the need for faster and less costlier studies that can provide quick feedback on the effectiveness of interventions of a behavioral nature has led to a shift in the broader use of nimble evaluations. These have become more relevant in policy making as they inform about effects before the scale-up and answer relevant questions at a lower cost and at a faster pace (Apolitical 2018).

Impact Evaluations: Traditional and Nimble

In general, impact evaluations are helpful to test outcomes as they are able to determine causality. As a relatively new approach, behavioral interventions need to be tested on whether they can produce the desired effects and changes across the service delivery chain in infrastructure. One way of doing this is through impact evaluations. There are broadly two types of impact evaluations: one that looks at longer-term and deeper effects—traditional impact evaluations—and another that measures more short-term and rapid outcomes—nimble evaluations (Dibner-Dunlap and Rathore 2016). This report provides results from studies that use both. Broadly, impact evaluations focus on cause-and-effect questions, looking to determine the causal effects of a program, modality, or design innovation. In terms of methods, randomized control trials (RCTs) have generally been accepted as the gold standard, but whenever randomized implementation is infeasible, other quasi-experimental techniques have been developed to ascertain causality (International Evaluation Group 2017). When conducting impact evaluations, it is key to have a good design so the results can contribute to generalized knowledge (Gertler et al, 2016).

Traditional impact evaluations usually answer longer-term questions, require a robust data collection process be put in place, and are regarded as the most rigorous method to evaluate effectiveness of an intervention. They try to understand the effect of a program on their intended outcome indicator. Therefore, they require a clear theory of change that articulates the elements that go into the program, the process of implementation, and its desired impact. Without articulating a clear theory of change, there can be large variations in the implementation that are likely to lead to misleading results and conflicts over interpretation. Additionally, traditional impact evaluations require a robust data collection system be put in place, even if temporary. They require monitoring data and conducting surveys, and considering the time they take to be carried out, they can be costly (Gugerty and Karlan 2018).

Nimble evaluations are used for behavioral interventions as they serve to understand short-term outcomes in a less costly, useful, and more quick way. Also called A/B tests or split-tests (Dibner-Dunlap and Rathore 2016), they are often more suitable for behavioral interventions because they are useful to understand human behavior under natural circumstances (Karlan, Haushofer, and Litvine 2018). Nimble evaluation prices can range between US\$0 and US\$80,000; and in some cases, they even save costs as they help to improve the operations of an organization. Because they rely on administrative data, they serve to understand short-term outcomes and operational questions. Moreover, they can be run in a few months, most often between three months and a year. These characteristics have made them useful to study behavioral insights and to understand the impact of a set of alternatives. For example, before scaling up, it would be helpful to learn whether household-level campaigns for promotion of sewer connections are more effective through community groups or through paid government workers (Karlan 2018).

Some nimble approaches include small tweaks in messaging, such as on utility bills or administrative support to poor households. In Costa Rica, messaging on utility bills was changed and consumers reduced their water consumption between 3.4 and 5.6 percentage points as a direct result (Datta et al. 2020). In Morocco, by providing administrative support and credit offerings to poor households, the utility was able to increase connection rates to the water network by 59 percent in just six months (Devoto et al. 2012).

Nimble interventions, as they test short-run behaviors, are a useful way to evaluate whether the current strategies to achieving such goals are on the right path. They rely on low-cost access to administrative data to measure outcomes of interest and require large samples to identify effects. Nevertheless, they are limited in the outcomes they can measure because they focus on short-term behaviors. When carried out, nimble evaluations may not be able to examine all questions studied in a traditional RCT. But increasingly, they can be used to answer the fundamental operationally relevant question: Does the intervention actually work? Or, among a set of alternative interventions, which one will work better in a given context and hence can be scaled up? Most development goals, such as the reduction of poverty or a global access to water and sanitation, are long term, but they need for short-term outcomes to be completed. Nimble evaluations can thus be a step in the process to completing a longer term, larger scale RCT.

How Are Behavioral Approaches and Nimble Evaluations Relevant for a Task Team Leader?

The cost of conducting a nimble evaluation is just a fraction of operational costs but can help at various steps along the project cycle. The potential benefits of a small change in program delivery far outweigh the cost of implementation, especially when comparing the size of sunk cost investments to the cost of a small evaluation.

At preparation, they can help the task team leader (TTL) on the effective design of soft components, such as capacity building. For example, in an operation with an institutional-strengthening component, a behavioral approach that could be rigorously evaluated would help determine the nature or type of capacity building that would result in changes to key performance indicators (KPIs), such as the number of complaints addressed within a certain time period or a percentage increase in revenue collection. Evaluating a capacity-building initiative while isolating behavioral interventions in the design would help identify what aspects of capacity building should be taken forward.

At mid-term review, such approaches can help the TTL evaluate where and why the project is (or is not) meeting its desired outcomes and inform any necessary restructuring. They provide evidence for how to turn the course, if needed, and be less path dependent. For example, in chapter 2, collecting data with the Lusaka Sanitation Program in Zambia identified where households were not taking up the newly constructed sewer network. Nimble approaches provide the opportunity to test mechanisms to improve uptake while the operation still has time to course correct.

Finally, at implementation completion review, it can help the TTL understand the reasons behind the main successes and lessons from the operation.

Discussion

In the discussion on nimble versus traditional methods, some have questioned the relevance of nimble evaluations. Karlan (2018) pointed out that the two approaches are complementary as they address different questions. In particular, the growing use of rapid evaluations feeds long-term goals and can help traditional impact evaluations be more effective as short-term hypotheses are tested. Secondly, the Behavioural Insights Team (BIT)(2019) identified a misalignment among researchers' interests and policy makers' needs. Academics have found that nimble evaluations are difficult to publish as they test limited outcomes. Conversely, many of practitioners' efforts are not shared in academia. The BI Team panel (2019) proposed that academic publications include several nimble interventions, and it has made several efforts to produce publishable evaluations relevant for policy makers. Finally, impact evaluations, whether nimble or traditional, cannot be used in all cases. Gugerty and Karlan (2018) proposed several reasons to avoid their use, especially when the human and financial resources are not available to conduct a good evaluation.

It is worth noting that nimble evaluations are not always effective, but a no result can still provide useful information. For example, the use of different pro-recycling messages in Peru did not have a significant impact on recycling behavior (Chong et al. 2015). Sunstein (2017) gave five reasons to explain why nudges might be ineffective or less effective than expected. First, some nudges may produce confusion in

the target audience. Second, some interventions may have only short-term effects. Third, some nudges may generate backfire effects. Fourth, certain interventions are based on an inaccurate understanding of the particular context. Fifth, some nudges can generate compensating behavior, resulting in no net effect.

There is a lot still to be studied from behavioral interventions, and even ineffective interventions bring powerful insights about the next steps. Most of the limitations presented can be overcome with further studies, and overall results have showed positive effects. In conclusion, table 1.2 presents the three agents involved in water infrastructure provision, the typical behavioral biases they face, relevant entry points, and studies that considered the problem.

TABLE 1.2
INFRASTRUCTURE TRIAD AGENTS AND THEIR BEHAVIORAL BIASES

	Typical biases	Relevant entry points	Example studies	Potential applications
Policy maker	-Not welfare satisfier -Trust -Impatience -Repeated interaction	-Framing -Persuasive language -Improvements in choice architecture	-Congdon et al. (2011) -Rioja (2003, 2013)	Encouraging water point insurance
Service provider	-Status quo bias -Habit -Present bias	-Extrinsic rewards -Managerial practices -Framing compensations	-Álpizar et al. (2019) -Ashraf, Bandeira, and Jack (2014) -Bandeira et al. (2020) -Belle (2015) -Bloom, Lemos, et al. (2015) -Bloom, Propper et al. (2015) -Gauri et al. (2019) -Rasul and Rogger (2018)	Encouraging trust in utilities, incentivizing providers to deliver safe water, encouraging providers to safely transport and dispose of fecal sludge
Customer	-Choice overload -Status quo bias -Social norms -Moral wiggle room	-Social norms approaches -Planning principles -Message framing	-Álpizar et al. (2019) -Brent, Cook, and Olsen (2015) -Datta et al. (2020) -Devoto et al. (2012) -Hoffmann (2018) -Guiteras, Levinsohn, and Mobarak (2019) -Toledo (2016)	Encouraging collection rates for water services, encouraging water treatment at the household level, water conservation under social norms treatment, encouraging water reuse, collective action in irrigation

CHAPTER 02

Impact Evaluations and Nimble Evaluations

IMPACT EVALUATIONS

RIGOROUS, RCTs, CAUSE-AND-EFFECT

ROBUST DATA

1 TO 3 YEARS

AVG. USD 500,000

LONG-TERM OUTCOMES

NIMBLE EVALUATIONS

LOW COST, USEFUL, FAST

ADMINISTRATIVE DATA

3 TO 12 MONTHS

LESS THAN USD 80,000

SHORT-TERM OUTCOMES

02. Impact Evaluations and Nimble Evaluations

Some of the behavioral barriers include motivation, awareness, capabilities, adoption, social norms, willingness to pay, and present bias.

In this second chapter is an overview of some of the main findings from nimble and impact evaluations undertaken to address issues, specifically in the water and sanitation sector with the support of this advisory services and analytics (ASA). These studies look at the impact of capacity building and nonfinancial incentivization of service providers for improved delivery, behavioral initiatives to improve adoption of sanitation services—both onsite and sewer, how to alleviate payment barriers for service adoption, and the impacts of increasing awareness of hygiene behaviors on sustained service use. Table 2.1 shows a summary of all the studies referenced here, for which more information can be found in appendix B. As shown in the previous chapter, some of the behavioral problems include motivation, awareness, capabilities, adoption, social norms, willingness to pay, and present bias. Also, the type of studies includes nimble randomized control trials (RCT), experiments, multi-country studies, traditional impact evaluations, and surveys.

TABLE 2.1
BEHAVIORAL INTERVENTIONS CONDUCTED WITHIN THE WATER GLOBAL PRACTICE

Behavioral challenge	Behavioral problem	Country case(s)	Type of study	World Bank contacts
A. Water service provision				
How do you encourage better maintenance of water points in rural communities?	Motivation, awareness, capabilities	Nicaragua, multi-country	Impact evaluation and multi-country study	Christian Borja-Vega, Jonathan Grabinsky, Pavel Luengas-Sierra
How do you incentivize workers to improve their service delivery in a utility?	Motivation, capabilities	Ethiopia	Experiment	Sanjay Pahuja, George Joseph, Yi-Rong Hoo
B. Sanitation, health, and hygiene consumer behavior				
What are the main barriers to getting households to connect to the sewer network?	Adoption, social norms, status quo bias	Zambia, Ethiopia	Nimble RCT, concept stage questionnaires	George Joseph, Sophie Ayling, Yi-Rong Hoo

How do you encourage customers to pay their sewer connection fees?	Consumption/willingness to pay, valuation	Zambia	Nimble RCT	George Joseph, Sophie Ayling, Yi-Rong Hoo
How do you encourage households to adopt better onsite sanitation options? How do you encourage households to adopt better hygiene practices?	Adoption, hassle factors, social norms, valuation	Zambia, Punjab, Lao PDR, Lao PDR (II), Cambodia	Survey experiment, traditional impact evaluation	Zambia: George Joseph, Sophie Ayling, Yi-Rong Hoo Punjab: George Joseph, Luis Andres Lao PDR: Viengsompassong Inthavong Cambodia: George Joseph

Note: GP = Global Practice; Lao PDR = Lao People's Democratic Republic; RCT = randomized control trial.

What Can Capacity Building and Improving Employee Motivation Do for Service Quality Outcomes?

Proper maintenance of water systems is usually associated with aging infrastructure and can lead to poor service delivery. A commonly recognized challenge in water provision for both urban and rural water is ensuring the ongoing proper maintenance of water systems for piped and non-piped infrastructure. As the International Water Association (2020) pointed out, “lack of, or insufficient operation and maintenance of water and wastewater systems contribute to the vicious cycle of underperforming service providers operating in often perilous financial circumstances; this can ultimately lead to poor service delivery that compromises public health.” This issue can be associated with aging infrastructure, which can result in frequent leaks and thus contamination of drinking water sources from wastewater. This situation puts the population at risk from waterborne diseases, such as cholera and typhoid (Ashraf et al. 2017).

Although this is an issue often associated with piped networks in urban centers, poor maintenance affects rural communities as well, and little is known on the capabilities that contribute. World Bank reports from Nigeria and Tanzania highlighted the lack of functioning water points, with 38 percent and 29 percent, respectively (Andres, Chellaraj, et al. 2018; Joseph et al. 2019). In Tanzania, as many as one in five water points will fail in the first year after construction. Even if underlying structural issues are the reason for this, collective action and individual behavioral barriers may also be inhibiting utilities and communities from performing needed maintenance responsibilities. There is little reliable data on what contributes to the success or failure of water and sanitation services in rural areas (Andres, Borja, et al. 2018). Even less is known about how institutional, managerial, technical, and operational capa-

bilities contribute to sustainable services in communities beyond cities. However, the available evidence suggests that good support and maintenance are key if water distribution systems are to operate reliably for the long term (Borja-Vega, Luengas Sierra, and Grabinsky Zabludovsky, 2020).

Although not explicitly behavioral in nature, several interventions by the World Bank Water Global Practice operations have focused on building the soft skills or capacity of local and municipal authorities to manage rural water and sanitation infrastructure.

An impact evaluation that begun in Nicaragua in 2017 showed how capacity building of local rural water committees could significantly affect rural maintenance. The intervention’s main objective was to strengthen institutional and management capabilities at community and municipal levels—water and sanitation municipality units (UMAS) and water and sanitation committees (CAPS). It did so by providing training for participants to develop, implement, and update action plans with specific goals and deadlines intended to strengthen institutional capacity and improve environmental, sanitary, and hygiene conditions in rural communities. The intervention improved CAPS’ capabilities in formal operation (+0.36 points), financial stability (+0.42 points), and system operation and maintenance (+0.30 points) (see table 2.2).

TABLE 2.2
SUMMARY OF RESULTS FROM NICARAGUA IMPACT EVALUATION – CAPACITY BUILDING OF RURAL WATER COMMITTEES

	a. All Samples			b. Excludes contaminated controls		
	Control mean	Treatment effect		Control mean	Treatment effect	
		Effect	p-value		Effect	p-value
CAPS						
Overall score (Components 1 to 5)	2.69	0.30	0.005	2.54	0.38	0.002
1. Formal operation	2.72	0.36	0.003	2.52	0.48	0.001
2. Adequate tariffs for water supplied	2.54	0.08	0.657	2.39	0.18	0.360
3. Financial stability	2.29	0.42	0.006	2.15	0.47	0.003
4. Adequate operation and maintenance	2.82	0.30	0.060	2.62	0.50	0.012
5. Adequate protection of water source	3.08	0.32	0.132	3.02	0.28	0.287
Other: Legalization	0.65	0.10	0.183	0.62	0.10	0.244

Note: CAPS = water and sanitation committees. Entries in bold are where significant effects were found.

The intervention worked through training that local utilities provided to teams through the government's emergency social investment fund (FISE) and through continuous support from water and sanitation regional advisors (ARAS) and other regional FISE staff. All municipalities in the country were required to send a two- or three-person team from their UMAS to the training. These sessions provided standardized institutional and managerial training to the municipal units on how to improve CAPS at the community level. The overall goal of the training was to strengthen institutional capacity of CAPS and to improve environmental, sanitary, and hygiene conditions in rural communities.

Field-level leadership (FLL) training aims to improve maintenance at an organizational level. Funded within the Water Global Practice, this is quite a rare initiative as there are few interventions aimed at systematically transforming the internal culture of public service delivery organizations and building constituencies of support for positive change.

The FLL training consists of three phases aimed to change employee motivation. The first is a core workshop composed of a series of intensive group sessions conducted over a period of three to four days. Participants are able to fully express themselves and their sentiments in a safe space and identify areas they can commit to improving in at work. In the second, employees can reflect on the workshop experience as they go back to work, after which they go on to participate in a self-reflection workshop. All in all, the three phases of the program take about six to nine months to complete. These interventions strive to increase employee motivation and ultimately improve service delivery to the customer through shorter response times to complaints and connection requests and a reduction in the frequency of service errors and nonrevenue water.

FLL training has showed promising results in different contexts. This was first implemented as a pilot in India and Tanzania in 2017. In India, it seemed to result in two to four times better project performance in treatment areas of the Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management Project in terms of year-on-year change in project performance indicators. Meanwhile, in Tanzania, it resulted in a reduction of 10 percentage points in nonrevenue water in eighteen months in the Dar-es-Salaam Water and Sanitation Company. Its applicability to a broad variety of cultural settings shows promise for the use of behavioral approaches in this space. Presently, there is ongoing work in Ethiopia to apply FLL to the Addis Ababa Water and Sewerage Authority (AAWSA), with two branches evaluated as treatment groups and two as control. As of the writing of this report, the employee survey is being conducted to assess whether the FLL training results in any changes in employee job perception and in the quality of the service provision from the customer perspective.

Finding impacts of interventions that motivate employees can be helpful to policymakers. As presented in the Service Provider section in chapter 1, trials from other sectors have shown how motivated employees can enhance operations at a much lower cost. If similar effects are found in the water sector, this could help informing future operational design.

What Factors Make a Difference to Adoption Decisions in Sanitation?

Water Global Practice investments have recognized these challenges and sought to evaluate the effectiveness of investments to address them. In this section are the main findings across a range of studies that sought to and/or achieved changes in uptake or usage behavior using behavioral tools, often but not always in combination with subsidies. They cover the challenge of getting households to move from open defecation and unimproved to improved onsite options and getting customers to connect to the sewer network. Findings are drawn from studies in Cambodia, Lao People's Democratic Republic, Punjab, India, and Zambia.

Lesson 1: Harness Social Influence and Social Norms

Social norms can be a major factor in either inhibiting or encouraging a behavioral change in a community with initiatives like community-led total sanitation (CLTS). As mentioned in chapter 1, one study by Guiteras, Levinsohn, and Mobarak (2017) found that the adoption of improved latrines was greater in communities with higher neighborhood density when subsidies were offered. Dis-adoption of undesirable practices has been enabled by soliciting feelings of disgust in the case of CLTS campaigns. Meanwhile, framing can play a role in changing social norms if households see change as something aspirational for themselves or their communities, a technique some sanitation marketing campaigns have adopted. The most notable examples of harnessing social norms come from CLTS initiatives, of which there are numerous examples of rigorous evaluations showing tangible results.

The Department of Water Supply and Sanitation (DWSS) in Punjab, India, adopted a CLTS approach to motivate communities to attain open defecation-free status. The central pillar was a behavior change communication (BCC) campaign that focused on raising awareness and demand for health, hygiene, and sanitation; mobilizing collective action toward behavioral change; and generating peer pressure through the creation of community-based committees that monitor neighborhoods and encourage sanitary practices. The project also supported the construction of toilets in households across the state. As an incentive, Rs. 15,000 (equivalent to 197USD) was offered to eligible beneficiaries to cover the full cost of constructing twin leach pit latrines.

Results showed significant improvements in sanitation indicators, thanks to the intervention. A multiple-arm, cluster-randomized impact evaluation was designed to measure the influence of the Swachh Bharat Mission–Gramin (SBMG) in Punjab. The study found that the coverage of “safely managed” toilets among households without toilets (as envisioned by the United Nations Sustainable Development Goals for 2030) increased by 6.8 to 10.4 percentage points across various intervention arms compared with a control group. Similarly, open defecation was reduced by 7.3 to 7.8 percentage points. In the weighted data, the percentage of households in treatment Gram Panchayats reporting open defecation by any member declined from 27 to 30 percent at the baseline to 24 to 25 percent during the midline. Finally, households with access to toilets at the baseline saw a statistically significant reduction in open defecation. Open defecation declined by 12 percentage points in the first arm, by 8.7 percentage points in the second arm, and by 7.2 percentage points in the third arm compared with the control arm. The study also revealed a large improvement in awareness of hygiene behaviors, even when starting from a relatively high baseline.

A similar study in Lao PDR compared the effects of CLTS and sanitation marketing. The theory of change for the intervention is that poor-inclusive scaling-up of household sanitation requires changing social norms about open defecation, strengthening the supply of low cost latrines and creating affordable sanitation products and demand for those products. Complementary targeted individual and/or collective incentives to reach the poor and achieve open defecation-free status might also be needed. Researchers conducted a clustered RCT in 160 villages across ten districts in two provinces of Champasak and Sekong in rural southern Lao PDR to evaluate the effectiveness of combining financial incentives with CLTS. These 160 villages were randomly assigned to one of four equally sized treatment groups (forty villages per group), stratified by district, with four villages per arm in each district.

TABLE 2.3
TREATMENT ARMS

Treatment Group	Incentive	Incentive paid to:
1	Toilet Rebate	Households
2	Reward for open defecation elimination	Village committee
3	Toilet rebate and reward for open defecation elimination	Households and village committee
4	None	N/A

Source: Cameron et al, 2021.
Note: N/A = not applicable.

The evaluation of this study demonstrates that social influence can be of high value in influencing behavioral change, but it can be even more powerful when combined with appropriate incentives at the community level. All treatments seemed to lead to an increase in toilet ownership from 42 to 64 percent over the three-year period. However, comparison between treatments shows that both household- and village-level incentives had a significant impact at the village level. Endline sanitation coverage at the village level was approximately 16 percentage points (30 percent) higher in villages that were offered the household incentives compared with control villages. It was approximately 14 percentage points (25 percent) higher in villages that were offered the village incentive compared with control villages. As a secondary effect, the results suggest that improved community-level health seemed to result from overall improvements in the village environment.

Lesson 2: Provide Information and Reducing Hassle Factors

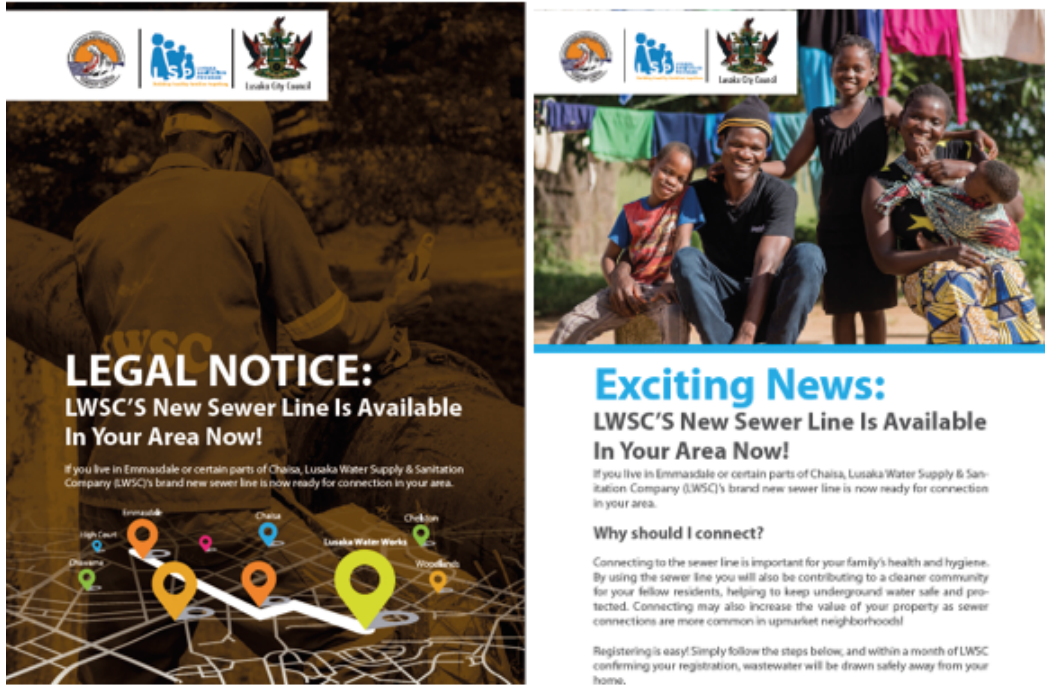
The intention-action gap and hassle factors may also come into play for the decision to change one's sanitation infrastructure. Constructing or upgrading one's toilet may involve several steps, from procuring the materials and labor to filling in forms for an application and paying for the service. The intention-action gap refers to the gap between planned and realized behavior. It manifests in sanitation when a household states an interest but does not act upon it in terms of purchasing a latrine or a connection to the sewer network. The perception of hassle factors can be driven by a lack of awareness of how to go about the adoption process. Providing simple and easy-to-follow steps to make the process seem less complicated can be a way of reducing hassle factors and increasing likelihood of adoption.

As part of an experiment in Zambia, the team worked with the utility to develop leaflets that sought to alleviate hassle factors. Two types of information leaflets were randomly distributed among households (see figure 2.1 for the leaflets). Both sought to alleviate hassle factors associated with connection and provide step-by-step information and contact information for them to do so. However, one leaflet sought to test promotional messages for encouragement, whereas the other presented as a legal notice. It found that the leaflets with the legal obligation notice were significantly more effective than the encouragement-oriented ones in getting households to come forward to connect to the new line. There were 90 unique sign ups (36.7% of those households which received that leaflet) from the legal obligation notice, versus 68 unique sign ups (12.6% of those who received that leaflet) from the encouragement leaflets. This is a significant difference of .24 percentage points between the treatment and control group allocations. Nonetheless, it remains to be seen whether those who were legally obligated to sign up were more or less likely to pay the connection fee.

FIGURE 2.1
BEHAVIORALLY INFORMED LEAFLETS DEVELOPED BETWEEN LWSC AND WORLD BANK

Panel A: Cover of the 'legal obligation' framed leaflet

Panel B: Cover of the 'encouragement' framed leaflet



Source: Leaflets develop by Lusaka Water Supply and Sanitation Company (LWSC) in collaboration with World Bank

Lack of awareness can potentially influence poor uptake in sanitation. For example, potential customers may not know poor sanitation can cause a range of health and welfare problems, such as the risk of safety for women and girls in rural areas when going out to use the toilet; school absenteeism for young girls while menstruating, which can be exacerbated by having inadequate toilet facilities at school; and waterborne diseases like cholera or typhoid.

Framing messages on reasons for connection had a differentiating impact and revealed various motivations for consent. In addition to the health messaging in the Zambia leaflet experiment, the same team tested whether posters that framed messaging on reasons for connection to the sewer differently had any influence on connection uptake. Respondents saw three posters with information on how and why to connect to the network. One poster stressed that households should connect to the network to raise the value of their property, the second focused on protecting the community from cholera, and the control simply told households to connect. The experiment found that households who interpreted the main mes-

sage as protecting the health of the community seemed marginally more likely to agree to connect. This reinforced a finding from a separate part of the study in which households stated their main reason for consenting to connect to the sewer network was the health of their families (26 percent) or the health of the community (25 percent). However, the single largest category for motivation was legal obligation (38 percent).

Framing can affect household connections. These motivations are therefore important to take on board when there are sensitivities regarding enforcing connections yet providing free connections is financially unviable for the utility itself. Households may be willing to pay if encouraged to do so in a way that speaks to both their motivation and their time/mental constraints.

Lesson 3: Recognize Customers' Competing Priorities and Natural Inertia for Change

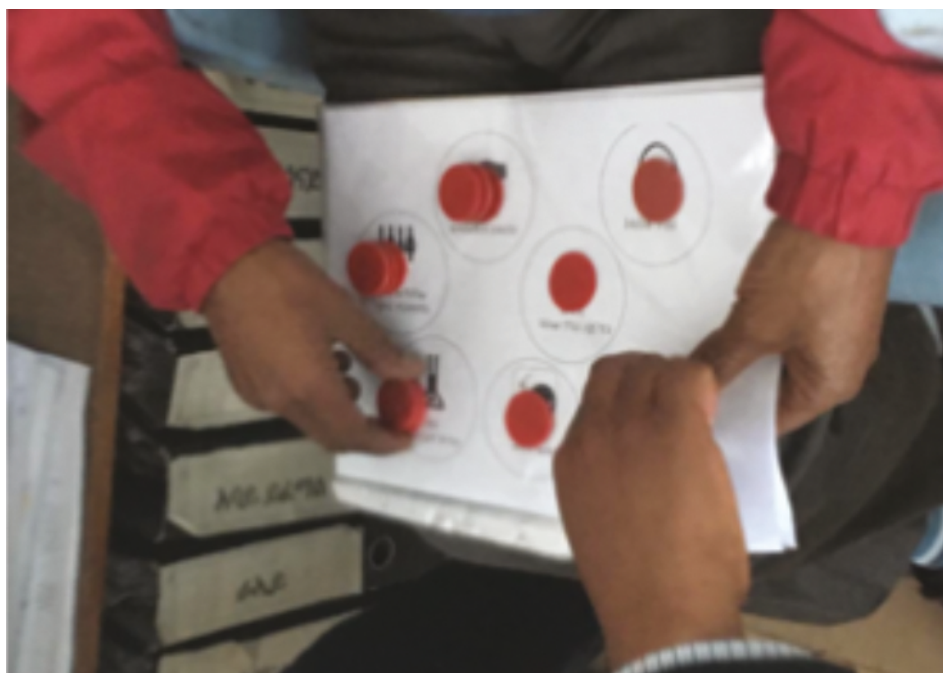
Individuals may not place the value of adequate sanitation as high on their priority list as other essentials. Despite people knowing that a toilet facility is important, a well-cited statistic says that more people in India own a mobile phone than have access to a safe toilet (United Nations University 2010). This affects an individual's willingness to pay for services and should be considered when designing pricing plans.

Agents' own biases can determine willingness to acquire new systems. Researchers often come across the argument that individuals or households are happy with their existing systems and/or behaviors and see no need to change. This is known as status quo bias or inertia in behavioral economics. For example, some individuals practice open defecation because it has been a traditional practice to go out and use "nature's toilet." In Malawi, some households prefer to make adaptations to their existing pit latrines than to change to ecosan toilets when offered, despite potential advantages of ecological sanitation options (Chunga et al. 2016).

The survey also sought to see how households would prioritize sanitation versus other household expenses. Households were shown an illustration (figure 2.2), and then asked to distribute tokens to represent money among different household spending items with a budget of ZMK 1,000 (equivalent to about US\$100), and one of these is a sewer connection. Photo shows enumerators practicing this exercise.

Preliminary findings from the survey showed that, in this case, households placed a relatively high value on connecting to the sewer network (just after children's education and before starting their own business). However, this is a useful tool to be applied in different contexts to understand the other priorities with which sanitation needs to compete.

FIGURE 2.2
EXPENSES DIAGRAM AND PICTURE SHOWN TO HOUSEHOLDS DURING THE 'TOKEN EXPERIMENT' EXERCISE

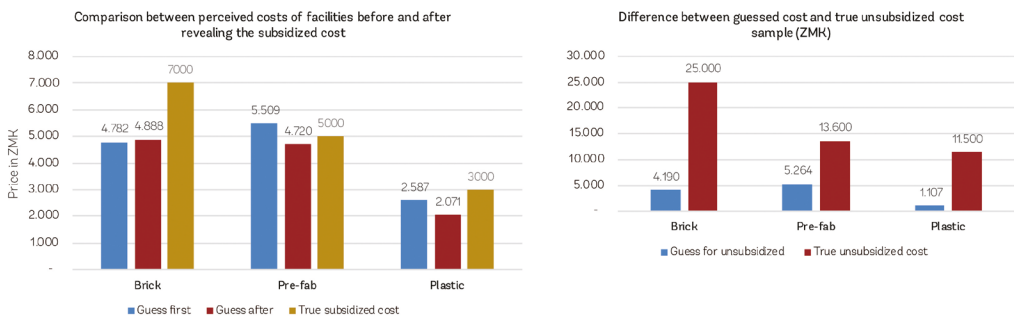


Source: Lusaka Onsite Sanitation Survey, 2018

Lesson 4: Reducing Loss Aversion or the Pain of Paying through Pricing Structures and Allow Positive Associations for Sanitation Goods

A clear barrier that several interventions in the water sector have tried to address so far is reducing the cost of service for water or sanitation through subsidies. As a survey collected in Lusaka has shown, this has come to affect customer perceptions on price. As part of the Lusaka Sanitation Program, an ongoing World Bank operation, households were offered toilets at a subsidized price. However, thinking about the sustainability of the project, it was important to understand whether the unsubsidized cost would form a barrier to adoption once the World Bank investment ends. The discounted cost of the toilet during the project's lifetime was eventually marketed as ZMK 2,400, which was equivalent to US\$240 at the time of writing. Meanwhile the unsubsidized cost of the toilet was between ZMK 11,500 (US\$1,150) and ZMK 25,000 (US\$2,500) depending on the technology chosen (prefabricated, brick, or plastic). When customers were asked how much they thought different models of a toilet would cost (before being revealed the true cost), their cost guesses were far closer to the subsidized price than the real one (figure 2.3).

FIGURE 2.3
PERCEIVED COSTS OF TOILET FACILITIES



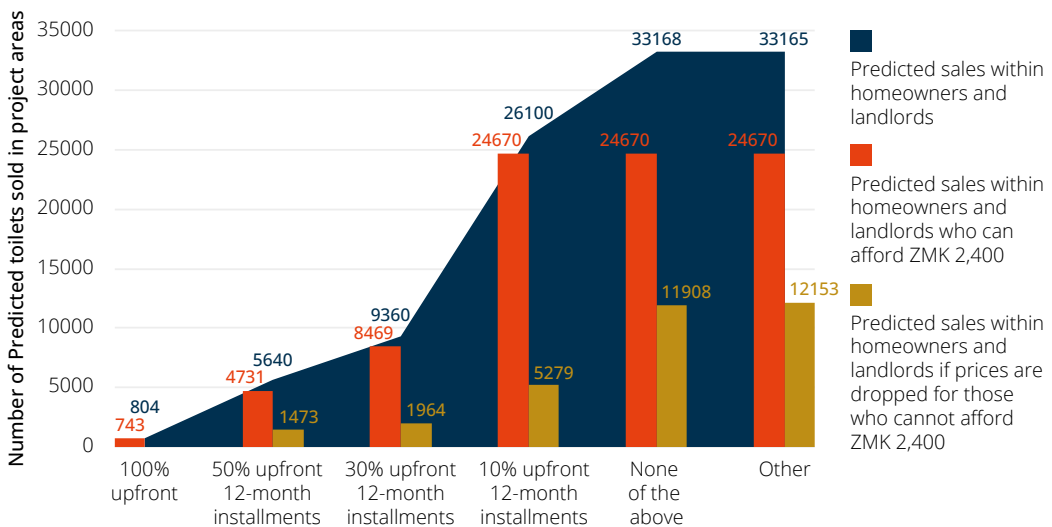
Source: Primary data collection by Fibonacci Engineering for the World Bank Water GP, July 2018

Respondents in the 5 percent sample who were told the unsubsidized price reportedly reacted with disbelief, with some even losing trust in the survey itself as a result, believing it to be a scam. One possible interpretation of this is that subsidized prices for toilets have become the norm in Lusaka, and thus the market price now seems unreasonable.

Even at a subsidized price, the upfront cost of a facility may still be off-putting, whether a customer is unable or unwilling to pay. However, in surveys of customers for both onsite sanitation and sewer, offering payment installments could greatly increase stated willingness to take up new infrastructure. For onsite sanitation, pay-

ment installments appealed to 44 percent of homeowners and 61 percent of landlords, with the most popular option being to pay 10 percent upfront and the rest over 20 months. As the graph in figure 2.4 shows, respondents' likelihood of uptake increased with longer-term installments.

FIGURE 2.4
CUMULATIVE NUMBER OF PREDICTED TOILET SALES TO HOMEOWNERS AND LANDLORDS



Source: Primary data collection by Fibonacci Engineering for the World Bank Water GP, July 2018

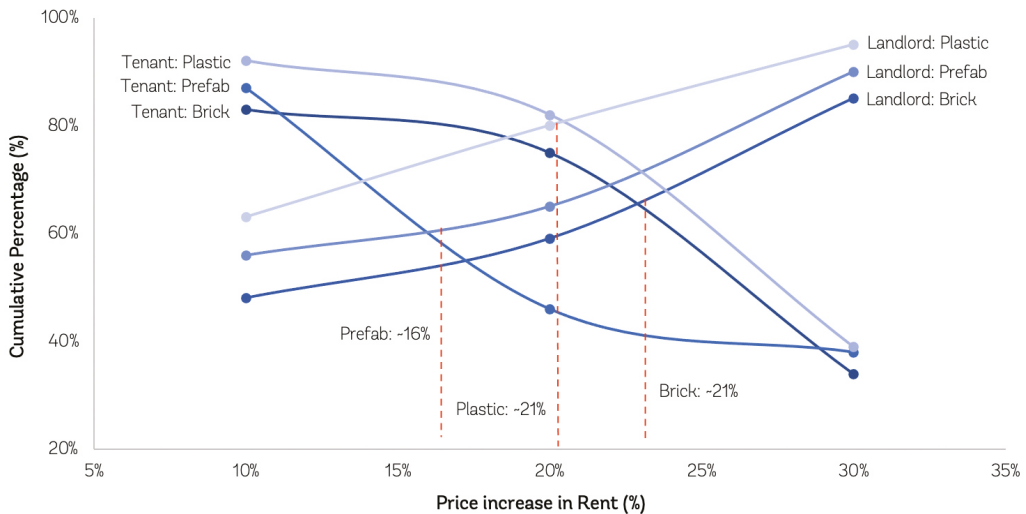
For sewer connections, the utility was already planning to offer payment installments of up to 20 years for repayment. However, a survey found that 61 percent could afford the connection fee immediately and the remainder could pay it off in less than five years.

Another important finding from the onsite survey was the overlap between landlords and tenants on a potential increase in the rental value of the property if it included a toilet facility. As figure 2.5 shows, depending on the type of toilet facility, this overlap occurred at between 16 and 23 percent of the value of the rent. Here it is worth considering the possibility of microcredit packages. This same question could be asked in multiple contexts and produce location-specific findings.

Finally, payment issues can be addressed by thinking about defaults. In many utilities in the developing world, payment systems are not yet automated. The act of paying requires the customer to take time out of their day to do so. Modern payment systems that allow for automated monthly installments to be taken from the users' accounts would greatly reduce hassle factors and the consciousness of the customer

about the ongoing payments. They may ultimately also help the utility to reduce non-payment and increase revenues. Such a system has been put in place with support from a World Bank contractor in 2022. At the time this report is going to print, there are some technical challenges with the system, but it is being used by customers and is due to be streamlined into the utility’s communication and marketing messaging.

FIGURE 2.5
WILLINGNESS TO PAY FOR DIFFERENT MODELS



Source: Primary data collection by Fibonacci Engineering for the World Bank Water GP, July 2018

Lesson 5: Encourage Champions and Aspirational Leadership

Leadership and champions in the promotion of sanitation behavioral changes play an important role, in addition to norms of the broader group, as was briefly mentioned in the studies from Punjab and Cambodia. In Punjab, India, the BCC considered the influence of social norms and community leaders in conjunction. The community mobilizers identified and sensitized sanitation champions at the Gram Panchayat level. In doing so, they hoped to gain influence in affecting the social norms of the community, disseminating the messages through local government institutions, cooperatives, schools, health care facilities, women’s groups, community-based organizations, self-help groups, and so on, during a phase called pre-triggering.

Natural leaders training in addition to CLTS contributes to a reduction in open defecation. A separate study by Crocker et al. (2016) conducted a cluster-randomized field trial to evaluate training natural leaders in addition to a CLTS intervention in Ghana. The natural leaders training led to more time spent on CLTS by community members, increased latrine construction, and a 19.9 percentage point reduction in open defecation ($p < 0.001$).

Lesson 6: Recognize Customer Diversity and Segmentation

A final lesson from these studies has been to recognize the diversity of a customer base when appealing to households to switch to a new sanitation technology. This diversity can mean a diversity in income as well as the social norms and aspirations that come with it.

In Cambodia, the study found that the subsidy program alone was more effective than sanitation marketing alone among poor households. The intervention combined subsidies with marketing in some treatment arms while leaving each to work exclusively in others. Among poor households, the implementation of the Community Hygiene Output-Based Aid (CHOBA) program increased the likelihood of new latrine purchases by 15 percentage points compared with sanitation marketing exclusively. The joint implementation of both programs increased the likelihood of new latrine purchases by 26 percentage points higher than sanitation marketing alone.

However, in nonpoor households, sanitation marketing alone had a more significant impact on uptake. This was true even when they were in a village where poor households received a subsidy. The likelihood of new latrine purchases in those communities was still estimated to be 26 percentage points higher than when the subsidy program alone was implemented. There was no decline in performance among the subsidy-ineligible nonpoor. This finding is consistent with that of Guiteras, Levinsohn, and Mobarak (2015): There is evidence suggesting a positive and complementary spillover effect, in which the availability of subsidies for low-income households leads to greater purchases of latrines by relatively higher-income households ineligible for subsidies.

Discussion

This chapter sought to provide an overview of the main lessons that evaluations in the Water Global Practice have gleaned from impact evaluations in the sector over the past few years. To summarize, capacity building in rural Nicaragua produced significantly strengthened institutional and management capabilities of community and municipal water and sanitation committees. They were more able to manage the formal operation, financial stability, and system operation and maintenance, and they showed improvements in tariffs charged and source protection. There were knock-on impacts on community uptake of improved sanitation. It would be beneficial for other programs to replicate such capacity building in other contexts. An FLL training of water utility staff in Ethiopia is ongoing but, if effective, would also provide evidence of the effectiveness of motivational training and nonmonetary incentivization in improving water supply and sanitation (WSS) utility performance.

At the customer level, several potential behavioral barriers are posited in household adoption and use of sanitation services, whether for sewer or onsite sanitation. These include status quo bias, social norms-related preferences, lack of awareness of health

benefits of sanitation, intention-action gap, and hassle factors. All of these are in addition to questions of willingness and ability to pay. Data collection in Lusaka, Zambia, revealed differences in customers' expectations and the true cost of an unsubsidized onsite sanitation facility in the city, as well as an opportunity to address cost barriers by offering payment installment mechanisms to divide the cost over a longer period and reduce loss aversion of parting with a larger sum all at once. It also showed that both landlords and tenants would place a value on having a latrine with the property when framed as part of a rental cost. Finally, when it comes to persuading households to uptake sewer, legal enforcement messaging seems to be the main driver, but health of one's family and community are also important motivations for households to consent to connect, particularly if the household knows someone who was recently affected by cholera.

Another set of studies discussed factors that encouraged households to switch from open defecation to improved onsite sanitation. In Punjab and Lao PDR, important components of CLTS implementation included the use of a train-the-trainers approach from master motivators to motivators, the importance of triggering feelings of disgust regarding open defecation and reinforcing this through community organizations to influence social norms, and the harnessing of community members in the monitoring process for elimination of open defecation practices. Interestingly, in both Punjab and the first study in Lao PDR, the effects of CLTS were most effective in communities where households already had latrines that they were simply not using. This points to the importance of behavioral campaigns with easy availability of infrastructure to make the switch in behavior. The second impact evaluation in Lao PDR showed how both community- and household-level incentives on verifiable toilet construction could make a difference to household adoption of improved latrines. CHOPA in Cambodia showed how marketing and subsidies made different impacts, depending on the socioeconomic status of the household. Nonpoor households responded to marketing alone, whereas poor households responded to the subsidy more than the marketing. Finally, returning to Zambia, there seemed to be clear evidence of an intention-action gap for households in the sewer network catchment where, despite 95 percent of households consenting to sign up, a year after the line was ready, only 10 percent had connected in a middle-income area. An experiment is currently under way to test informational/marketing leaflets that stress the steps to connect with encouragement versus enforcement messages. The results of this will be shared.

All in all, this chapter has sought to address a range of important questions on improving both service provision and customer uptake in WSS through nimble and traditional evaluations and straightforward data collection. However, these questions are just a subset of several other questions that operations colleagues are asking. The next chapter posits some unanswered questions and where other studies might help inform future work.

CHAPTER 03

Directions for the Future

FUTURE

TRUST IN UTILITIES
COLLECTION RATES
ENSURING GOOD WATER QUALITY
WATER CONSERVATION IN AGRICULTURE
SAFER FECAL SLUDGE MANAGEMENT
EMPOWERMENT FOR MENSTRUAL
HYGIENE MANAGEMENT



03. Directions for the Future

There are many other questions that behavioral approaches, combined with nimble evaluations, are yet to explore. In this chapter are some of the remaining un-addressed questions that could be further explored through behavioral approaches in combination with nimble evaluations. The challenges presented in chapter 2 are only a subset of a larger number of questions that colleagues within the Water Global Practice have brought to light as typical challenges in various subsectors. Most of the questions involve behavioral challenges, and advances made to motivate next steps in using nimble and traditional evaluations are presented.

The following chapter explores questions on utilities' sustainability, safe water, water conservation, sanitation service provision, and hygiene. Some issues are encouraging collection rates for water services, ensuring good-quality last-mile connections, encouraging trust in utilities, and encouraging water point insurance. Regarding safe water, further studies could explore how to incentivize providers to ensure safe water and how to encourage water treatment at the household level. On water conservation and promoting collective action in the context of increasing water scarcity and climate change, questions of how to encourage water conservation with social norms information treatment, under a free basic water policy, water reuse, and rainwater harvesting systems could also be addressed. Concerning sanitation services provision, there is a need for more studies on how to encourage service providers to safely transport and dispose of fecal sludge and how to encourage households to use safely managed fecal sludge management (FSM) services. Finally, regarding hygiene, there is still a need to explore how to encourage adolescent girls and women to take care of their menstrual hygiene. Table 3.1 presents these challenges, the relevant behavioral approach, and further research topics related to each.

TABLE 3.1
CHALLENGES TO BE ADDRESSED IN WATER SUPPLY, SANITATION, AND HYGIENE AND FURTHER RESEARCH TOPICS

Challenges to be addressed	Relevant behavioral approach	Further research topics
Improving WSS revenue collection rates	Reciprocity, unperceived threat of punishment, and negative descriptive norms can explain nonpayment	What is the impact of improvements in consumer satisfaction in payment rates? Which strategies can build trust with customers?
Ensuring good-quality last-mile connections	Behavioral determinants of willingness to pay as present bias and intertemporal choice	How can utilities communicate improvements to enhance payment?

Encouraging trust in utilities	- Effects trust has on customers' choices and on utilities -Trust in ownership models	What is the impact of improvements in customer service in trust? How can effective communication with customers help utilities?
Encouraging water point insurance	Behavioral biases in the adoption of water point insurance schemes	How can take-up of insured maintenance and repair plans be incentivized? What is the impact of water point insurance in communities?
Incentivizing providers to deliver safe water	-Determinants of active participation from the community -Benchmarks covering more than budgetary performance	What are the best strategies for utilities to engage with communities? What benchmarks can be developed to score utilities?
Encouraging water treatment at the household level	-Identification of the determinants behind adoption of new practices and technologies -Social marketing strategies	Which new sources of water supply, as rainwater, are available for households? What are the determinants of adoption of new practices?
Water conservation under social norms information treatment	-Social norms information treatment and information about pricing schemes' effect on consumption	What is the differentiating impact of various nudges of water conservation? Which are the most effective?
Encouraging water reuse and rainwater harvesting systems	-Different forms and mechanisms of communication impacts on customers' attitudes -Adoption of rainwater harvesting systems	Which messages are more effective to change attitudes toward reuse practices? What is the viability of rainwater harvesting systems in specific regions?
Encouraging water conservation by farmers	-Commitment effect in a commercial activity -Social identity -Adoption of new technologies as smart water meters	How do farmers respond to social comparison nudges, in contrast with households? Which combination of interventions is more efficient to induce the use of new technologies that promote water conservation?
Discouraging overuse of groundwater by small farmers	-Trust among members of collective action mechanisms -Effect of biases in the response to changes in subsidy	How do farmers respond to changes in the policies? Are there development of a framework that considers behaviors of cooperation?
Encouraging collective action among farmers in irrigation	-Effect of training in success of community-managed associations and gender biases present on them -Impact of trust or bounded rationality in participation	What is the impact of social norms in the participation on community-managed associations? What are the behaviors that affect participation?
Encouraging providers to safely transport and dispose of fecal sludge	-Community-led total sanitation and sanitation marketing strategies employed by utilities that trigger strong emotions	How does one elicit strong emotions in the community to encourage certain behaviors? What is the space for sanitation marketing to fill a gap in the market?
Encouraging households to use safely managed fecal sludge services	-Effect of values, culture, negative reciprocity, lack of trust, status quo bias, diffusion of responsibility, and low perceived benefits on adopting sanitation services	Can nudges incentivize adoption of sanitation services? Which of them are more effective? How are household choices affected regarding fecal sludge management?
Empowering adolescent girls and women to take care of their menstrual hygiene	-Gender inequality, discriminatory norms, cultural taboos, poverty, and lack of basic services	How could facilities be more inclusive to promote menstrual hygiene? Can nonfinancial rewards motivate health employees to promote it? How can negative biases regarding menstruation be addressed?

Note: WSS = water supply and sanitation.

Encouraging Collection Rates for Water Services

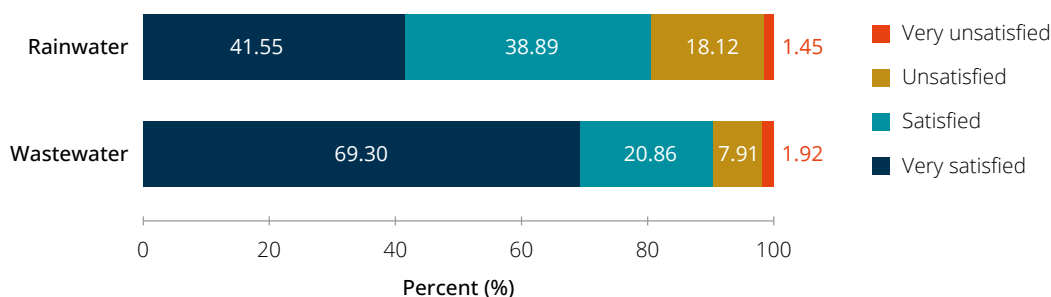
The need to encourage collection rates is an essential part of ensuring the sustainability of service delivery. According to the International Evaluation Group (2017), 663 million people lack access to improved water supply. This is consistent with the infrastructure gap that low- and middle-income countries face, in which financial needs are present at all levels. For utilities and municipalities serving the poorest populations, there is insufficient local revenue from tariffs or transfers to fund the necessary operational and maintenance expenditures (Nagpal et al. 2018). In particular, nonpayment in public utilities is an important constraint in expanding service access and limits their ability to serve poor households.

Usually, nonpayment is attributed to the lack of ability to pay on the part of the consumer, but behavioral insights have shown the existence of other factors. Aguilar-Benitez and Saphores (2008) found that in Nuevo Laredo, Mexico, nonpayment affects poor and affluent households alike, so ability to pay is not the only explanation. The Mind, Behavior, and Development Unit (eMBeD) has identified three factors present in the decision environment that explain nonpayment from a behavioral perspective: reciprocity, unperceived threat of punishment, and negative descriptive norms (World Bank n.d.). Reciprocity is a type of social norm in which the most likely response to a social exchange is similar to the one received, either positive or negative. In this case, when households receive poor service delivery, they tend to respond similarly, providing justification to their nonpayment. This explanation is consistent with the findings of Vásquez (2015) in Guatemala, where nonpayment was a demonstration of consumer dissatisfaction with current water services. In addition, uncertainty about enforcement of penalties discourages bill payment. In Mexico, only 50 percent of households on average paid their water bills on time in 2000, yet 75 percent paid for electricity when penalties are enforced (Aguilar-Benitez and Saphores 2008). Penalties can incorporate behavioral insights on nonfinancial penalties, such as violation of accepted social norms. Finally, households may perceive the default behavior as the norm rather than the exception, which discourages bill payment. When households act like this, they may be subject to inertia and default bias.

Nimble evaluations may be especially relevant to address these issues as they can help to further understand the behavioral barriers to nonpayment and they can serve as the starting point to larger evaluations. For instance, Szabó and Ujhelyi (2015) studied the impact of a water education campaign in low-income areas of South Africa. They found that the treatment group did increase total payment by 25 percent. However, the effect was driven mainly by households reciprocating the providers, rather than through an increase in consumer information, a reminder to pay, or threat of enforcement. Moreover, improved water services may have a positive economic impact on households through savings in time or

money, which can translate to higher payment rates. In particular, Burt et al. (2018) found that improvements in the continuity of water supply had a direct impact on time and monetary savings of households, concluding that at current costs and benefits, utilities should upgrade continuous water supply. These insights are consistent with the findings of Vásquez and Alicea-Planas (2018) in Nicaragua, where nonpayment was inversely related with consumer satisfaction with the current service quality. Results from this study on customers' satisfaction depending on water accumulation system are in figure 3.1. Furthermore, Donkor (2013) showed the possible existence of a correlation between consumer satisfaction and water utility business performance. These are helpful for both households and utilities, illustrating the importance of consumer satisfaction in payment rates, and should be further explored using behavioral insights.

FIGURE 3.1
SATISFACTION WITH WASTEWATER AND RAINWATER SYSTEMS IN NICARAGUA



Source: Vásquez and Alicea-Planas 2018.

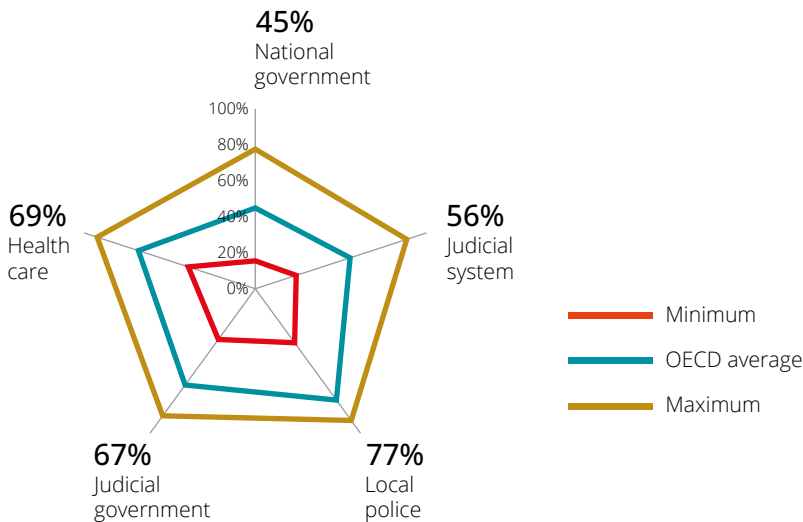
Ensuring Good-Quality Last-Mile Connections

The financial constraints that utilities face put an additional burden on their ability to ensure good-quality last-mile connections. To provide this service, utilities require that willingness to pay be high enough to justify expansion or a subsidy to finance the operation. However, willingness to pay often depends on the quality of the service. For example, Koehler, Thomson, and Hope (2015) monitored handpump usage in rural Kenya and determined that dramatic improvements in maintenance services influence payment preferences. These findings reveal how utilities can communicate better to enhance payment. In these settings, households are usually subject to intertemporal choices and may be affected by a present bias, which could lead to de-prioritization or deferral of payment. Intertemporal choice refers to the impact of different periods of time in the future on the likelihood of selecting choices alternatives; and present bias is specific to the higher likelihood of selecting choice options whose payments are nearer in time (Gohmann 2017).

Encouraging Trust in Utilities

Customers’ trust in utilities becomes a key factor as it affects their choices to acquire new services, pay for the ones they already have, and collaborate with utilities. It is important for the success of a wide range of public policies that depend on behavioral responses from the public (OECD n.d.). As shown in figure 3.2, citizens trust public services more than the government itself. In the water sector, trust between customers and utilities is crucial if utilities wish to have community support for upgrades to water treatment facilities, to promote water tap consumption, and to reduce household reliance on bottled water (Weisner et al. 2020), yet there are many factors influencing the public’s perception.

FIGURE 3.2
CITIZEN TRUST IN NATIONAL GOVERNMENT AND PUBLIC SERVICES



Source: OECD n.d.
Note: OECD = Organization for Economic Co-operation and Development.

Most literature on this matter has focused on tap water—how customers judge it based on its aesthetics and the way utilities respond to customers’ concerns. In particular, Weisner et al. (2020) defined risk perception of drinking water as an individual’s subjective judgment to the aesthetic and nonaesthetic qualities of water. Unexpected aesthetic issues, such as odor and color, can set off distrust among customers (Goetz 2018). Customers want to trust their water utility, knowing they can depend on their services and their concerns will be adequately addressed. In fact, Goetz (2018) argued that responding with genuine concern to complaints and validating customer input is an opportunity to build trust. Therefore, when the public perceives risk in the tap water, the utility must communicate their response effective-

ly. Both studies (Goetz 2018; Weisner et al. 2020) showed the importance of this and provided some strategies that can build confidence. However, the literature of the impact of these strategies is limited, and more research is needed.

The trust customers have in their utilities and how they engage with them can also be a determinant of the type of ownership model chosen. Birchall (2002) investigated this and stated that consumer ownership of water has advantages and would be less costly than investor ownership (if there are not large conflicts of interest among consumers). When the members are consumers who encourage participation, trust relations are built. As a result, this type of model promotes social goals and ethical practices into the business strategy, which gives utilities a cooperative advantage (Birchall 2002). In this proposed consumer-ownership model, collective values and mutual incentives accompany trust to achieve greater engagement from customers. This example presents that trust influences not only utilities' performance but also the type of ownership models that are viable, making it an important asset for water utilities to cultivate; however, the strategies on how to do so are unclear.

Trust is important not only in the relationship between utilities and customers but also in the private sector's participation in providing water services. In some cases, water utilities outsource activities, but this process entails risks as there is lack of trust between the water utilities and private companies (Heino, Katko, and Pietilä 2015). For instance, in Finland, municipalities have the legal responsibility for arranging water services. However, they can collaborate with the private sector to produce the services. Heino, Katko and Pietilä (2015) conducted a questionnaire of 71 of the largest utilities in Finland, asking about the current situation and the prospects of their service provision arrangements. The results revealed partnerships based in the management of mistrust, which require precise, rigid contracts and continuous monitoring that then lead to inefficacy, weakened cooperation, and limits to innovation. The authors suggested that more attention be paid to strengthening trust, emphasizing reciprocal learning. Future research is needed to identify the types of methods that can address this mistrust, for which nimble evaluations results are relevant.

Encouraging Water Point Insurance

Water point insurance can be a mechanism to promote access to safe water. More than a billion people around the world rely on communal water points every day to access safe water. But water points often fail, with more than one out of every five rural water points broken (Social Impact Partners 2018). These failures occur for many reasons; however, the cost of repair often exceeds the financial capacities of the community. For this reason, **promotion of a water point insurance** that could alleviate the burden of repair costs has been proposed. A water point insurance or an insured maintenance and repair plan is a mechanism that results in a pooling of risks across multiple water points, shortened repair times driven by availability of funding,

and a long-term reduction of monthly premiums (because fewer replacements are needed as the level of maintenance improves). This approach is new, and research has not identified obstacles that would rule out the possibility of insurance to address these needs. This has motivated further research on these approaches. Social Impact Partner (2018) proposed as the first step a small-scale pilot to validate the primary hypothesis and determine the feasibility of the insurance scheme. For this pilot, nimble evaluations are a suitable tool as they allow for a product's uptake and an understanding of how people make decisions to be tested. In fact, World Vision (2019) launched a pilot in 2019 in Kenya with the purpose of enhancing the sustainability of rural projects. In this case, rural communities are expected to generate the revenue to cover the insurance and for it to be collected by water users' committees.

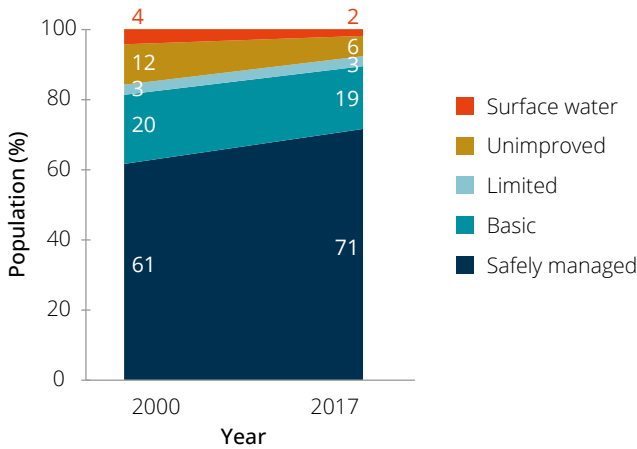
Incentivizing Providers to Deliver Safe Water

This section reviews the problem of safe water from the incentives that service providers need to deliver it. The population using safely managed drinking water services increased from 61 to 71 percent between 2000 and 2017, but there are still more than two billion people who lack access, and three out of ten people don't use it (see figure 3.3; UNICEF and WHO 2019). In the search of incentives for services providers to address this issue, Narayanan et al. (2017) found that bottom-up approaches, characterized by a strong involvement of alternate services providers, have shown effectiveness in improving access to safe water supply. When the service provider involved active participation from the community, access to safe water was higher for households. These findings open the question on the best strategies to engage the community—possibly framing, addressing social norms, or social pressure. Even in developed countries, such as the Netherlands, water supply companies are looking to shift to have a more active consumer orientation (Hegger et al. 2011). Regarding specific methods that can be implemented, Tran et al. (2020) assessed the rainwater harvesting methods utilities in Vietnam use that can secure a sustainable water supply. The specific strategies to treat water must consider local weather, human activities, and the affordability of the community. However, plenty of methods are available, and after a careful design, they can be implemented. Nimble evaluation results are extremely relevant as they can test these approaches in a fast and cost-effective way, determine which alternatives serve better to engage with the consumers, and evaluate utilities' take-up of methods.

These examples show strategies to deliver safe water, but the question of how to incentivize utilities to use them remains. In this matter, Nagpal et al. (2018) suggested that utilities be benchmarked not just based on their budgetary performance but also on their improvements in reaching the poorest populations. The incorporation of new standards to measure performance in the long term can result in the establishment of new norms of service provision, which can affect incentives of decision makers at different levels of the organizational hierarchy. Furthermore, agents work-

ing on these types of services have prosocial motivations that make them sensitive to social outcomes of the work (Besley and Ghatak 2018). In this sense, the questions of how utilities can engage more with customers and how reward schemes within the organization can be implemented to improve quality of the services remain.

FIGURE 3.3
GLOBAL DRINKING WATER COVERAGE 2000–17



Source: UNICEF and WHO 2019.

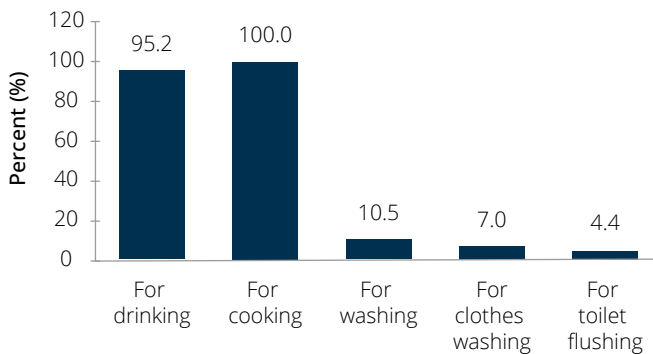
Encouraging Water Treatment at the Household Level

Even if utilities engage new approaches to improve service quality, there are still obstacles to ensure sustainable improvements in water supply and a need to encourage water treatment when quality cannot be guaranteed at the household level. Poulos et al. (2012) found that in Andhra Pradesh, India, only 36 percent of respondents reported treating water at home at some point during the year. For this reason, household water treatment and storage (HWTS) products have been viewed as important mechanisms for increasing access to safe water (Poulos et al. 2012). Although HWTS products are effective in reducing illness, levels of adoption and continued use remain low. According to the authors, understanding of household preferences for these products can be used to create demand through product positioning and social marketing. One example of these kind of strategies is the attention the Vietnamese government paid to rainwater use (Dao et al. 2021).

The use of rainwater has been promoted to meet domestic needs in rural areas, contribute to flood reduction, and minimize groundwater exploitation. Dao et al. (2021) conducted a survey in Vietnam, and 95 percent and 100 percent of the rural house-

holds in the sample used rainwater for drinking and cooking, respectively (see figure 3.4). The authors did an assessment on the operations and maintenance behaviors of the water treatment and provided recommendations that adapt to the environments and particular conditions on the rainwater. This is one of many examples of how marketing strategies and legal frameworks—which have been using behavioral insights long before and respond to household-specific needs—can be helpful to address development issues.

FIGURE 3.4
DIFFERENT USE PURPOSES OF HARVESTED RAINWATER AT SURVEYED HOUSEHOLDS IN VIETNAM



Source: Dao et al. 2021.

Water Conservation under Social Norms Information Treatment

Several behavioral interventions have been carried out on the important question of reducing consumption relying on social norms information treatment (SNIT). A sixfold increase in global water use over the twentieth century has led to the availability of fresh water being one of the most critical issues policy makers are facing (Datta et al. 2017). From a policy perspective, it is crucial to understand the impact of interventions that can change consumption patterns. These conservation programs appeal to utilities because they are an alternative that is easy to implement and usually results in short-term reductions in energy and water use of about 2 to 5 percent (Nauges and Whittington, 2019). As shown in chapter 1, most rely of social comparisons to influence behavior. According to Brent et al. (2017), this type of intervention works because customers see that their water use is higher than similar neighbors and feel guilty for their overconsumption. In

consequence they put a “moral tax” on consumption, in which the size of the tax depends on the magnitude of the difference between household performance and the comparison group.

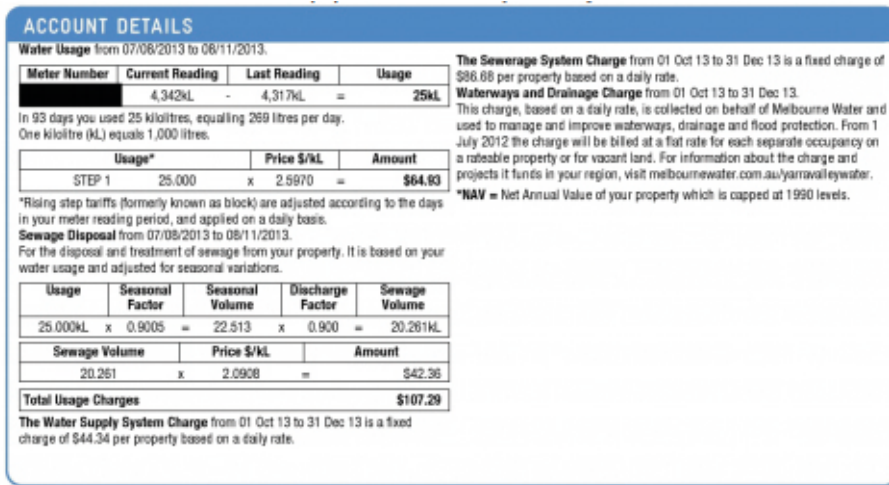
There are several forms of SNIT, some of which have not been studied in detail.

For instance, Bhanot (2017) presented an experiment that invokes perception of peer rank, or how one performs relative to one’s peers. In Castro Valley, California, household mailers contained different forms of peer information and social rank messaging to motivate water conservation. The results showed reductions from 13 to 17 gallons per day, depending on the mailer version, and had differentiating effects depending on the initial use of water. Neutrally framed information caused a boomerang effect for low-water-use households, but competitive framing eliminated it. Another example is the experiment of Brent et al. (2017) in Reno, Nevada, in which the main social comparison was presented in percentage rather than in levels of consumption. The authors argued that this treatment allows for isolation of the moral tax behavior channel because it provides less financial information. For an accurate comparison, they implemented three types of treatments: comparison in percentage, comparison in levels, and information on monetary savings. All treatments led to a 1.5 percent reduction in water consumption relative to the control group. Brent et al. (2017) concluded that understanding behavioral mechanisms helps policy makers select the interventions that adjust with the specific objectives. Therefore, understanding how different nudges work expands the toolbox to address the different forms of water scarcity that different regions face.

Implementing interventions to induce changes in customers’ consumption levels may have further consequences, both positive and negative, on the objectives that utilities want to achieve.

One example of positive consequences is an experiment by López-Rivas (2020), who sought to identify spillover effects of SNIT in Diamante, Colombia, and found that spillover effects of norm-based messaging are even more effective in reducing consumption than traditional estimation. Brent and Ward (2019) present another example. In this intervention, customers were provided with more information about the price structure their utilities implemented to elicit knowledge about the cost of water, as shown in figure 3.5. Results showed that consumers had poor information about the marginal price of water and overestimated the costs of using water. When households were given more accurate information, they increased water use. These results are consistent with the recommendations of Nauges and Whittington (2019) about the need for water utilities to undertake a careful economic analysis of SNIT for their particular local circumstances to ensure that the policy will enhance welfare. The great impact that behavioral interventions can have, mainly in a context in which price changes are difficult to achieve, is attractive for utilities, and further research is needed to better understand the impact of different nudges.

FIGURE 3.5
BILL INFORMATION ABOUT PRICE AND QUANTITY IN AUSTRALIA



Source: Brent and Ward 2019.

Most interventions focus on water conservation under payment schemes, but to achieve water conservation under a free basic water policy is also important as it can result in water waste and additional financial burdens to water utilities. In South Africa, about 7.5 million people access free basic water via communal taps (Scheihing et al. 2020). The authors proposed a strategy in which low-income communities are rewarded for reducing water wastage. The strategy is based on the agreement that a substantial percentage (for example, 60 percent) of the municipal cost savings from the reduction in water waste will be directly invested into projects that promote the development of the community. This strategy has not been tested; however, it may have potential to benefit both the communities and the utilities, and it might even save costs for the utilities.

Encouraging Water Reuse and Rainwater Harvesting Systems

Considering the water stress many regions are already facing and more will face because of rapid urbanization and population growth, more options to sustainable water supply have become relevant. Examples include water reuse on water-stressed regions and rainwater harvesting systems (RHS). The adoption of these by water utilities and households may be further addressed through behavioral insights. Regarding water reuse, Goodwin et al. (2018) showed that providing information to the public about their options can positively affect acceptability. The authors conducted an experiment to evaluate the impact of various forms and mechanisms of communication with the public regarding reuse, specifically the use

of different ways of framing video animations. Comparing the messages with the control group showed that compliance messages and the general messages had statistically significant improvement for some attitudes. This is a clear example of the value of nimble evaluations, as they help to evaluate a set of alternatives in a fast and cost-effective way.

For their part, RHS are increasingly viewed as a practical means for supplementing water supply in water-scarce regions (Dallman et al. 2016). Rainwater harvesting is a process of collecting and storing rainwater during rainfall occasions, and its conservation in tanks is used as an alternative to tap water (Ali, Zhang, and Yue 2020). Several studies have investigated the viability of these systems and the uses rainwater can have in households. Ali, Zhang, and Yue (2020) developed and applied a hydro-economic model to investigate water saving and stormwater capture efficiency and financial feasibility of RHS under five climatic regions of Pakistan. The results showed that capture efficiency was higher for RHS that had larger tank sizes, and these were able to supply as an alternative for tap water in some uses. The most adequate systems and the efficiency of RHS largely depended on the region, as rainfall and environmental conditions vary. In India, Krishna, Mishra, and Ighalo (2020) determined that RHS are crucial to relieve pressure in groundwater extraction. The necessity of these systems in India is greater than anticipated; therefore, there is a need to encourage the adoption of these methods. In some regions, rainwater can even be used for human consumption, as is the case of communities in north and south local government areas in Langtang Nigeria (Saidu et al. 2021). The benefit-cost analysis Dallman et al. (2016) conducted in Southern California revealed that, in several scenarios, RHS showed economic benefits. This research informs policy makers on potentially cost-effective ways to supplement water supplies, enhance water conservation, and reduce resource using. However, there is still a lack of research on the specific systems that work in each climate and the willingness of customers to adopt these technologies.

Encouraging Water Conservation by Farmers

Promoting water conservation behavior among farmers requires novel strategies, which have started to be explored. By 2020, the agricultural sector consumes 70 percent of the global water supply and is among the most water-intensive activities (Ouvrard et al. 2020) when compared with other human activities. In consequence, farmers' water consumption is a public priority, which can be addressed using behavioral tools. In fact, Chabe-Ferret et al. (2019) used social comparison nudges, which have generally been applied to change households' behavior, in the European farming context. These authors used smart water meters and an automated texting platform to communicate to farmers about their neighbors' and their own water use. The results from the experiment showed that the nudge was effective at reducing the consumption of those who irrigate the most, although it appears to have reduced

the proportion of those who do not consume water at all. The proportion of farmers who consumed more than 80 percent of their quota went down by 7 percentage points in the treatment group when compared with the control group. However, the proportion of farmers that did *not* consume water also increased by 10 percentage points in the treatment group, suggesting a boomerang effect from the intervention on that group. Farmers' responses to social comparisons is different from those of consumers because of the more direct effect of reducing water consumption on their economic productivity. However, as these studies show, there is space for cost-effective nudges to be used in addition to other interventions.

Considering farmers may react more to new information about others' practices than to social comparison measures, behavioral interventions to encourage the use of new practices have large potential. One of the technologies promoted to deal with the increases in water scarcity are smart water meters. However, farmers have been highly reluctant to adopt them, mainly because of data privacy concerns. Tackling this issue, Ouvrard et al. (2020) conducted a discrete choice experiment to promote the voluntary adoption of smart water meters. The authors tested two policy instruments: a conditional subsidy and green nudges. On one hand, the conditional subsidy was offered to farmers that adopted this technology only if the rate of adoption in their area was sufficiently high. On the other hand, the green nudge consisted of reminders about the existence of water restrictions, the importance of good management of water resources, and a testimony of a farmer who had adopted the smart meter. The results showed that all three instruments did induce farmers to adopt the new technology and that willingness to pay is positive if data confidentiality is guaranteed and they receive an alert when there is abnormal water consumption. These results motivate further research in the use of nudges in the agricultural setting, with the possibility of using cost-effective measures to address water stress.

Discouraging Overuse of Groundwater by Small Farmers

It is key to identify strategies that can discourage overuse of groundwater by small farmers. Groundwater is one of the main and safest sources of water as it supplies numerous urban and rural communities and serves as a strategic reserve that can be used in times of crisis (Velez Nicolás et al. 2020). In fact, groundwater provides 30 percent of freshwater in the world (Salcedo Du Bois 2014). Nonetheless, the intensive use of this resource, in particular by the agricultural sector, has created an urgent need to design governance mechanisms at the local and national levels (Faysse et al, 2011) and to evaluate the hard evidence of such crises to identify the type of responses that actually work. Groundwater management is challenging as it is a common pool resource (CPR) in the same way irrigation systems are. One of the

classical approaches to this problem is government regulation. In some countries, such as Mexico and India, the government has implemented subsidies for energy used to pump groundwater. These have artificially reduced the cost of pumping water, fostering overexploitation of aquifers. Foster, Rapoport, and Dinar (2017) and Foster, Dinar, and Rapoport (2018) explored the impact of changes in the structure of in the decisions of farmers through lab experiments and data simulations. They found that farmers may reduce water pumping when subsidies are eliminated, reduced, or decoupled. From these options, the authors argued that decoupling is the most feasible policy for its political implications. These results give important insights about ways to discourage overuse of groundwater; however, they haven't been tested in farmers (the lab experiments were conducted on undergraduate students). Therefore, it is imperative to conduct further studies in the population of interest as behavioral barriers can differ substantially.

Several authors have proposed collective action as a way to manage CPR as groundwater. Scholars in this line argue that rules that are created and agreed within the community, along with tools that ensure the enforcement of those rules, can be effective in the provision and preservation of CPR (Salcedo Du Bois 2014). In the agriculture sector, farmer-managed systems have been promoted as a tool to facilitate management of natural resources. Authors such as Kurian and Dietz (2004) discussed the importance of group heterogeneity in these joint management contracts. They concluded that given the wide variety of characteristics that a group has and the diversity of ecological conditions, rules must be context specific. This premise calls for methods that test tools in a faster and less costly way, such as nimble evaluations. Moreover, Salcedo Du Bois (2014) suggested that the analysis of institutions involved in groundwater management and user behaviors requires an analytical framework that goes beyond traditional economics. However, this framework is still weak, and there is a need for a formal conceptual framework that considers cooperative behavior and is supported by observation and data. This calls for action from behavioral economists and researchers.

Interventions to inform farmers and change social norms about groundwater use should incorporate behavioral insights, such as framing and choice architecture. According to Faysse et al (2011), farmers have adopted two types of strategies to address the impact of an unsustainable use of groundwater: chasing and adaptative. On one hand, chasing strategies consist of investments done to obtain sufficient fresh water to maintain the farm's production system. On the other hand, adaptative strategies refer to the adaptation of cropping systems and pathways to decrease water use. However, for these strategies to work, organizations responsible for groundwater management must have significant financial and human resources and farmers must be officially registered in these organizations. As the Food and Agriculture Organization (FAO 2003) explained, resource management should be considered a socioeconomic issue with a pro-

found technical component. In that sense, the dissemination of information to affect farmers' decisions becomes key. In fact, high-quality economic and scientific research is one of the main issues in establishing groundwater markets (Wheeler, Schoengold, and Bjornlund 2016).

Encouraging Collective Action among Farmers in Irrigation

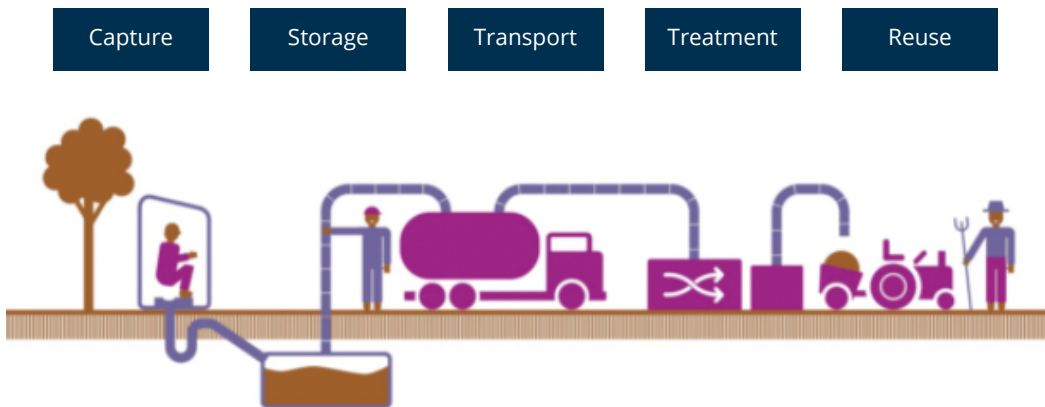
Encouraging collective action among farmers to manage irrigation systems has been viewed as a solution to achieve a better management. Despite huge government investments in the establishment of irrigation schemes, some face collapse after the state withdraws support (Muchara et al. 2014). For this reason, most developing countries have transferred to a communal management of irrigation schemes. In this system, community organizations receive the responsibility of managing water distribution, collecting irrigation service fees, and maintaining infrastructure (Kurian and Dietz 2004). This has showed positive results and become the main option in different contexts; therefore, it is important to **encourage collective action among farmers to manage irrigation systems**. Muchara et al. (2014) studied the determinants of farmers' participation in collective irrigation management in South Africa. Furthermore, Balasubramanya (2019) found that longer training in the creation of the community-managed water user association had a causal effect on increasing participation. However, participation was negatively affected when female workers operated farms, suggesting that these models may have a gender bias that limits women's participation. The authors studied socioeconomic, institutional, and resource-related variables and found that collective activities are negatively affected by low farmer-literacy levels, whereas water scarcity has a positive effect.

This study opens the door for investigating further variables that may affect participation in these schemes, as is the case of behavioral barriers, such as lack of trust or bounded rationality. Moreover, the effects of this system have been recognized by the Nepalese government, which stated that farmers' governance in managing irrigation systems is a successful policy (Dhakal, Davidson, and Farquaharson 2018). However, the authors found that farmer-managed irrigation systems (FMIS) alone do not necessarily improve the performance of irrigation resources. In some cases, they have even brought inequality and a negative impact on the mutual trust among users. To avoid these effects, FMIS must share proportionally the costs and benefits among users, which in some cases requires a change in the institutional design of the system. For instance, Kurian and Dietz (2004) explained that homogeneous groups may perform better than heterogeneous in facilitating collective action. In the institutional redesign that collective action systems require, it is key to incorporate behavioral insights in the research and implementation. Social norms present in more hierarchical societies may be a huge barrier to achieving a good management of the system, and agents must consider these things.

Encouraging Providers to Safely Transport and Dispose of Fecal Sludge

Removal, transport, and disposal of fecal sludge can be a health hazard for workers themselves and the environment in which the service is needed. Though much focus for sanitation provision is focused on the service at the user end, the entire sanitation supply chain should be considered to ensure safe management of sanitation services. This means considering not just the user experience (capture according to figure 3.6 below), but also storage, transport, treatment, and reuse. When unsafely dumped, fecal sludge or sewer water can perpetuate water contamination and further the spread of infectious disease. For workers, it is a difficult and unpleasant job despite being an essential service for the community. Yet if properly treated and processed, fecal sludge has the potential for lucrative and effective reuse in agriculture, with chain benefits for the whole sanitation chain (WaterAid 2019).

FIGURE 3.6
SANITATION CHAIN



Source: WaterAid 2019.

Barriers to FSM can be addressed through interventions that focus on behavioral changes. Fecal sludge collection has long been a dangerous and lowly regarded job since the night soil men of nineteenth-century urban centers in the United States and United Kingdom. If the work itself could be reframed along the lines of safe waste collection, environmental cleanup teams, or hygiene brigades, it would better dignify the work itself and increase its value and, thus, households' willingness to pay for this essential service.

Some strategies that can be used for this purpose are CLTS and sanitation marketing. First, CLTS is a method that focuses on behavioral changes needed to en-

sure real and sustainable improvements by raising awareness about the risks of open defecation (Institute of Development Studies 2011). However, framing is more negative as it is designed to elicit strong emotions as shame, disgust, and peer pressure to persuade individual and families to build and use latrines. On the other hand, more human-centered design approaches that have more recently gone hand in hand with sanitation marketing reframe adoption as being about encouraging cleanliness. The Clean Team in Ghana pioneered by Water and Sanitation for the Urban Poor is one example of such an approach.

Another consideration is to encourage leadership within the service provider organizations. Crocker et al. (2016) evaluated training natural leaders as an addition to CLTS. This training led to increased time spent on CLTS by community members and increased latrine construction, and it reduced open defecation by 19.9 percentage points. Thinking how CLTS could be applied to FSM providers could include mobilizing community awareness of the importance of the job of fecal sludge collectors. The recognition of the importance of this service could put pressure on FSM service providers to ensure safety of both their workers and the FSM process as a whole. The service provision itself could also be made more attractive to the providers by raising awareness of the potential to sell fecal waste for agricultural processing.

Box 3.1 Sanitation Marketing in Cambodia, Vietnam, and Bangladesh — iDE

The model of sanitation marketing (SanMark) used by one nongovernmental organization (NGO), International Development Enterprises (iDE), works in three areas: product and service design, demand creation, and supply chain strengthening. In demand creation, agents speak to households about their sanitation needs, and their commissions are built into the selling price, so the model is sustainable for businesses and agents. In supply chain strengthening, iDE identifies and trains local entrepreneurs to meet the new demand for sanitation services.

These areas are crucial for communicating to companies in the business about the potential of waste as a source of profit, the provision of a clean service, and getting more stakeholders involved. iDE has made fecal sludge management (FSM) a priority as the lack of this service threatens the health benefits of household latrine constructions.

In Cambodia, FSM products, such as pit gauge and dual-pit upgrades, have been tested. In Vietnam, market research on existing FSM services in rural areas and supply chain viability has been conducted. Finally, in Bangladesh, they have tested commercially available composting toilets and are currently scaling up a latrine pit filter that reduces surface water and groundwater contamination.

In addition to CLTS, sanitation marketing has also proved to be helpful in changing attitudes toward FSM. Sanitation marketing is an approach that intends to identify and fill market gaps by influencing supply and demand for sanitation products for incorporating private businesses, nongovernmental organizations (NGOs), and government stakeholders in the service provision (iDE n.d.). In box 3.1 is an example from one NGO that has included FSM as a consideration in its model.

CLTS and sanitation marketing show how the adoption of FSM services is a problem that involves service providers and households simultaneously, with behavioral insights key because they provide information on the real choices for both agents. They also help communicate in a more efficient way the benefits that providing FSM could have.

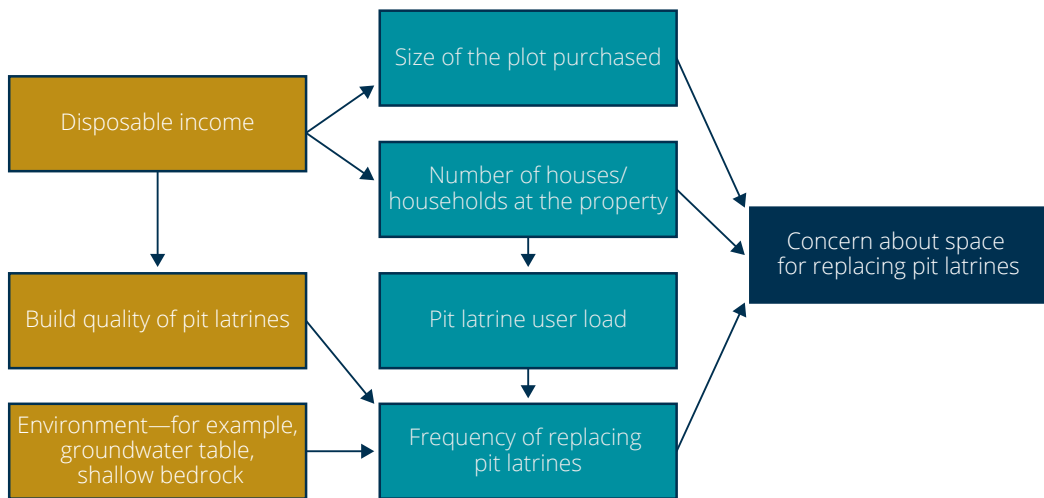
Encouraging Households to Use Safely Managed Fecal Sludge Services

There are some obstacles to encourage households to use safely managed FSM services. Peletz et al. (2017) showed that in Tanzania, household demand for latrine platform products is too low to achieve national goals for improved sanitation coverage through fully commercial distribution. Some of the barriers were financial, but cultural determinants, such as values related to purity and harmony, social support, and traditional roles, have also limited demand for sanitation uptake. In some cases, such as Chunga et al. (2016) in Malawi, even when presented with the option to adopt new technologies, property owners preferred to adapt their existing facilities by constructing their replacement pit latrines on an old pit latrine location; some of the reasons are in figure 3.7. Even if users are given all alternatives and their clear advantages, they may be subject to inertia and prefer the known technology. However, when looking at the determinants of adoption, Santos et al. (2011) showed that households in Salvador, Brazil, focus more on attributes of health protection, accessibility, privacy, and house modernization, rather than on high costs when opting for flush toilets. These are nontraditional factors for which nimble evaluations may be useful to understand households' decisions under natural circumstances.

The problem of households not connecting to wastewater systems and, in general, sanitation services has been shown to involve multiple behavioral barriers. Key informants involved in the provision of wastewater management practices in Brazil identified a set of problems. First, users face **negative reciprocity** because they perceive that utilities are just looking to charge for new services, rather than provide essential services, which results in a resistance to connect. Second, households **lack trust** in the service, which is associated with a lack of understanding of what connection to the service implies. Third, households have **status quo bias**. Households have found alternatives, sometimes inadequate, that they consider sufficient and

thus resist change. Fourth, people are not aware of these systems' importance and generally **perceive them as having low benefits**. Finally, there is a **diffusion of responsibility** in which people are becoming aware of the problem but think it must be solved by the utilities. These problems are clear examples of the applicability of behavioral sciences to sanitation problems, in which nudges may have important effects to raise connection to services.

FIGURE 3.7
KEY CAUSES OF CONCERN ABOUT SPACE FOR REPLACING PIT LATRINES



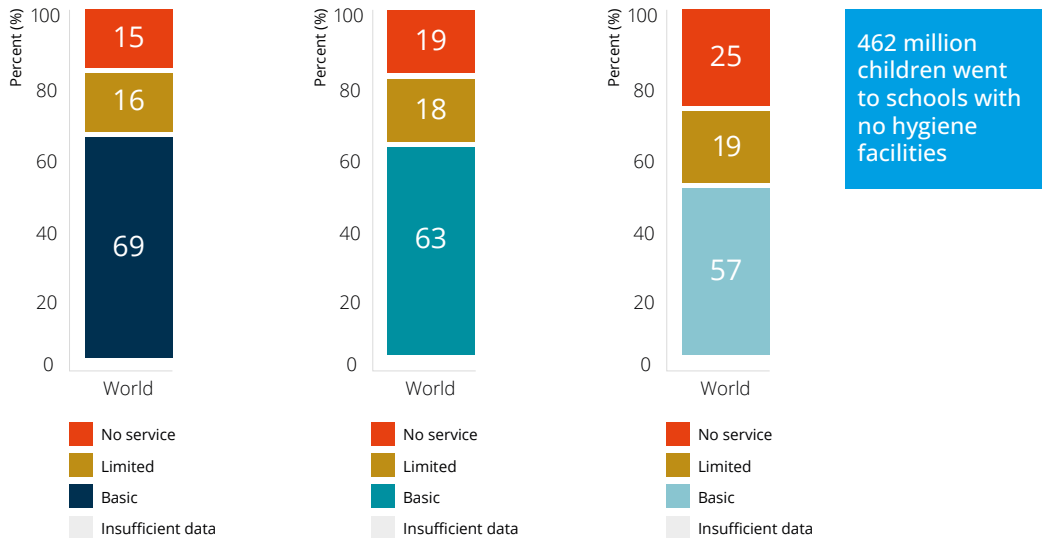
Source: Chunga et al. 2016.

Empower Adolescent Girls and Women to Take Care of Their Menstrual Hygiene

One issue that has not been studied but may have great potential is how to encourage adolescent girls and women to take care of their menstrual hygiene. Behavioral economics is especially powerful when promoting hygiene practices for two reasons. First, they are useful to understand what the barriers behind adoption and habit formation are because they aim to understand decision making under natural circumstances. Second, the methods behavioral economics uses allow for the testing of different alternatives and interventions to identify which ones may have better results. According to UNICEF (2020), millions of women and girls across the world are denied the right to manage their monthly menstrual cycle in a dignified and healthy way. As figure 3.8 shows, only 57 percent of schools in an eighty-one-country sample had basic hygiene service. Gender inequality, discriminatory social norms, cultural taboos, poverty, and lack of basic services have meant that menstrual health and hygiene needs go unmet for adolescent girls and women.

FIGURE 3.8
BASIC WASH IN SCHOOLS (2019)

- Estimates for **92 countries**
- **69%** of schools had a **basic drinking water** service
- Estimates for **101 countries**
- **63%** of schools had a **basic sanitation water** service
- Estimates for **81 countries**
- **57%** of schools had a **basic hygiene** service



Source: UNICEF and WHO 2019.
 Note: WASH = water supply, sanitation, and hygiene.

Many facilities are not designed with the consideration of menstrual hygiene, as is the case of school toilets that do not have doors or that lack areas to dispose of sanitary products. For adolescent girls and women to manage their menstruation in a safe and dignified manner, they need access to infrastructure, services, and products that allow them to do so. In particular, a study for low- and middle-income countries showed that there is an absence of guidance, facilities, and materials for schoolgirls to manage their menstruation (Sommer et al. 2016). The lack of privacy and space for changing, cleaning, drying, or discarding materials, as well as insufficient availability of water for personal hygiene, are important areas in which sanitation systems often fail to address the needs of menstruating girls and women (Sommer, Kjellen, and Pensulo 2013). However, there has not been a systematic mapping of menstrual hygiene management priorities or coordination of relevant sectors and disciplines to act on the matter; and even Sommer, Kjellen, and Pensulo (2013) said there is a lack of research on the subject. Some of these barriers can be tackled using nudges that promote the use and provision of products. For example, agents recruited by external organizations can promote hygiene products. This happened in Zambia, where health facilities recruited hairstylists to sell women condoms to combat HIV in a context in which discussing sexual health

is a taboo. Through the use of financial and nonfinancial rewards, agents significantly increased sales, which meant more women were using the product (Ashraf, Bandeira, and Jack 2014).

One of the crucial points regarding menstrual hygiene is the lack of proper infrastructure and availability of products. As shown earlier, the other main points are the social and cultural beliefs regarding menstruations in many countries. For instance, Downing, Benjimen, and Natoli (2020) found that in Vanuatu, many women and girls have limited knowledge on menstruation, and the attitudes of men and boys influence the feelings of shame and embarrassment during menstruation. In particular, UNICEF (2019) recognized that unsupportive and patriarchal attitudes and social norms regarding menstruation that lead to stigma, myths, and taboos are one of the main barriers to improving menstrual health and hygiene. As a short-term goal, girls, women, boys, and men should improve their individual knowledge and attitudes about menstruation. For this goal, there is a need for knowledge generation and learning, social mobilization, and community dialogue, and teaching and learning on menstruation hygiene in formal and nonformal education and health programs (UNICEF 2019). As shown in this report, most of these needs can be addressed with behavioral methods, such as nimble evaluations that measure the impact of education programs and employ strategies to change social norms. However, currently there is lack of evidence that calls for urgent action from the development partners.

What's Next?

Behavioral interventions with a nimble evaluation built in, can reveal small-scale interventions that work more quickly and at lower cost than traditional approaches.

The issues presented in this section are of great importance to achieve developmental goals; however, many opportunities remain to address them from a behavioral perspective. Behavioral economics, the use of nudges, and the use of nimble evaluations promote alternatives to traditional methods that can achieve results in a more quickly at a lower cost than traditional approaches. The specific questions presented in this chapter have a clear behavioral dimension that researchers have already identified; however, more can be done to incorporate these insights into interventions.

Conclusion

This report has sought to provide a new conceptual framework for analyzing challenges in the water and sanitation sector—through a behavioral lens. The first chapter provided a brief introduction to behavioral economics, why it has emerged as a new approach in recent years, and why it is relevant for water and sanitation sectors. Then the process of implementing an infrastructure project was broken down, highlighting different behavioral barriers along the way—starting with the investment and contracting decisions made by the policy maker, moving to the challenges of balancing service quality and expansion at the service provider level, and ending with encouraging uptake and sustainable use of these services by the customer. This chapter drew from the accompanying paper to this report, *Behavioral Insights in Infrastructure Sectors* (Joseph et al, 2021) to identify barriers, mechanisms, and tools at each step along the way for addressing infrastructure-specific behavioral challenges. It then outlined what methods could be used to evaluate these approaches to infrastructure challenges—in water supply and sanitation (WSS) in particular—highlighting both traditional and nimble evaluations and their comparative advantages.

The second chapter provided an overview of the work that has been conducted or funded under this advisory services and analytics (ASA), using either traditional or nimble evaluations. These works have evaluated some key questions coming through operations that are commonly faced in WSS project implementation. The chapter provided examples of capacity building and training of personnel at the service provider level resulting in improved service level outcomes, with potential knock-on impacts in terms of the health of communities being served. At the consumer level, it highlighted several potential behavioral and financial barriers to uptake and sustained use of primarily sanitation services (improved onsite and sewer). It offered insights into the various mechanisms by which these barriers can be addressed, including through payment installments; framing of sanitation as part of the housing infrastructure; targeted approaches in subsidies versus marketing for different socioeconomic groups; recognizing the power of community influence and social norms; and providing messaging on health and steps to make the process easy for connection and uptake of a new service.

The third chapter and final chapter moved on to questions that remain unaddressed by this ASA but require further investigation. It explores what research already exists on encouraging collection rates for water services, ensuring good-quality last-mile connections, encouraging trust in utilities, and encouraging water point insurance. Regarding safe water, we explored matters on how to incentivize providers to ensure safe water and how to encourage water treatment at the household level. On water conservation, it studied how to encourage water conservation

with perception of social rank, under free basic water policy, and water reuse on resource-stressed regions. Concerning sanitation services provision, it studied how to encourage service providers to safely transport and dispose of fecal sludge and how to encourage households to use safe fecal sludge management (FSM) services. Finally, regarding hygiene, it studied how to encourage adolescent girls and women to take care of their menstrual hygiene. Overall, more research needs to be done in all of these areas using the approaches outlined to provide useful recommendations to these largely underexplored questions.

Overall, this report sought to provide several insights into the power of a range of evaluation tools in the context of the water and sanitation sector and beyond. These approaches are not just for academic purposes, but they can also be shaped to answer highly operationally relevant questions. The aim of this report is also to have shown how more can still be done to address WSS challenges from a behavioral perspective, including those on encouraging revenue collection, trust in utilities, quality of service provision, quality of water and FSM services, water conservation, promoting collective action in small-farmer irrigation, and safe sanitation for women and girls.

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Appendix 1A

Further Detail on the Behavioral Challenges of the Infrastructure Triad

The Policymaker's Role

A vast majority of infrastructure service provision is not undertaken through market processes alone because of their public goods nature. Given that private provision of infrastructure will fall short of optimal levels, the government takes responsibility for the provision of the service, the design, and approval of the contracts with the construction companies, or it provides them itself through state-run mechanisms. The public sector provides a majority of infrastructure investments—in fact, 83 percent of the investment for infrastructure in developing countries was from government entities and state-owned enterprises in 2017 (World Bank 2017). Still, public-private partnerships outsourcing the activities related to the public service are totally or partially widespread. The relationship between government and service providers, which can be between private and public actors, is mediated through contractual arrangements that may influence the effectiveness of the investment. This interaction can be studied using a principal-agent framework, in which the policy maker can incentivize utilities to be more efficient in their provision of services.

The past decades have shown a trend for unbundling infrastructure services. In fact, according to the *World Development Report 1994*, unbundling is desirable because it identifies more precisely the subsidies needed to deliver services to the poor and improves management quality (World Bank 1994). Nevertheless, this generates some accountability issues that can be analyzed using the principal-agent model. First, the government/policy maker must choose the infrastructure projects. From this point on, behavioral biases come into play. Policy makers' and government agents' behaviors may be plagued by behavioral biases, heuristics, or social preferences guided by their environment, just like anybody else. For example, policy makers may be subject to the availability heuristic, a decision shortcut in which the likelihood of the selection is affected by the ability of the respondent to recall information about the options (Gohmann 2017). Similarly, the context in which the choices are presented affects the likelihood of the selected option—that is, choice architecture—and this may have direct implications on the project choice.

Given the complexity, magnitude, and long-term nature of infrastructure projects, procuring authorities should conduct their due diligence and perform assessments to determine project viability (World Bank 2018). Officers may estimate that the time required to complete a task is shorter than the actual time required—that is, planning fallacy—and if the preparation phase is incomplete, that can affect the performance of the rest of the project.

Second, once the project is defined, a contractual arrangement must take place. In this case, the principal (that is, the government) gives authority and property rights over certain operations to the agent but must design the contract in a way that induces the agent to serve her interest. For its part, the agent acts and makes decisions (some of these are explored in the next section). The process for selecting a partner must include fairness, neutrality, and transparency (World Bank 2018), so behavioral insights are key. Behaviors of procurement officers, such as present bias,¹ may relate to corruption with direct implications on the way that bidders act in the procurement process. For instance, the *Procuring Infrastructure Public-Private Partnerships Report* (World Bank 2018) evaluated laws and regulations of 135 economies and determined that 82 percent of the procuring authorities show clarification about the selection process to all bidders. However, low-income countries in the sample publish much less information about the procurement results. These practices are related to a lack of transparency, which may generate the wrong incentives among bidders. Furthermore, the contractual arrangement must foresee any principal-agent problems that may arise and establish the correct set of incentives, as well as the renegotiation and termination clauses.

Third, the policy maker/government must deal with contract management, including monitoring and evaluation systems and frameworks to facilitate the implementation of the investment projects. The monitoring systems, as mechanisms established in the contracts that track the progress of the project, address some of the challenges of the principal-agent model. Behavioral insights are key to determine which control mechanisms may be more efficient, discover the best way to highlight results, and identify biases. Some of the good practices the World Bank (2018) recommended include using a system for tracking progress and modification, expressly including renegotiation clauses in the contract, implementing dispute-resolution mechanisms, among others.

The Service Provider

Once the government has chosen the provider and issued the contract, there are several barriers and potentials for providing incentives to improve service delivery. Literature has highlighted the importance of behavioral aspects within organizations that affects their optimal functioning. For example, Porchet and Saussier (2018) showed that private management and in general better managerial practices are associated

with an improvement in service quality and changes in technical efficiency. Employee motivation, which is linked to monetary and nonmonetary rewards systems, lies at the heart of service provision in infrastructure. Before deciding on the type of rewards, it is relevant to acknowledge the possible selection of employees toward the public sector. As Besley and Ghatak (2018) showed, public agents may have prosocial motivation, which makes them less sensitive to monetary rewards and more sensitive to the social outcome of their work. This implies that organizations can benefit from motivated employees because effort can be elicited at a lower cost. Therefore, the discussion of employee selection in the public sector should focus on designing contracts to elicit acceptance from the most motivated employees. However, Kuvaas et al. (2017) illustrated the difficulty of finding the optimal incentives scheme in the presence of intrinsic and extrinsic motivation, with the danger of the latter crowding out employee motivation. Because financial rewards may have perverse effects in the public sector, the importance of incentive design cannot be underestimated. Another example is Belle (2015), who conducted an experiment in the health sector of Italy and found that monetary incentives for activities with a prosocial impact may crowd out employee motivation.

Behavioral interventions within service providers have been able to show positive results on improving service delivery. Through experiments in different areas, mainly in the health sector, authors have brought insights about practices to enhance performance. Table 1.1 presents a summary of several behavioral interventions and their results. In general, the literature on providing incentives for public servants is extensive, but the main behavioral issues that can be identified are in areas such as (a) employee motivation, (b) good service delivery, and (c) adoption of new practices. First, some interventions to enhance employee motivation include social recognition interventions (Gauri et al. 2019), the study of prosocial motivation with financial and nonfinancial rewards (Ashraf, Bandeira, and Jack 2014), and performance-related pay (Belle 2015). Results showed that interventions that incorporated social recognition in Nigeria were able to improve performance in selected contexts (Gauri et al. 2019), and in Zambia nonfinancial rewards were effective in settings in which the power of financial incentives was limited (Ashraf, Bandeira, and Jack 2014). Moreover, Belle (2015) proved that monetary incentives can crowd out employee motivation in activities with prosocial impact, such as the health sector.

Second, some studies for good service delivery included the causal impact of competition and showed how the existence of rival hospitals increased managerial quality, which is associated with better hospital outcomes (Bloom, Propper et al. 2015). Also, performance under autonomy was positively associated with completion rates among bureaucrats in Nigeria (Rasul and Rogger 2018), and allocation authority within organizations must balance agency issues (Bandeira et al. 2020). In addition, better management practices are associated with better educational outcomes in schools (Bloom, Lemos et al. 2015).

Third, for adoption of new practices, Álpizar et al. (2019) presented an intervention in Costa Rica to enhance the adoption of practices to reduce climate change impacts in water provision utilities, showing the weakness of regulatory practices in increasing adoption.

There are examples of how different behavioral interventions and frameworks can affect private and public sector organizations. In the case of infrastructure projects, this kind of intervention may have cascading effects and positive consequences on service delivery if designed and implemented appropriately. These kinds of changes are strongly related to the psychology of the workers and the organizational culture rather than physical investments. Of course both are needed, but behavioral approaches are not necessarily obvious and do have positive consequences in the service delivery that call for more research.

The Customer

In line with the discussion on behavioral economics, to build a sustainable infrastructure investment, there is a need for a new behavioral approach that humanizes the model of incentives and behavior of infrastructure users. A project's profitability, costs, and benefits depend on many potential users' decisions. For instance, any infrastructure project should match a demand to avoid or minimize wasteful use of resources. Therefore, investors must forecast user demand to recognize the projects that are more useful to society. Traditionally, predictions have been based on selfish profit-maximizing behaviors, which is quite distant from reality. Based on a broader interpretation of the characterization of users as behaviorally motivated agents, new behaviorally inspired interventions emerged to optimize adoption and use of infrastructure investment. Consequently, this section summarizes how behavioral insights have shifted several preexisting assumptions regarding users' decisions.

Regarding the provision of infrastructure from the side of the final consumer, there are two main issues: **adoption** and **consumption/use** of the service. For instance, in the water and sanitation sector, on the one hand, the adoption of water services relates to the connection of new users to the utility's service, representing the extensive margin. On the other hand, the consumption challenge addresses the use of water by those already connected to the service, constituting the intensive margin. Each of these has specific user decisions that may need to face different behavioral biases and distinctive interventions to increase adoption or moderate consumption. When facing an adoption decision, potential users must ponder cost-benefits of the new service or good. In this kind of environment, information can become overwhelming. The framing and type of message provided—and the attention paid to attitudes, identity, and beliefs—could play a crucial role in adoption. A good example is the status quo bias, in which people are inclined to make the same or similar decisions in the future as they made in the past. For example,

people who are not connected to the sewer network, because of status quo bias, may stay with their existing system, especially if there is a cost incurred to change. In contrast, once the service is adopted, they quickly become accustomed to usage and cannot imagine their life without the service. By this point, consumption or use of the service becomes influenced by several behavioral factors, such as other-regarding preferences, social norms, and habits. The main issue related to consumption is water conservation and how to induce customers to adopt new habits.

Adoption

The adoption of water services by individuals and families are affected by both their own behavioral biases and those of policy makers and service providers who create the choice architecture for their decision making. Evidence has shown that factors that have often not been included among economic variables, such as wording in informational brochures, nonmonetary costs (time costs), and attitudes toward ambiguity and governments, affect the adoption decision. For its part, the private sector has widely adopted behavioral approaches to understand consumers in their natural state with the use of marketing strategies. Furthermore, these factors could affect individuals and families of various strata, ideologies, or ethnic identities differently. Those working in developing countries have started to pay attention to this with the use of interventions, such as information brochures to reduce energy consumption or the introduction of social norms of safe driving (Hairth and Mahmud 2020). Information interventions in electricity have been widely studied in the United States (Allcott 2011), and their results have motivated others in countries such as Germany (Andor et al. 2020). Traditional factors, such as prices, costs, expected benefits, liquidity, and credit constraints, might fail to paint a complete picture of the adoption problem, so policy makers should consider a broader behavioral approach.

Regarding the problem of the forecasts about users' adoption with traditional methods, Delaire et al. (2020) presented an example from Kenya in which willingness to pay for high-quality pour-flush latrines was much lower than the estimates of market prices. By comparing stated and revealed willingness to pay, the authors found that less than 5 percent of households were willing to pay the full costs. These results suggest that traditional methods, focused on price-based incentives alone, may not provide accurate estimates of consumer demand for safe, reliable, and equitable sanitation products among low-income populations.

Furthermore, different evaluations have showed that the decision for adoption of water services often includes more variables than the ones traditionally considered. For instance, Devoto et al. (2012) showed that willingness to pay for a private water connection is high when it can be purchased on credit, not because a connection improves health but because it increases the time available for leisure and reduces inter- and intrahousehold conflicts on water, eventually leading to sustained improvements in well-being. In fact, part of the treatment recognized this by addressing

the hassle factors behind connecting by offering help to households in the treatment group to fill in the necessary forms. Understanding the behavioral factors behind a decision is key to delivering messages that effectively encourage connection, showing the need to focus on better-framed communications. For example, Toledo (2016) found that persuasive wording was as crucial as subsidies in affecting the adoption rates of energy-efficient light bulbs in Brazilian favelas.

Bear in mind that behavioral approaches should be a complement to traditional interventions. In most cases, willingness to pay can be understood better when considering nontraditional variables. Also, subsidies can be targeted in a more efficient way when considering behavioral aspects. In India, monetary incentives were a valid variable to screen out the richest individuals who were willing to pay for a water filter; however, time was a more valuable factor to assess the valuation of poorer individuals (Hoffmann 2018). Guiteras, Levinsohn, and Mobarak (2019) found that sanitation adoption may be interdependent across households, with social norms generating spillovers. In this case, subsidies in more demographically dense areas, where people were interacting more, had a bigger effect. These examples show how though subsidies can be valuable on their own, they could stimulate more behavioral change when combined with recognition of the importance of social influence.

Consumption

Infrastructure investments often provide common pool resources, as in the example of human-made aqueducts or water and energy distribution networks. A characteristic of this type of distribution network is congestion, which occurs when the system usage approaches some bottleneck; in water, it is when the demand induced by consumers at any given time is greater than the provision capacity. When this happens, it generates negative externalities on other consumers. Public water utilities around the world face pressure to match rising water demand with diminishing or uncertain supplies. In order to meet conservation goals, utilities are looking beyond traditional demand-management measures to behavioral interventions, which study the overuse of resources as a result of undervaluation and aim to ensure the sustained use of a service as energy-efficient technologies.

Several behavioral interventions seeking to reduce consumption have taken place in different parts of the world. One of the most common is the use of social norms to reduce water and energy consumption. For instance, Datta et al. (2020) used neighborhood comparisons and descriptive social norms to reduce average water consumption in Belen, Costa Rica. This simple, inexpensive, and non-personalized behavioral intervention reduced average water consumption by 4.9 percent using the neighborhood comparisons and by 3.2 percent using descriptive social norms. In addition, the use of social comparisons in three water utilities in the United States showed significant decreases in consumption in two of them (Brent, Cook, and Olsen, 2015). Moreover, Allcott (2011) presented findings of one of the biggest social

norms interventions in the United States used to reduce energy consumption. This program provided evidence that nonprice interventions substantially and cost-effectively change consumer behavior—in this case, the program reduced energy consumption by 2.0 percent.

The most common intervention that has been used for reducing energy or water consumption is social comparison; however, other strategies include savings tips, providing usage of audits, or feedback. Nemati and Penn (2018) used a meta-analysis to identify the overall effect of 117 studies in the gas, electricity, and water sectors. In the water sector, they found that the effect size of behavioral interventions spans from 14.8 percent in Australia to -2.80 percent in the Netherlands. In general, the information strategies reduce consumption by 5 percent. The reduction is largest in the gas sector (6.84 percent), followed by electricity (5.75 percent) and water (5.24 percent). Behavioral interventions are advantageous in the water sector because of their inexpensive nature. Considering the growing demand for water and the following scarcity, these interventions are becoming more relevant, and it is worth continuing to investigate them.

When looking at users already connected to the service, behavioral studies also address the adoption of practices and new infrastructure devices. Brandon et al. (2017) examined two mechanisms underlying long-run reduction in energy consumption: energy-saving physical capital and habit formation. They found that social comparison reports impel changes in capital stock and that such changes are important drivers of persistence in low consumption levels. Research suggests that social nudges may have a limited impact on the formation of new habits, but they appear to provide an effective way to induce the adoption of technologies that obviate the need for changing habits. As Allcott (2011) showed, behavioral biases limit the adoption of certain practices as the “MPG illusion,” a perceptual error, reduces the demand for energy-efficient vehicles in the equilibrium. Another example is the Álpizar et al. (2019) study, which said that encouraging adaptation to climate change is fundamentally about encouraging changes in human behavior. However, practices were limited in their effects on building capacity to resist climate change. These results suggest the need for a wider investigation into motives, intentions, and biases that agents have to address resource conservation issues correctly.³

3 Higher likelihood of selecting choice options whose payoffs are nearer in time.

Appendix 2A

Detail on Studies Conducted within the Water Global Practice from Chapter 2

Encouraging Rural Maintenance: An Impact Evaluation in Rural Nicaragua

Component one of the Sustainability Project of the Rural Water and Sanitation Sector (PROSASR) in Nicaragua provided technical assistance to water and sanitation committees (CAPS), which were able to improve institutional and management capabilities.

Motivation/Challenge

In 2014, the World Bank and the government of Nicaragua launched PROSASR, paying particular attention to poor communities. PROSASR has sought to consolidate institutions working on water supply and sanitation (WSS) and create a sustainability chain of better operational, technical, and financial management capabilities among operators of water distribution systems.

Intervention

The intervention's main objective was to strengthen institutional and management capabilities at community and municipal levels—that is, water and sanitation municipality units (UMAS) and CAPS. UMAS provide technical assistance to CAPS, the formal or informal institutions that manage, operate, maintain, and repair water distribution systems in the rural communities of Nicaragua.

Participants were required to develop, implement, and update action plans with specific goals and deadlines that sought to strengthen the institutional capacity of CAPS and to improve environmental, sanitary, and hygiene conditions in rural communities.

Research Design

To measure the effectiveness of these interventions, 300 rural communities in municipalities across the country were divided into two groups in a randomized control trial (RCT). In a phased-in design, a group of 150 communities received the intervention first, and the second half followed the year after.

The evaluation identified intermediate and long-term outcome indicators. Intermediate outcomes were those related to the project's objectives of strengthening institutional and management capabilities of UMAS and CAPS. These are particularly similar to the kinds of process outcomes that nimble evaluations are designed to measure. Long-term outcomes seek to measure whether quality and sustained service enhancement translate, ultimately, into better health outcomes for the beneficiary populations because of an improvement in the continuous delivery of safe water services. These long-term outcomes are more akin to traditional evaluation impacts that one would want to measure as they look for welfare impacts of the evaluation.

Outcomes were measured using baseline and endline surveys based on a monitoring tool called the Rural Water and Sanitation Information System (SIASAR). This system collected data on the functionality of water system infrastructure and the institutional and management capabilities of the CAPS (among other factors) for the first time in 2012–13 and then again in 2017–19.

Findings/Outcomes

As the endline measurement took place just a year after the intervention ended, benefits have yet to appear in terms of the long-term goal of increasing access to safely managed water for households in the communities. It is likely that not enough time passed to allow improvements in institutional and management capabilities to bring rural Nicaragua closer to this key objective. The intervention did, however, also seem to affect an uptake of improved sanitation in treatment communities, with an 8 percent increase in improved sanitation and a 37 percent reduction in open defecation in treatment communities versus control. Given that some behavioral change trainings were included in the institutional strengthening of CAPS and UMAS, there is evidence that this had a significant impact. Updated data from the SIASAR in 2020, and a potential new data collection effort two years ahead could help researchers detect the long-term impacts of the intervention.

Lessons Learned

This intervention supports the idea that capacity building at the institutional level can help strengthen capabilities of local communities' water committees to provide adequate operation and maintenance to their water systems, which can in turn improve service delivery to communities. Although this intervention was not explicitly about changing the behavior of rural water committees, building capabilities and providing educational opportunities for CAPS staff did affect the quality of WSS delivery. It also managed to have a positive impact on sanitation indicators, despite that not being the main focus of the intervention.

Field-Level Leadership in Ethiopia

This section presents the World Bank Water Global Practice pilot implementation of field-level leadership (FLL) in Ethiopia, that aim to address institutional development challenges.

Motivation/Challenge

There is growing recognition that the problems underlying the poor performance of a water utility in a developing country are complex and multidimensional. This situation calls for techniques that go further than the standard technical and managerial techniques. Many World Bank operations have supported institutional reform in the water sector, yet there are no interventions aimed at systematically transforming the internal culture of public service delivery organizations and building constituencies of support for positive change. This has prompted implementation of a human motivation-based approach as a complement to achieve results and sustainability.

Intervention

To address this gap, the World Bank Water Global Practice piloted the implementation of an innovative approach to support water sector projects that encounter institutional development challenges. This unique intervention—FLL—identifies and supports field-level public officials whose internal values are strongly aligned with the underlying values of development projects with the objective of improving performance and service delivery outcomes of public agencies in the water sector.

The FLL training consists of three phases. The first is a core workshop composed of a series of intensive group sessions conducted over a period of three to four days, during which participants are able to fully express themselves and their sentiments in a safe space and identify areas they can commit to improving in at work. In the second, employees can reflect on the workshop experience as they go back to work in a field application, and then finally they follow up in a self-reflection workshop. All in all, the three phases of the training program take about six to nine months to complete.

These interventions aim to change motivation for employees in addressing customer complaints and ultimately improve service delivery to the customer through shorter response times to complaints and connection requests and reduction in the frequency of service errors and nonrevenue water.

Research Design

To compare the efficacy of FLL interventions, an evaluation was implemented in four of the eight operational branches of Addis Ababa Water and Sewerage Authority

(AAWSA) across the city. Arada and Nifas Silk were the branches in treatment, and Akaki and Addis Ketema were the control. They were considered comparable pairs based on a branch performance indicator, difficulty of water provision, upcoming sewer works, geographic proximity relative to other branches, and number of customers. Some 850 to 900 employees across four branches were to be included in the survey.

At the time of the writing of this report, an employee-level survey had been conducted to gain baseline data on:

- **The employee network at the branch level** to help evaluate whether the FLL improves the number and strength of relationships among employees and whether it reflects in greater job satisfaction, better performance, and motivation, with data provided by interviews between trained enumerators and employees.
- **Basic socioeconomic characteristics** of employees, as well as their job history and expectations, which can be gathered online.

These indicators will be monitored for changes to see whether they improve after the implementation of FLL. First, they will focus on employee-centric activities or performance indicators that are less influenced by the availability of physical infrastructure and capital endowment. Second, a subset of employees from each of the treatment branches will be included in a “lab-in-the-field” experiment in which employees who participate in a workshop will be examined for changes in job perception. Last, data from households will be collected to gauge customer satisfaction and measure changes in the quality of service provision from the customer perspective.

Findings/Outcomes

Anecdotal evidence from the branches that implemented FLL noted that the training led to interesting employee initiatives with the aim of improving team work and the day-to-day functioning of the branches. WhatsApp-groups and coffee-time meetings were spontaneously created by employees for increasing communication. The results on the employees RCT are being analyzed due to COVID delays on the completion of the endline. Preliminary findings appear to show that FLL has improved network tightness inside branches both horizontally and across ranks.

Lessons Learned

Utility performance depends just as much on the motivation of its staff as it does the resources and infrastructure it holds and operates. If FLL trainings can help develop an organizational culture toward better performance, they will be of great value to improving WSS provision in developing countries around the world. As the Service Provider section in chapter 1 showed, motivated employees can enhance operations at a much lower cost, and nonfinancial incentives may be effective.

Stated Versus Revealed Preferences for Uptake of Onsite Sanitation: Lusaka Sanitation Program, Zambia

This study is part of the World Bank investment in the Lusaka Sanitation Program (LSP) in Zambia as one of the first steps to implementing the Lusaka Sanitation Master Plan. This plan aims to provide adequate sanitation facilities to all urban citizens in the Lusaka Province. The study shed light on the willingness to pay for sanitation facilities to design suitable payment mechanisms and plans to meet goals. Understanding the elements behind willingness to pay for the adoption of these services will help policy makers on the effectiveness of the interventions.

Motivation/Challenge

Lusaka is Zambia's capital and its largest city with 2.3 million people, representing 17 percent of Zambia's national population (according to the 2010 census). Sanitation conditions in Lusaka frequently claim lives through regular occurrences of cholera, typhoid, and dysentery, as well as severe environmental pollution. When the World Bank investment in the LSP was first approved in 2015, an estimated 70 percent of Lusaka's urban residents were living in 33 peri urban areas, which are relatively high-density, unplanned neighborhoods largely composed of poor residents. Roughly 90 percent of peri urban areas rely on pit latrines, most of which are unimproved (that is, they do not comply with the Joint Monitoring Program definition of adequate sanitation); the remaining 10 percent living in peri urban areas use sewers or septic tanks, or they defecate in the open (estimated at 1 percent). With support from the Millennium Challenge Corporation, the government of the Republic of Zambia developed the Lusaka Sanitation Investment Master Plan in 2011. The Master Plan provides a strategy for 100 percent coverage of Lusaka Province—in both offsite (sewers) and onsite sanitation—by 2035. Including onsite sanitation (pit latrines and septic tanks, often shared), sanitation coverage reaches about 69 percent; however, many of these facilities do not meet public health requirements as defined by government policy and the Joint Monitoring Program. Many onsite systems do not work properly because of rocky conditions and a high water table, and this may lead to users making direct connections or deliberately dumping removed contents into stormwater drains and streams. The World Bank investment, LSP, is one of the first steps toward implementing the Lusaka Sanitation Master Plan and providing adequate sanitation facilities to all urban citizens of Lusaka Province, starting with investments in the city of Lusaka.

Intervention

Component two of the LSP focuses on increasing population access to improved onsite sanitation with the key performance indicator target at the end of the project being the construction of 3,500 improved onsite sanitation facilities by October

2021. Given that the average household size is six people, this would amount to providing onsite sanitation facilities for 21,000 city residents. The project also involves building the institutional framework for the Lusaka Water and Sanitation Company (LWSC) to market and sustainably provide this service following the operation's completion.

Following the principle of building a sustainable business model, for the utility to continue to offer the service after project completion, the toilets are not being constructed or provided to residents free of charge. The project costs cover the design of suitable onsite latrine technologies that could safely function in Lusaka's geology of high groundwater and rocky ground. The overall cost of construction is subsidized, so residents who sign up for LWSC to construct them on their properties are quoted a reduced cost. However, the consumer may still consider their fraction high as an upfront cost. Therefore, the utility needs to design suitable payment mechanisms and plans to address ability to pay. Furthermore, suitable marketing campaigns need to identify willingness-to-pay issues and address them with some of the behavioral barriers outlined in the introduction to this section.

Finally, once again thinking about the sustainability of the project, it is important to understand whether the unsubsidized cost would form a barrier to adoption once the World Bank investment ends. The discounted cost of the toilet during the project's lifetime was eventually marketed as ZMK 2,400, which was equivalent to US\$240 at the time of writing. The unsubsidized cost of the toilet was between ZMK 11,500 (US\$1,150) and ZMK 25,000 (US\$2,500), depending on the technology chosen (pre-fab, brick, or plastic).

Research Design

To better design the marketing and payment mechanism components for improving uptake of the onsite sanitation facilities to be offered, the World Bank collected data from 10,000 households, including landlords (25 percent), homeowners (37 percent), and tenants (38 percent). The sample was households in areas where improved latrines were due to be marketed either as part of the World Bank investment or the broader Master Plan for the city.

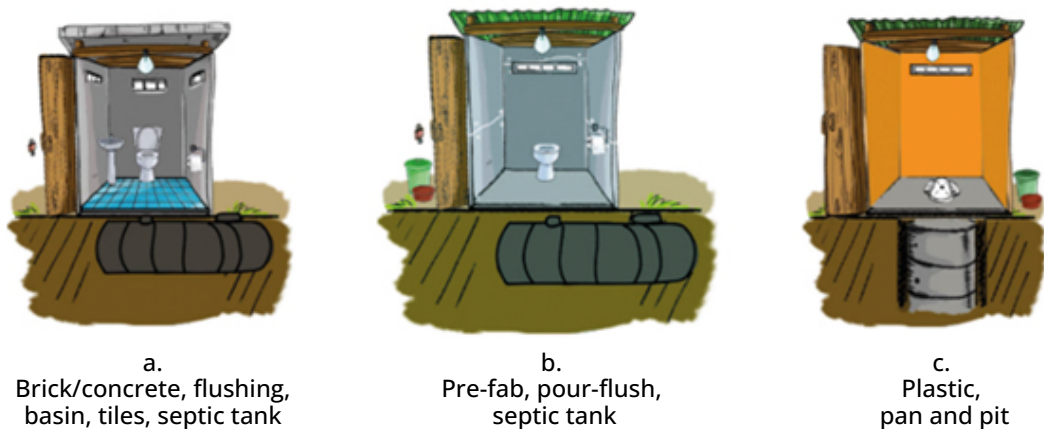
The research sought to answer several questions, but the fundamental importance for this report was to understand the attitudes and preferences of respondents with regard to adoption and pricing of onsite sanitation facilities. It measured how these differed by socioeconomic characteristics, resident status, current WSS infrastructure, and awareness of the importance of sanitation for health. To assess whether household attitudes would differ based on the subsidized and unsubsidized costs, 5 percent of the sample—just fewer than 500 households—were asked questions regarding that price.

Findings/Outcomes

The headline findings of the study were as follows:

Respondents' perception of the toilet price was far closer to the subsidized price than the real price. There were three models of toilets, as shown in figure B.2, with different prices for each. In all cases, the participants guessed that the true price of the toilet was much closer to the subsidized price. In fact, the subsidized price is about 26 percent of the unsubsidized price.

FIGURE B.1
TOILET MODELS OF LUSAKA SANITATION PROGRAM

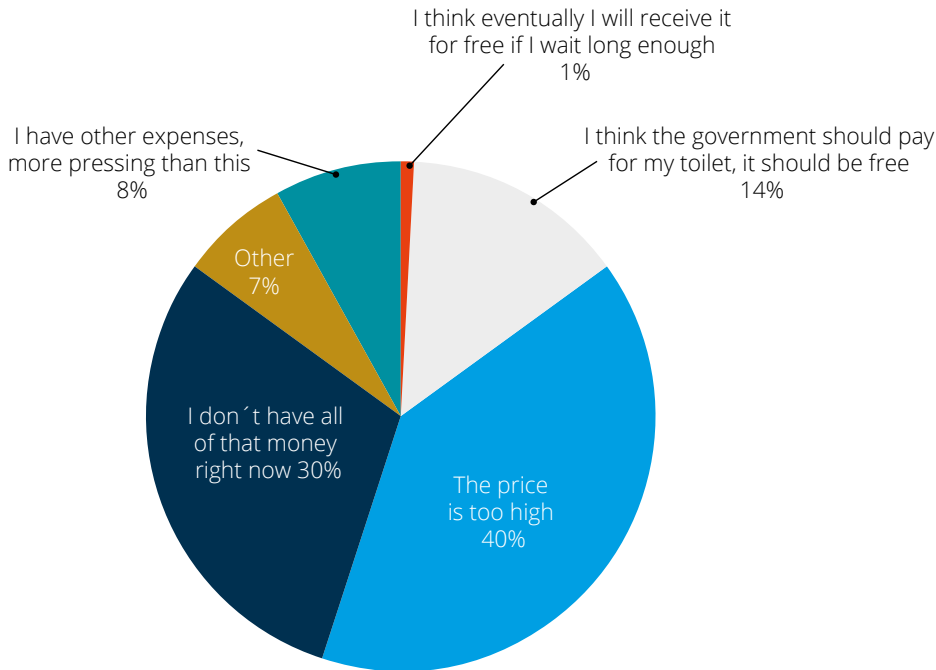


Source: Lusaka Onsite Sanitation Survey, 2018

Forty-five percent of landlords and homeowners said they could afford a discounted price toilet of between US\$300 and US\$700. However, if additional reductions were applied, this could increase to 67 percent, according to stated willingness to pay. The survey also asked households to specify their reasons if they were not willing or able to pay the discounted price available at the time for their chosen facility. Although financial constraints were the main reason, constituting 70 percent of responses from homeowners and landlords, as figure B.2 shows, 14 percent also stated that they thought the government should pay for their toilet—that it should be free—revealing a lack of both willingness and ability to pay as a potential barrier to adoption.

FIGURE B.2

REASONS FOR NOT BEING WILLING TO PAY DISCOUNTED PRICE



Offering payment installments could greatly assist uptake. Payment installments do appeal to 44 percent of homeowners and 61 percent of landlords (mainly the 10 percent upfront and the rest over twenty months). This is an important consideration given that only 2 percent of landlords from the households in the catchment area said they could pay the full amount upfront. Based on the responses to the options provided, the survey anticipated 750 upfront payments for toilets within the first year; but with 50 percent upfront and payment installments over a year, this was expected to increase to a minimum of 5,000 toilet sales in the first year, and with 30 percent upfront and the rest over fifteen months, the researchers anticipated a minimum of 8,500 toilet sales could be reached.

The key driving motivations behind stated willingness to adopt a latrine are legal obligation and, to some degree, social norms. As part of the survey, households were randomly primed with one of three messages just before being asked about their interest in adoption of the service (see Box B.1). The message that had the greatest impact was the legal message, which resulted in significantly more households choosing a facility. The social norms message also had a significant impact compared to the health message. However, the health message did have an effect, with households who knew someone who had cholera significantly more likely to state they would adopt than those who did not know someone who had cholera.

Box B.1 Types of Messages in Lusaka Sanitation Program

Health message – “Did you know that a major reason for the recent cholera outbreak here in Lusaka, affecting [X number] of people and resulting in [X number] of deaths, is largely attributable to the poor sanitation and water conditions of entire communities of residents here in the city? This requires improving the sanitation conditions that your household is exposed to. With this in mind, we would like to ask you a few questions.”

Legal message – “Lusaka government is soon to pass a regulation requiring the upgrade of all households to improve on-site sanitation facilities in peri-urban areas where connection to the sewer network is not an option in the near future. With this in mind, we would like to ask you a few questions.”

Social norms message – “Most aspiring families in [insert: adjacent neighborhood name of similar peri-urban status] are currently in the process of upgrading their toilets to improved latrines which are both more comfortable and safer for the health of their families and communities. With this in mind, we would like to ask you a few questions.”

Source: Lusaka Onsite Sanitation Survey, 2018

There may be a “sweet spot” between landlords and tenants, whereby both parties could agree to an increase in the rental price of between 16 and 23 percent so that tenants could have improved toilets on the facility. This depended on the facility type, but it could be an important lesson for utilities looking to roll out onsite sanitation in other locations.

Lessons Learned

This research has shed light on several important questions when it comes to encouraging adoption of improved sanitation, many of which may be applicable in other developing countries where such interventions may be desirable. First, at least in Lusaka, subsidized sanitation facilities have become the norm rather than the exception. This affects the cost that households expect to pay with understandable knock-on effects on their willingness to pay. Although 46 percent of landlords and homeowners said they had the money to pay for the facility at the subsidized price, only a tiny minority (2 percent) were willing to pay that amount upfront, and thus the offer of payment installments could substantially help to reduce the initial adoption barrier, even if subsequently they choose to pay off the remainder more quickly. The fact that 14 percent of respondents said that they were not willing or able to pay the discounted price for their chosen facility because they “think the government should pay for my toilet; it should be free” also sheds light on attitudes on sanitation and how seeing sanitation as something the government should provide may inhibit sustainable adoption, according to market principles. However, when it comes

down to it, a legal obligation to adopt better sanitation is a persuasive tactic, followed by social norms messaging. Health messaging can be effective if the concern about cholera is close to home. Finally, despite some of the stated preference responses showing low willingness to pay for sanitation, when packaged as part of the property, both landlords and tenants would be likely to charge and pay similar amounts for a property with an improved toilet.

Improving Uptake of Onsite Sanitation and Hygiene Practices: Clean India Mission, India

The main goal of the previous study was to understand stated and revealed willingness to pay for sanitation facilities and try to understand the elements behind households' attitudes. This study reviews a specific intervention to improve uptake of onsite sanitation and hygiene practices. This section presents a project done in Punjab to achieve a reduction in open defecations using a community-led total sanitation (CLTS) approach. The main pillar of CLTS is to achieve a behavioral change, which considers many of the elements presented in chapter 1.

Motivation/Challenge

This intervention focuses on the Punjab region of India. Despite great strides in improving access to both safe water and sanitation in rural areas according to statistics—71.9 percent rural sanitation in Punjab coverage compared with 32.7 percent as an average for the country (Andres et al. 2020)—consistent use of facilities was still lacking despite Punjab being one of the richest states in the country. Before the initiation of the Clean India Mission for Villages (Swachh Bharat Mission–Gramin [SBMG]), only 1 percent of all Gram Panchayats (village councils) in the state had received the government of India's Nirmal Grama Puraskar (Clean Village Award) for achieving 100 percent open defecation-free (ODF) status. So by the time the SBMG launched, it was not just toilet construction but also the promotion of toilet use, and the achievement and maintenance of ODF status, that were critical priorities in Punjab.

Intervention

The World Bank-assisted Punjab Rural Water and Sanitation Sector Improvement Project supported Punjab's Department of Water Supply and Sanitation (DWSS) in implementing the SBMG across all villages in Punjab, with the objectives of 100 percent toilet coverage and 100 percent toilet use. The project ran from March 24, 2015, to June 30, 2021.

The DWSS adopted a CLTS approach to motivate communities to attain ODF status. The central pillar of this approach is a behavioral change campaign (BCC) that focuses on raising awareness and demand for health, hygiene, and sanitation; mobilizing collective action toward behavioral change; and generating peer pressure through the

creation of community-based committees that monitor neighborhoods and encourage sanitary practices. The project also supports the construction of toilets in households across the state. As an incentive, Rs. 15,000 (equivalent to 197 USD) was offered to eligible beneficiaries to cover the full cost of constructing twin leach pit latrines.

The BCC also recognizes and addresses many of the behavioral barriers outlined earlier in this section. The community mobilizers consider the importance of social norms by identifying and sensitizing sanitation champions at the Gram Panchayat level. In doing so, they hope to gain influence in affecting the social norms of the community, disseminating the messages through local government institutions, cooperatives, schools, health care facilities, women's groups, community-based organizations, self-help groups, and so on during a phase called pre-triggering. Following this is the triggering itself, in which the "dirty fly" demonstration elicits feelings of disgust. The motivator offers participants a glass of clean water to drink, which most people gladly accept. Then the motivator pulls out a hair, touches feces with that hair, and dips the hair back into the water. Nobody is willing to drink the water now. When this association is salient in the minds of those gathered, the motivator educates the participants on how flies transmit contamination from exposed feces through food to the human body and how open defecation implies that people are consuming one another's feces. Triggering activities are meant to convey (a) the link between exposed feces and fecal contamination of food, (b) the importance of washing hands with soap, and (c) the need for constructing and using toilets that can effectively separate human excreta from the human environment.

In addition to this, awareness campaigns were carried out in primary and middle schools—more detail can be found in the full paper (Andres et al. 2020)—with the idea being to ensure that the younger generation influences the home behavior of families.

Research Design

A multiple-arm, cluster-randomized impact evaluation was designed to measure the impact of the SBMG in Punjab. The final sample had 260 Gram Panchayats of twenty-four households each, so there were 6,240 households in total across the trial. Specifically, the impact evaluation sought answers to the following research questions:

Did the various project interventions influence households' decisions to construct toilets?

Did the project interventions lead to a reduction in open defecation rates in beneficiary communities?

How did the BCC campaign affect hygiene awareness and related practices?

Did school programs focused on raising students' awareness of hygienic practices effectively boost such practices, toilet construction, and toilet use?

What effects did the project's intensive follow-up efforts have on hygiene awareness and related practices, toilet construction, and toilet use?

Findings/Outcomes

At the time of writing of this paper, the midline survey results were available, focused on the project's short-term impacts on hygiene awareness and related practices, toilet construction, and toilet use. The study found that the coverage of safely managed toilets among households without toilets (as envisioned by the United Nations Sustainable Development Goals for 2030) increased by 6.8 to 10.4 percentage points across various intervention arms, compared with a control group. Similarly, open defecation was reduced by 7.3 to 7.8 percentage points. In the weighted data, the percentage of households in treatment Gram Panchayats reporting open defecation by any member declined from 27 to 30 percent at the baseline to 24 to 25 percent during the midline. Finally, households with access to toilets at the baseline saw a statistically significant reduction in open defecation. Open defecation declined by 12 percentage points in the first arm, 8.7 percentage points in the second arm, and 7.2 percentage points in the third arm, compared with the control arm.

The study also revealed large improvements in awareness of hygiene behaviors, even when starting from a relatively high threshold. At baseline, almost 80 percent of the adult population displayed awareness of handwashing before eating and after defecation. At midline, this awareness increased to 91 percent of the adult respondents for the control group and between 95 and 96 percent for the three treatment arms. Similarly, 88 percent of the respondents from the control arm and between 92 to 95 percent of the respondents from the treatment arms reported awareness of the importance of handwashing before eating at the midline. Improvements were also found in the use of soap after these same behaviors for both adults and children.

The project intervention also had a significant impact on ownership of safely managed facilities in intervention Gram Panchayats in arms one and three: Overall coverage increased between 5 and 6 percentage points compared with control Gram Panchayats. Finally, it is worth mentioning that the study used a difference-in-difference estimation of impact.

Lessons Learned

Although there have been other impact evaluations demonstrating CLTS effectiveness, the literature suggests that most related studies have found the reduction in open defecation because of CLTS programs to be less than proportionate to the construction of toilets under these same programs. Toilet construction is a relatively easy objective compared with elimination of the practice of open defecation and switching to the use of improved toilets.

This project in Punjab managed to achieve a reduction in open defecation that was greater than the increase in the coverage of basic facilities across intervention Gram Panchayats. More interestingly, the reduction in open defecation came through the increased use of toilets among members of households that already had toilets at the baseline. This shows that the project was successful in changing the behaviors of people who had previously chosen to defecate in the open despite having easy access to a toilet. The same was true of the impact on awareness of the importance of handwashing before eating and after defecation among adults across all treatment arms, which was again greater for households with access to toilets at the baseline. The nonsignificant impact on open defecation rates in households without toilets at the baseline—and that are the major beneficiaries of the project—might be because such changes take time to materialize, especially considering project delays in the construction of new toilets.

Although impact evaluations can be a black box, the key features of this intervention, which could have been the reasons for its effectiveness, included its use of a train-the-trainers approach from master motivators to motivators, the importance of triggering feelings of disgust regarding open defecation and reinforcing this through community organizations to influence social norms, and the harnessing of community members in the monitoring process for elimination of open defecation practices.

Improving Uptake through CLTS Combined with Sanitation Marketing and Different Types of Subsidies: Lao PDR

The study in Punjab reflects how CLTS has been gaining importance as it is effective in reducing open defecation through a change in collective behavior. The study in this section considers CLTS in addition to sanitation marketing and different types of subsidies and enables the comparison of the impacts of each.

Motivation/Challenge

In rural areas of Lao PDR, where the majority of the poor live, access to improved sanitation remained well below the Millennium Development Goal target at the start of the project: 42 percent of the people in rural areas did not have access to improved sanitation (Moh & LSB, 2011). The World Bank is providing technical assistance to the Department of Hygiene and Health Promotion and National Centre for Environmental Health and Water Supply (Nam Saat) in Champasak and Sekong provinces, targeting ten districts through a combined CLTS and sanitation marketing intervention, while building capacities for coordination, planning, and monitoring.

The theory of change for the intervention is that (a) poor-inclusive scaling-up of household sanitation requires changing social norms about open defecation; strengthening the supply of low-cost, affordable sanitation products; and creating demand for those products and (b) complementary targeted individual and/or collective incentives to reach the poor and achieve ODF status might be needed.

Sanitation marketing and CLTS come from different perspectives in terms of how they approach behavioral change. Although CLTS places more emphasis on collective behavior, sanitation marketing focuses on the aspirations of individual households. This intervention is interesting because it enables the comparison of the impacts of each.

Intervention

The World Bank is providing technical assistance to the Department of Hygiene and Health Promotion and National Centre for Environmental Health and Water Supply (Nam Saat) in Champasak and Sekong provinces, targeting ten districts through a combined CLTS and sanitation marketing intervention while building capacities for coordination, planning, and monitoring. CLTS activities were targeted at 400 villages within ten districts in 2014–17, and private businesses will receive support through technical assistance to deliver and market toilets throughout the ten districts.

Research Design

The evaluation aimed to increase the understanding of:

- the impact of CLTS and sanitation marketing on rural sanitation outcomes, which is the focus of this study;
- the effectiveness of different conditional financial incentive packages for increasing access to durable sanitation by the poor and achieving village wide access to improved sanitation (that is, ODF); and
- the effectiveness of the health benefits on children younger than age 2 of increased access to improved sanitation, both at the household level and at the community level (that is, externalities).

The outcomes are measured using a propensity score matching design (Rosenbaum and Rubin 1983) to construct a comparison group, defined as a set of villages that were not initially selected for the implementation of the program but that were observationally identical to those that were selected. Table B.1 shows the division between treatment and control villages in the study.

TABLE B.1
IMPLEMENTATION OF CLTS BY VILLAGE

Village type	Has CLTS been implemented in this village?		Total
	Yes	No	
Control	6	49	55
Treated	13	24	37
Total	19	73	92

Note: CLTS = community-led total sanitation.

Findings/Outcomes

The main outcomes of interest were the impact of implementing CLTS on the construction of latrines and the reduction in the practice of open defecation by household members. Although the findings are still preliminary, one important conclusion is that local buy-in, as reflected in compliance with treatment status, seems to matter. The CLTS implementation leads to an 8 percent increase in construction of latrines and an almost identical reduction in open defecation among adults, regardless of gender, but not to a reduction in open defecation among children. These estimates and conclusions are relatively robust to the exclusion of additional controls and to the use of weights. The policy implication determines that the involvement of local leadership in the implementation of programs like this seems vital for its success. Similar to the intervention in India, this research found that treatment effects were larger in villages where modern sanitation practices were already common (that is, where village heads declared the village as being ODF at baseline).

Lessons Learned

This study contributes to the knowledge about CLTS approaches and how they can interact with other types of strategies. Mainly, it supports the fact that the involvement of local leadership and of the community is of vital importance to a program's success. It also shows how an approach that aims to change behavior has positive effects in sanitation uptake. Finally, it contributes to the knowledge about CLTS and sanitation marketing and the differentiating effects they have as the first tackles community behaviors and the second individual decisions.

Improving Health Outcomes Using CLTS Combined with Different Financial Incentives: Lao PDR

The prior study presents the use of CLTS approaches in combination with subsidies and sanitation marketing. This study is also located in Lao PDR but aims to look at the combined effects of CLTS and financial incentives on health outcomes and child

growth. It aims to contribute to that literature by seeking further evidence of the existence of a relationship between improved sanitation and child height. In other words, it evaluates the effectiveness of combining financial incentives with CLTS.

Motivation/Challenge

In this second study that aimed to evaluate methods for improving sanitation uptake in Lao PDR, a clearer result was found for improving health outcomes and child growth from CLTS combined with different financial incentives in the interventions. Health spillovers (also referred to as externalities, herd protection, or indirect effects) are of significant interest to both economists and public health researchers. However, surprisingly few studies have examined them in the context of water supply, sanitation, and hygiene (WASH), and the precise nature of the relationship is still disputed. Augusburg and Rodriguez-Lesmes (2018); Plous Kresch, Lipscomb, and Scheter (2020); and Spears (2019) presented signs of a nonlinear relationship between open defecation density and average child height for age. Spears (2019) found evidence of a threshold with health gains existing when sanitation increases from a low base and stopping once a particular level of coverage is reached (estimated to be 30 percent). Gertler et al. (2015) found a linear relationship between community open defecation rates and child height. This study aimed to contribute to that literature by seeking further evidence of the existence of a relationship between improved sanitation and child height and the answer to these questions: Does community toilet coverage generate health externalities? If so, how large are they? Is there any evidence of threshold effects? Along the way, it made interesting discoveries about the relative efficacy of individual versus collective incentives on sanitation.

Intervention

The intervention was a combination of financial incentives with CLTS implemented by the National Centre for Environmental Health and Water Supply (Nam Saat) in the Lao Ministry of Health, in partnership with the nongovernmental organization (NGO) East Meets West.

Research Design

Researchers conducted a clustered RCT in 160 villages across ten districts in two provinces of Champasak and Sekong in rural southern Lao PDR to evaluate the effectiveness of combining financial incentives with CLTS. These villages were randomly allocated to one of four equally sized treatment groups (forty villages per group), stratified by district with four villages per arm in each district. They all received CLTS but differed in the type of subsidy offered. The treatments included subsidies offered at household, villages, or both; the control group didn't receive any.

In villages assigned to treatment group 1, after a verified installation, households amounted to roughly US\$20, or 13 percent of the price of the lowest-priced

pour-flush toilet, including superstructure. The rebates were made available only to the poorest 30 percent of households, determined via a scorecard system. In these villages, members of the village sanitation committee were also paid an incentive of about US\$3 per toilet installed.

Villages assigned to treatment group 2 were offered a monetary award of between US\$300 and US\$500, depending on population, paid to the village administration committee upon elimination of open defecation. This could be declared when all households had a durable toilet at least 15 meters away from the house, with no excreta found on the floors, in addition to evidence of regular use and of handwashing with soap, as confirmed by visits by Ministry of Health officials. The village reward could be used at the committee's discretion on any development project.

Villages assigned to treatment group 3 were offered both the household-level rebate (with mobilizer incentive) and the village-level award. The remaining villages served as the control group, receiving CLTS only.

Data was collected longitudinally on 2,400 households and included measuring of child height and weight if participants consented. For instance, 14 percent of children could not be measured, usually because of absence at the time of the interview. Child growth changes were measured using treatment assignment and whether the respondent reported having a friend who owned a toilet prior at baseline; specifically, 57 percent of respondents reported having such a friend, as instrumental variables.

Findings/Outcomes

Using data from a random sample of households with young children and village administrative data, the study showed that sanitation coverage was approximately 30 percent higher in villages that were offered a household incentive and 25 percent in villages, compared with CLTS-only villages. Improved private sanitation produced positive health spillovers—a 10-percentage point increase in village sanitation coverage, which decreased the probability of childhood stunting by 3 percentage points.

First, all treatments seemed to lead to an increase in toilet ownership, with an increase from 42 to 64 percent over the three-year study period. However, comparison between treatments shows that both household- and village-level incentives had a significant impact at the village level. Endline sanitation coverage at the village level was approximately 16 percentage points (30 percent) higher in villages that offered the household incentives than in control villages and approximately 14 percentage points (25 percent) higher in villages that were offered the village incentive than in control villages. There is no evidence of an interaction between the two types of incentives.

Second, with regard to the long-term impacts of latrine ownership on child growth outcomes, the researchers measured two instrumental variables. The first stage

was to measure the impact of having a friend who owns a latrine before baseline. They found this to be a strongly significant determinant of both household toilet use and village toilet coverage. For the second stage, a 10-percentage point increase in village toilet coverage increased expected height-for-age z-score by 0.09 standard deviations ($p = 0.00$). A 10-percentage point increase in village coverage decreased the probability of stunting by 3 percentage points ($p = 0.04$). These results are fundamentally unchanged when additional household control variables are included in the regression. Taken together, these results suggest that improvements in health status are mostly driven by overall improvements in the village environment rather than improvements in household access to sanitation.

Lessons Learned

The evaluation of this study demonstrates the power of incentives on changing behavior at the community level. The full impact evaluation provides additional evidence of the effect of improved community-level sanitation—rather than household-level sanitation—on better child health outcomes, specifically the probability of stunting. This type of study shows how targeting incentives in different ways and at different levels has varied effects. Evidence shows how agents respond in individual ways to the incentives because they care about social norms and respond to peer pressure.

Encouraging Uptake of Improved Sanitation Using Community Hygiene Output-Based Aid: Rural Cambodia

Previous studies in this chapter looked at CLTS approaches combined with sanitation marketing, subsidies, and other financial incentives. For its part, the following section presents an evaluation on the effects of sanitation marketing and subsidies. This study presents the Community Hygiene Output-Based Aid (CHOBA) program and a sanitation marketing intervention in 110 villages in Cambodia. The main advantage of this evaluation is that it allows the study of the impact of each intervention alone, the combined effect, and their influence on poor and nonpoor households.

Motivation/Challenge

As of 2015, 61 percent of Cambodians living in rural areas lacked access to improved sanitation, and 51 percent practiced open defecation (WHO and UNICEF 2017). The latter has been linked to faltering child growth in Cambodia (Vyas et al. 2016) and globally (Spears 2013). This intervention is interesting to evaluate because it allows the comparison of both the effects of sanitation marketing with subsidy separately, across poor and nonpoor groups, and the extent awareness versus ability to pay is the primary constraint to uptake.

Intervention

The subsidy program under study is known as CHOBA and was implemented by the NGO East Meets West/Thrive Networks. It integrates training of local product/service providers and a partial (USD18) targeted subsidy offered in Cambodia as an upfront discount to households in possession of a government-issued poverty certificate under the formal “ID-Poor1” and “ID-Poor2” categories. It has selected elements of CLTS—specifically a village meeting intended to elicit disgust with open defecation. The output basis of the CHOBA subsidy is a rebate to service providers who earn a payment equivalent to the consumer discount upon verification of their installation of a hygienic latrine to each poor household. It differs from the nature of the output-based aid payment in Vietnam, where the rebate is targeted to consumers. Jointly, the study presents a n intervention of sanitation marketing.

Research Design

The team employed a nonrandomized, propensity score-matched cohort design (Rosenbaum and Rubin, 1983, 1985) to explore the interactions between partial, poverty-targeted output-based aid subsidies and sanitation marketing among rural villages in the six Cambodian provinces in which the CHOBA program was implemented.

The team examined differences in latrine coverage and ownership of a pour-flush toilet over time across different income levels among villages exposed to the CHOBA subsidy program alone, sanitation marketing alone, or both. The differences were explored among an array of variables not reported here, including those related to awareness of the benefits of sanitation and improved hygiene behaviors, sales modalities, consumer preference and valuation, and credit availability and utilization.

For the study, the team identified thirty-eight CHOBA-only villages, thirty-four sanitation marketing-only villages, and thirty-eight villages where both programs were implemented that exhibit similar propensity scores. In total, the team recruited 1,965 households, selected by income-stratified, population-proportional-to-size random sampling, divided among the 110 villages.

Findings/Outcomes

The primary outcome of interest for this research is the average toilet coverage within each of the three programs, as well as across the three income groups: ID-Poor1 and ID-Poor2, near-poor, and nonpoor. In addition, they considered three aspects of new latrine ownership: (a) the likelihood of new latrine purchases among households who did not own a latrine before the start of program, (b) the likelihood that the same households installed a functional latrine at the time of survey, and (c) the likelihood that the new latrine was installed in a shelter with a durable roof and walls.

The findings were as follows:

- **The subsidy program alone was more effective than sanitation marketing alone among poor households.** In this group, the CHOBA program increased the likelihood of new latrine purchases by 15 percentage points compared with sanitation marketing exclusively. The joint implementation of both programs increased the likelihood of new latrine purchases by 26 percentage points higher than sanitation marketing alone.
- **In nonpoor households, sanitation marketing alone had a more significant impact on uptake.** On the other hand, when both programs were implemented, the likelihood of new latrine purchases was estimated to be 26 percentage points higher than when the CHOBA program was implemented solely. When sanitation marketing was implemented exclusively, the likelihood for new latrine purchases was estimated to be 18 percentage points higher than CHOBA. Again, when all households are considered, the implementation of the sanitation marketing program increased the likelihood of new latrine purchases by 8 percentage points compared with when CHOBA was implemented solely. Combining the two programs increased the likelihood of new latrine purchases by 19 percentage points compared with the implementation of CHOBA individually and 12 percentage points compared with sanitation marketing. These findings and the overall pattern of results are virtually similar when considering whether the newly purchased latrines were installed and verifiably functional at the time of the survey.
- **There was no decline in performance among subsidy-ineligible nonpoor.** This finding is consistent with that of Guiteras, Levinsohn, and Mobarak (2015). There is evidence suggesting a positive and complementary spillover effect, in which the availability of subsidies for low-income households leads to greater purchases of latrines by relatively higher-income households ineligible for subsidy.

Lessons Learned

As these findings suggest, the subsidy program is more effective at increasing latrine coverage among the poor than sanitation marketing. Meanwhile, insofar as it employs no poverty assistance, it is unsurprising that sanitation marketing, whether executed exclusively or in combination with the subsidy, outperforms the subsidy program alone among nonpoor households. The absence of a decline in performance among the subsidy-ineligible nonpoor even with the inclusion of the subsidy program is, however, notable, controverting the hypothesis that the introduction of the subsidy program would decrease demand among the nonpoor. This finding supports the idea that different interventions affect households that have specific characteristics in distinct ways. From a behavioral perspective, this can be explained by the various biases and behavioral barriers households have toward the valuation they give to these services.

Understanding Barriers to Connecting to the Sewer Network: Lusaka Sanitation Program, Zambia

A previous section of this chapter presented the LSP in Zambia as an effort to address the deficit of sanitation services by extending the sewer network operation. However, an important issue remains unsolved: the design of the payment plan and payment mechanisms that ensure the sustainability of the service. After the sewer connection is extended, households must connect to the network and start paying for the service. For the service to be sustainable, it is necessary to address the ability and willingness to pay for the cost of the connection, which is the aim of this study, and how it is affected by different types of factors.

Motivation/Challenge

As part of the aforementioned LSP in Zambia, the operation also sought to address the sanitation service deficit by extending the existing sewer network to cover larger parts of the city. At the start of the project, LWSC had 480 kilometers covering approximately 30 percent of the city's area and providing sewer services to 14 percent of residents. However, as the recently published "Connecting the Unconnected" (Kennedy-Walker et al, 2019) report from the Water Global Practice explains, it is a common challenge for many cities in the developing world to get that last-mile connection in place for households in the poorest communities where sanitation would make an important difference to public and environmental health. Three years after the start of the project, there was little more than 10 percent uptake of the available connections in the catchment where the line was ready, and there was concern this needed to be accelerated if end-of-project targets were to be reached.

Intervention

Component one of the LSP focuses on extending the sewer line to reach 3,000 new households through a combination of rehabilitation and new construction of 108 kilometers of sewer line by October 2021. Assuming six-person households, this could mean an extension of sewer services to approximately 18,000 individuals, in addition to industrial areas within the catchment.

Similar to onsite sanitation, the need for sustainability of service following the end of the project means LWSC has to design a suitable pricing plan and payment mechanisms that address households' ability and willingness to pay for the cost of connection. The utility created a pricing structure of high-, medium-, and low-cost areas for households in the catchment to encourage connection, and industries have a separate tariff. They also need to consider offering suitable payment mechanisms that may make the sign-up process easier (for example, mobile money or a dedicated savings account) and payment plans that allow households to pay back the full cost of connection over time.

The subsidized lowest cost of connection is ZMK 690 (approximately US\$32 at the time), which households are required to pay upfront, and the remainder of the charge, about ZMK 2,030 (approximately US\$95 at the time), could be paid off in installments across a five- to twenty-year period. However, these prices have been set from the utility's perspective of cost recovery and may need reevaluating following data collection.

A well-managed marketing campaign that keeps in mind the salient concerns and motivations of households that may make them more likely to sign up for the sewer connection also needs to accompany the rollout. Similar to onsite, the motivations (or lack thereof) for households to connect to the network need to be clearly identified.

Research Design

To address these disparate concerns, the team conducted several activities with the LSP team:

- Data collection in the area receiving sewer connection in the first year; gathering consent from households that will connect to the network in the next four years; and gauging attitudes and willingness and ability to pay to connect, according to the plans on offer, and when compared with other spending priorities. From the data collection, the team will test the relative efficacy of different types of marketing messages through inbuilt randomized experiments within the survey.
- An experiment to test marketing material with different tips on connecting to test what messaging is most effective in getting households to take the final step once the sewer line is ready.
- Engaging the Hygiene Hub and London School of Hygiene and Tropical Medicine to understand the ways in which hygiene messaging, particularly in the context of COVID-19, could be channeled to better encourage uptake of sewer network connections.
- Setting up a savings account mechanism and payment of connections via mobile money to enhance connectivity.

Some of the questions this research will address include:

- What message is most salient in motivating households to connect to the network: health, property price increase, legal obligation, or social aspiration?
- What are the main motivational and behavioral barriers for households to connect to the sewer network?
- Can hygiene messaging make a difference to motivate households to improve their sanitation conditions?

The first question has been addressed using inbuilt randomized messages and posters within the respective inventories. In the year one catchment, messages on legal obligation, health, and trust were randomized at the beginning of the questionnaire

at the street level, before issuing the consent form. The team wanted to measure whether any of the messages could affect willingness to consent to connect to the network. Box B.2 presents the different types of messages.

Box B.2 Types of Messages in second phase of Lusaka Sanitation Program

Treatment 1: Health message

The cholera outbreak in Lusaka this year was particularly severe and affected over 2,000 people. Unfortunately, these kinds of outbreaks are common in Lusaka and are largely caused by poor sanitation and water conditions in communities. Luckily, cholera outbreaks can be avoided by improving sanitation conditions in our households and communities. We would like to remind you that good sanitation and behavior at the community level will have an impact on your health and of your family's health. These are some of the benefits of connecting to the network, which we wanted to let you know while we go through the questionnaire.

Treatment 2: Trust message

The Lusaka Sanitation Program is a project within LWSC [show logo] that will double the number of sewers within the city over the next five years. LWSC is currently working to improve sewer supply and service, faster response times, and more accurate billing. We are also implementing new technological upgrades to stop sewer blockages caused by your neighbors from affecting your own connection. You would only experience any blockages caused by your own household. We wanted to let you know about this service upgrade while we go through the questionnaire.

Treatment 3: Neighborhood incentives message

LCC will be rewarding streets where all the households connect to the sewer network in that street with a prominently displayed "Clean Street! Clean up Cholera" sign, which has the potential to increase the value of properties in your street. We wanted to let you know about this exciting opportunity while we go through the sign-up forms.

Control

[None]

Source: Lusaka Onsite Sanitation Survey, 2018

To address the second question, a data collection effort was undertaken in years two to five of the catchment. In this experiment, households initially distribute tokens, representing money, among various household spending items with a budget of ZMK 1,000 (equivalent to about US\$100)—one of these is a sewer connection. Following this, respondents were randomly shown one of three posters (see figure B.3),

each of which had a different message encouraging household connection to the sewer. One of the posters tries to motivate households based on increased property price if the sewer connection was made. The second motivates households based on improving the health of the community, and the final poster just encourages households to connect with no additional reason provided.

FIGURE B.3
POSTERS SHOWN TO HOUSEHOLDS IN LUSAKA



a. Incentives focused on property price increase



b. Motivation based on health community



c. No additional incentives

Source: World Bank commissioned Household Sanitation Survey, Lusaka, Zambia, 2018

The respondents were asked once again to allocate their tokens on each of the household items. The items displayed in the diagram, as shown in figure B.3, include saving for a house, paying off debts and loans, donating to charity, saving for a vehicle, saving for items such as fridge or television, saving for children's education, and saving to start one's own business. The experiment looks to understand (a) the relative priorities of the household when it comes to the sewer network and what the immediate competing priorities for sewer-related investments are and (b) whether any one of the messages has greater influence on the respondent's prioritization of the sewer network within their household spending. Respondents are also asked for their views on different payment plans on offer, which they would choose, and whether paying via mobile money or having the option of a savings account could be an easier way for them to pay. Separately the set-up of such a payment scheme is being pursued with LWSC. Beyond this, the survey gathers general demographic information on the household, their consent, and some metrics on their level of trust in LWSC service. All these outcome measures should help inform how LWSC needs to target its marketing and improve service to encourage households to connect in the catchment areas.

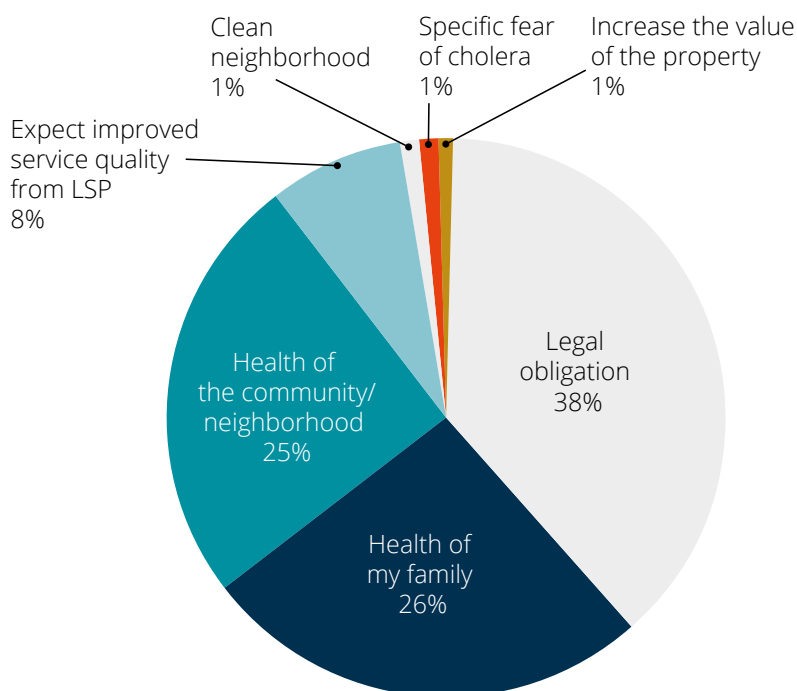
For the third question of how hygiene messaging may improve sanitation uptake, the Hygiene Hub has been tasked with some more qualitative research involving interviews with various stakeholders in both the LWSC and the community to gauge knowledge and awareness, and how any of these could be overcome and addressed in the material they produce.

Findings/Outcomes

The inventory of the year one catchment resulted in 95 percent of the catchment consenting to connect. The most prominent reason was legal obligation; but health of the community and the family were cited as important reasons on their own, together constituting 51 percent of the reasons given, as figure B.4 shows. There was no impact of the framing on consent because of the high consent rates. However, this data collection was completed in 2018, and in 2021 uptake was only a fraction of what was anticipated (just more than 100 connections, though 1,000 were anticipated in this area). Subsequent calls and contact with households by LWSC in 2021 revealed that many were unaware that the service was then available, as it was a long time since the initial data collection. There was also a lack of awareness about pricing and how they could go about connecting to the network. Therefore in 2021, leaflets were distributed to households according to a randomization to test which information results in a greater level of uptake. One leaflet provided more of a framing based on customers' legal obligation to connect, while another tried to encourage them to do so based on health and community benefits. Results were collected iteratively every month between one and six months after the distribution of the leaflets. The results from the data collection in years two to five, the results of the Hygiene Hub's work and results

of the leaflet experiment are available in the associated World Bank publications and reports such as the forthcoming publication *Citywide Inclusive Sanitation in Action – Case Study Series: Lusaka Sanitation Project* (Kennedy-Walker, Nachula Mukuka, and Ayling, n.d.) and the *Field Report Lusaka Sanitation Program – Inventory on Households and Industries Connecting to the Sewer Network in Lusaka, Zambia* (Tembo and Namitala 2021).

FIGURE B.4
HOUSEHOLD RESPONSES TO ‘WHAT IS YOUR MAIN REASON FOR CONSENTING TO CONNECT TO THE NETWORK TODAY?’



Note: LSP = Lusaka Sanitation Program.

Lessons Learned

The results of the year one consent form versus the uptake clearly demonstrates the intention-action gap between households who originally consented to connect to the network in the catchment subsequently not doing so once the service was available. The reasons for this are complex and demonstrate the importance of active engagement of the utility in understanding awareness, motivation, or behavioral barriers to uptake to achieve their connection targets.

Understanding Barriers to Sewer Connection and Public Toilet Maintenance in Addis Ababa, Ethiopia (Concept Stage)

In Addis Ababa, Ethiopia, an initiative sought to conduct a similar study to that described in Lusaka, Zambia, regarding sewer connectivity. An initial scoping mission found that households were not connecting to the newly constructed network for a variety of reasons. Part of the problem, according to utility managers and World Bank staff, was that many of the large number of newly constructed high-rise condominiums in Addis Ababa had gone up without the necessary regulatory or infrastructural provision for sewer network connection and were functioning with septic tanks. Making changes to these condominiums would require an investment for households beyond the initial cost of the property. In other parts of the city, it was suspected that the cost of connecting would also be out of reach of households. It was proposed to test one of several types of behavioral intervention, including (a) door-to-door sales with different types of messaging—social norms, health, or obligation—to encourage uptake (like that being conducted in Zambia) and (b) offering to assist with the financial cost with one of several options, such as staggered payments, help to cover the cost of home modifications, group-based discounts, subsidies based on poverty level, and a lottery. The team designed a series of modifications to an inventory questionnaire that would gather some data on what the most effective interventions to test might be.

The team was to examine the question of how to improve public toilet administration. At the time of the scoping mission, there were 300 public toilets in operation around the city and 1,000 due for construction and scale-up. The SMEs (small and medium enterprises) that run the toilet blocks were always made up of 20 people, regardless of demand or location, and selected based on unemployment. Sometimes facilities become abandoned, unclean, and unmaintained and there is insufficient revenue to cover the costs. The team proposed a study to assess the most market-conducive model to increase SME income. The study should find out the average number of customers the public toilet blocks receive per day/week per month in each locality, how much they are currently charging, characteristics of successful models and the income in those cases, the cleanliness and maintenance arrangements and costs of each, how much is sufficient income for an SME member, and how to adapt the business model. After conducting such a preliminary data collection, the team should propose experimentation with different methods as described in the rest of this chapter and report.

