

Final

The Water, Sanitation, and Hygiene (WASH) Project in Cabo Verde: Interim Evaluation Report

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LIST OF ACRONYMS

ADA	Agência de Distribuição de Água
AdS	Águas de Santiago
AdN	Amigos da Natureza
ANAS	Agência Nacional de Água e Saneamento
APP	Águas de Ponta Preta
ARE	Agência de Regulação Económica
ATAS	Assistência Técnica à Águas de Santiago
CNAG	Conselho Nacional de Águas
CNAS	Conselho Nacional de Água e Saneamento
CVE	Cabo Verde Escudos
DfID	Department for International Development
DNA	Direcção Nacional do Ambiente
ERR	Economic rate of return
FAS	Fundo de Acesso Social
FASA	Fundo de Água e Saneamento
GoCV	Government of Cabo Verde
IEC	information, education, and communication
IGF	Infrastructure Grant Facility
INE	Instituto Nacional de Estatística de Cabo Verde
INGRH	Instituto Nacional de Gestão de Recursos Hídricos
ITT	indicator tracking table
JICA	Japan International Cooperation Agency
LuxDev	Luxembourg Development Cooperation Agency

M&E	monitoring and evaluation
MCA-CV	Millennium Challenge Account Cabo Verde II
MCC	Millennium Challenge Corporation
MMU	multi-municipal utility
NGO	non-governmental organization
NITA	National Institutions Technical Assistance
NIRR	National Institutional and Regulatory Reform
PEA	political economy analysis
RASAS	Relatório Anual dos Serviços de Água e Saneamento
RFP	request for proposal
SAAS	Serviços Autónomos de Água e Saneamento
URA	Utility Reform Activity
USAID	United States Agency for International Development
USD	United States Dollars
WASH	water, sanitation and hygiene

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I. EXECUTIVE SUMMARY

In 2010, Cabo Verdeans paid almost three times as much for water as residents of any other country in Africa (Banerjee et al. 2010), even though they received poor quality service and suffered frequent outages (EBES 2013). There is only a scant amount of ground or surface water on the volcanic archipelago, and the country largely relies on desalinated sea water, which is a major driver of the high price. Poor management practices by municipal utilities and the large, partially privatized multi-utility (ELECTRA) that have until recently provided water, and sewerage services have also contributed to the high cost of piped water. These high prices could have been even higher, as the national government has indirectly subsidized many of the country's water utilities. These subsidies have the benefit of reducing prices, but also have diverted funds that could have been used for more productive purposes, inhibiting economic growth.

To address some of these challenges, the Millennium Challenge Corporation (MCC) funded the \$41 million Water, Sanitation, and Hygiene (WASH) project in Cabo Verde. The WASH project was part of a larger \$66.2 million five-year compact with the Government of Cabo Verde (GoCV), which began in 2012 and aimed to accelerate economic growth and alleviate poverty in Cabo Verde. The WASH project was implemented by the Millennium Challenge Account of Cabo Verde (MCA-CV).

MCC contracted with Mathematica to conduct a performance evaluation of the WASH project to understand how the project was implemented, determine its effects on key outcomes of interest, and evaluate the sustainability of the project's investments.¹ This report presents findings from the interim evaluation, based primarily on quantitative and qualitative data collected by the evaluation team between April and July 2018, about six months after the end of the compact (and the conclusion of most project activities).

A. Overview of the WASH project

The WASH project's objective was to “establish a financially sound, transparent, and accountable institutional basis for the delivery of water and sanitation services to Cabo Verdean households and firms” (MCC 2012). Before the start of the WASH project, the government of Cabo Verde had already taken important preliminary steps to improve the legal and regulatory framework in the WASH sector, and the WASH project advanced this work through three activities:

(1) The National Institutional and Regulatory Reform (NIRR) activity, designed to reform national policy in the WASH sector and strengthen the institutions that governed the sector. It expanded the functions of some of the existing WASH agencies and created several new agencies responsible for resource allocation, strategic planning, and coordination within the WASH sector (Box I.1). The activity was designed to create a national framework for a sector that had traditionally been scattered across various government entities at the national and

¹ The findings in this report represent the independent assessment of the authors, and do not reflect the views of the Millennium Challenge Corporation or Afrosondagem, the data collection partner. The authors report no conflicts of interest.

municipal levels. The new and altered agencies were charged with improving management of the WASH sector by (1) developing policy frameworks and revised legislation to clarify the responsibilities of each entity and to define national priorities for scarce resources, (2) instituting a system for fair and transparent tariff-setting, and (3) enhancing environmental protection, including regulating wastewater and testing water quality. Because the institutional and regulatory reform activities were at the national level, the NIRR activity was expected to benefit the entire population of Cabo Verde; it was completed in early 2017.

Box I.1. Overview of key WASH entities

National Agency for Water and Sanitation (*Agência Nacional de Água e Saneamento [ANAS]*): newly-created agency responsible for policy and planning; includes Social and Gender unit, and also serves as technical regulator for water quality

National Water and Sanitation Council (*Conselho Nacional de Água e Saneamento [CNAS]*): newly-created advisory board for the water and sanitation sector

Economic Regulatory Agency (*Agência de Regulação Económica [ARE]*): existing agency newly empowered to regulate water and sanitation tariffs

General Directorate of the Environment (*Direcção Nacional do Ambiente [DNA]*): existing agency's responsibilities expanded to include oversight of water and wastewater quality

(2) The Utility Reform Activity (URA), which transformed ELECTRA and the eight municipal utilities on the island of Santiago into *Águas de Santiago* (AdS), an autonomous, corporatized, multi-municipal utility for the island of Santiago. AdS was designed to replace the existing system, whereby households were served by various entities depending on their location and connection status.² AdS was intended to have financial and managerial autonomy from the municipalities that owned it. By operating on commercial principles, realizing economies of scale, and eliminating redundancies, AdS was expected to improve operational efficiency and quality of service, reduce non-revenue water,³ and increase the number of water connections. AdS was also expected to incorporate social inclusion objectives into its operations. The URA provided technical assistance to facilitate the legal process of incorporating AdS and to establish its operating procedures, including social and gender practices and information, education, and communication (IEC) campaigns; it also gave AdS information and supplies to reduce non-revenue water by improving commercial and technical management practices. AdS began serving most of Santiago in mid-2016 and took over service provision to Praia, the capital city, in

² Before the URA, households connected to the piped water network in Praia (the national capital) were served by the national power and water utility, ELECTRA, and households that did not have a household connection to the piped water network were served by the Water Distribution Agency of Praia (*Agência de Distribuição de Água, or ADA*). Each of the other eight municipalities on Santiago had its own water and sanitation department (known by the acronym SAAS, or *Serviços Autónomos de Água e Saneamento* in Portuguese).

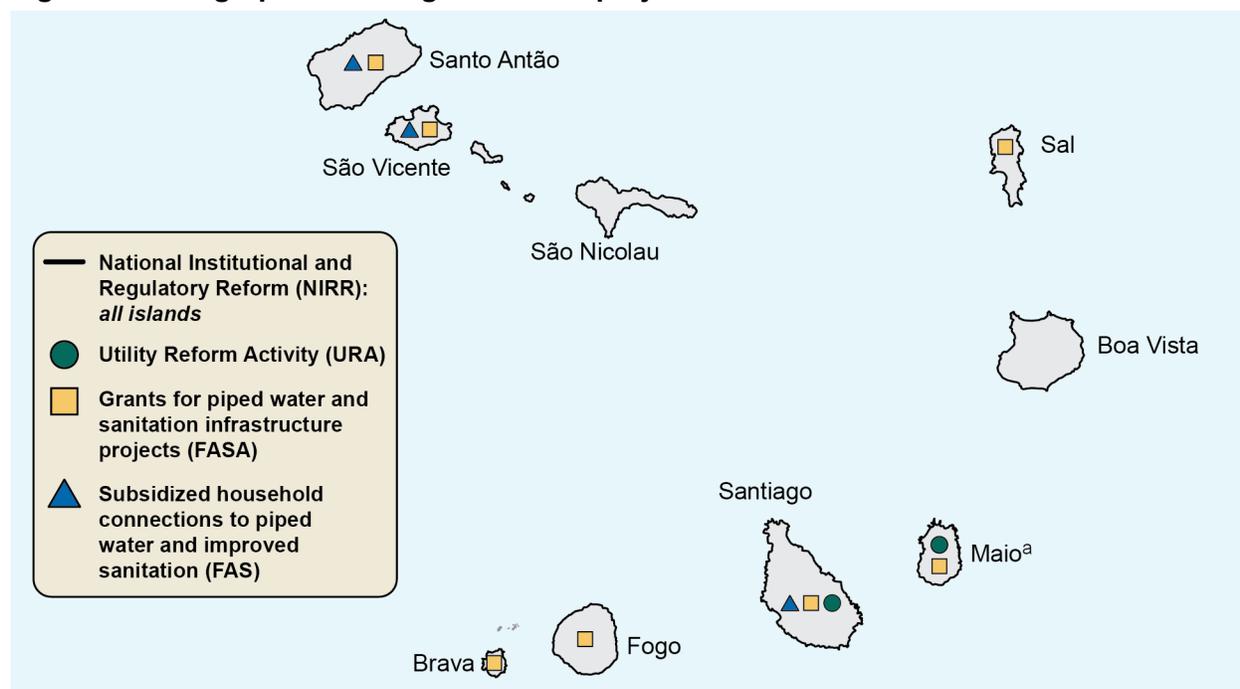
³ Non-revenue water is the difference between the volume input to the water supply system and the volume of water billed to registered customers or consumed by authorized users (American Water Works Association 2012).

mid-2017. (The URA also provided some support to establish a similar utility on Maio, but it was still under development at the end of the compact.)

(3) The Infrastructure Grant Facility (IGF) activity, which was intended to support the national reforms, incentivize utilities to enact corporatization reforms, and support corporatizing utilities. It supported capital improvements and household connections to improved water and sanitation through two funds:

- **The Water and Sanitation Fund (*Fundo de Água e Saneamento, or FASA*)**. The FASA provided funding on a competitive basis to water and sanitation utilities nationwide to improve or expand their infrastructure, on the condition that grants would only be awarded to corporatized utilities or those that were making progress toward corporatization. Municipalities and corporate utilities could apply for funding to build new primary or secondary distribution lines, replace leaky pipes, or rehabilitate or upgrade treatment facilities. Projects were selected by MCA-CV on the basis of the economic rate of return and other criteria, including environmental aspects and social and gender inclusion. All FASA projects included an IEC component to explain the infrastructure development to households in the project's catchment area, encourage more households to connect to the piped water network, and promote a culture of paying for water and sanitation services. The first FASA contract was signed in January 2015, and the last ones were signed just over a year later; most projects were not completed until just before the end of the compact in November 2017 and a few were completed with funding from the GoCV in the 18 months after the compact ended.
- **The Social Access Fund for Water and Sanitation Connection (*Fundo de Acesso Social, or FAS*)**. The FAS provided funding to local nongovernmental organizations (NGOs) to increase access to water and sanitation infrastructure by subsidizing household connections and educating households about water, sanitation, and hygiene. The FAS project was targeted to poor or otherwise vulnerable households and provided three types of subsidies: domestic water connections for households that were not connected to the water supply network, water and sanitation connections for households that did not have improved sanitation and were also not connected to the water network, and improved sanitation for households that already had a water connection. FAS projects also conducted IEC sessions on topics including, but not limited to, creating demand for household water connections and/or sanitation, conserving and handling water at home, and using and maintaining toilets. From October 2014 to November 2015, three NGOs implemented FAS projects on Santiago, São Vicente, and Santo Antão. The FAS was co-funded by the Coca-Cola Africa Foundation.

The NIRR activity was national in scope, whereas the other activities provided support on a subset of islands (Figure I.1). In particular, the URA primarily supported the establishment of AdS on Santiago, though it also supported the development of Águas de Maio (on Maio), which was still being established at the end of the compact. The FASA awarded projects on most islands, whereas the FAS focused on Santiago, São Vicente, and Santo Antão.

Figure I.1. Geographic coverage of WASH project activities

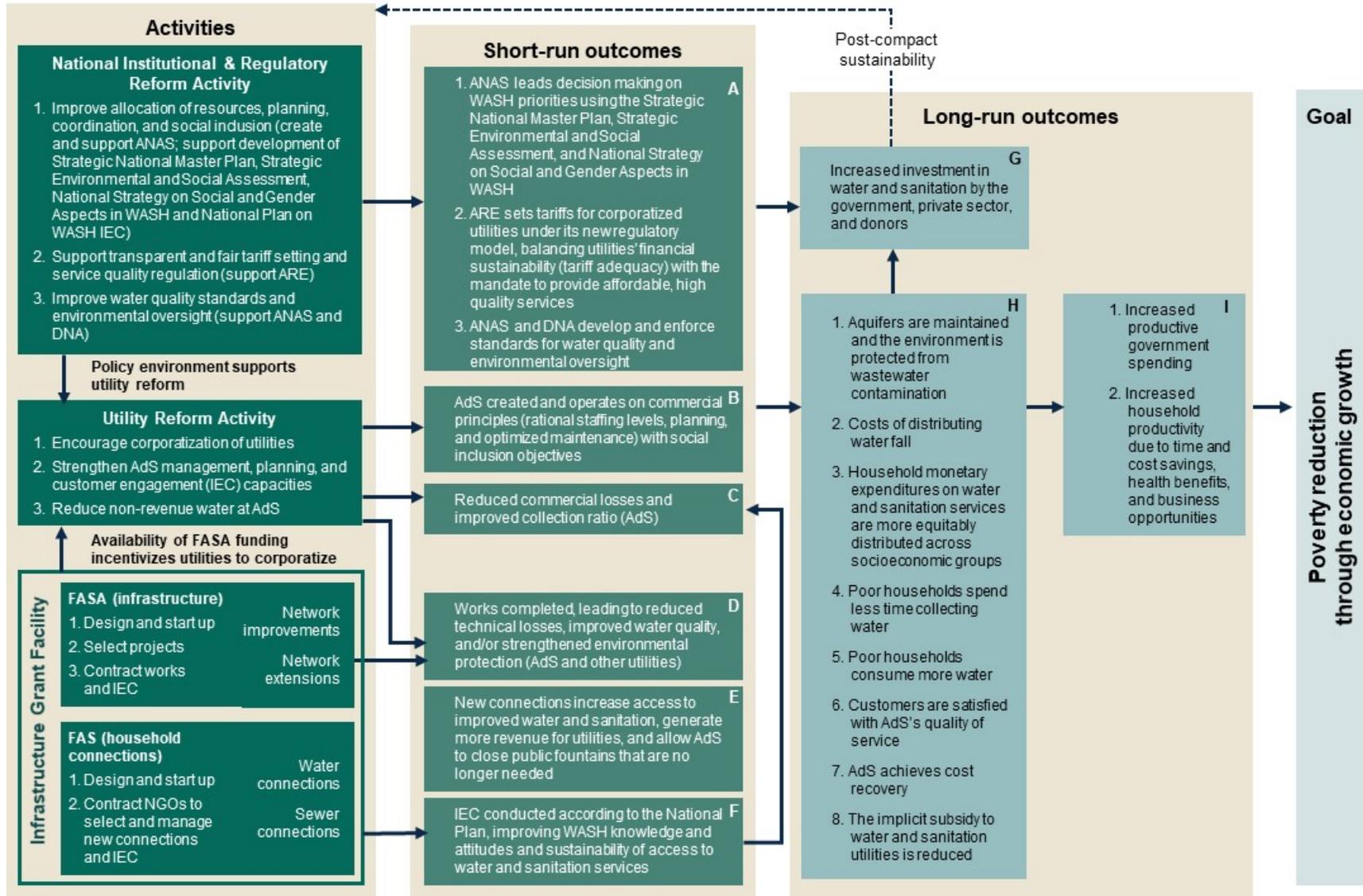
^a The URA provided limited support to Maio but helped to launch the process of corporatization.

The NIRR activity, URA, and IGF activity were designed to be synergistic, each contributing to the objective of establishing a financially sound, transparent, and accountable institutional basis for the delivery of water and sanitation services to Cabo Verdean households and firms (Figure I.2). Together, the three WASH project activities were envisioned to lead to financially sustainable and effective corporate utilities that would provide a high level of service. Reductions in the levels of non-revenue water would reduce the cost of distributing water, and the new water tariff set by ARE was intended to distribute these costs more equitably so that poor households that rely on non-piped water would no longer pay more per unit than households that have piped water. As corporate utilities gradually become financially sustainable, the implicit subsidy⁴ provided by the government could be reduced and new investment in the WASH sector would be stimulated by financial and social returns that have increased relative to before the compact. This increased investment would then promote the sustainability of the processes put in motion by the WASH project.

Ultimately, the government could redirect the funds it previously spent on the implicit subsidy, channeling them into productive spending and thereby stimulating the economy and alleviating poverty. At the household level, the lower cost of water (enabling poor households to consume more water) and the improved quality of service should allow households to be more productive by freeing up time and money for education or for income-generating activities and decreasing the amount of time lost to diarrheal diseases.

⁴ Funding provided by the government through a channel that is not easily identifiable (such as budgetary support to the municipality) to cover the difference between a utility's costs and operating revenue.

Figure I.2. WASH project logic



B. Overview of the evaluation design

The interim evaluation focuses on the project's implementation and short-term effects on national institutions, AdS, the population of Santiago, and FAS household beneficiaries in Santiago, as evidenced by outcomes approximately six months after the compact ended. Together, the interim and final evaluations aim to address the key research questions (Box I.2).

Box I.2. WASH project evaluation research questions

1. Were the Activities/Sub-Activities implemented as designed? What were implementation challenges and successes?
2. Is there evidence that the interventions have resulted in the outcomes outlined in the program logic?
3. How did the political and economic incentives of different sector actors affect the implementation, sustainability, and efficacy of the WASH project? In particular, how did these incentives affect the reform portfolio, and the effects of the WASH project on customers, utilities, and the management efficiency of the sector?
4. a) Has the FASA mechanism efficiently selected the most effective, high quality projects as measured by the effects of the FASA projects on the socioeconomic well-being of households, the finances and management of the utilities, economy value-added and business and household productivity? b) Is the FASA a sustainable institution in Cabo Verde that is and will catalyze additional financing for WASH infrastructure?
5. a) Was the tariff reform outcome pro-poor (progressive), regressive, or neutral in Santiago? b) Does the current tariff structure allow for cost-recovery by Águas de Santiago?
6. Was the WASH project as a whole effective at increasing the management efficiency and sustainability of the sector as measured by non-revenue water, collection ratio, and tariff adequacy? At reducing the [implicit] subsidy to the WASH sector at the municipal and national level?
7. What has been the effect of the WASH project on access to, quality and continuity of, and total costs of (direct and indirect) water and sanitation services for households and businesses in Cabo Verde? On gender and social equality in access to and cost of water and sanitation services?
8. How do the FASA and FAS projects' effects on these outcomes compare?

To understand the WASH project's implementation and short-term effects, the interim evaluation takes a mixed-methods approach to address the research questions, drawing on three components: a process evaluation, quantitative analyses, and case studies (Box I.3).

Box I.3. Components of the interim evaluation

1. **Process evaluation.** The interim evaluation used interviews, project documents, and administrative records to document how each activity was implemented, how implementation was influenced by the context (including the incentives faced by different actors and the characteristics of the individuals and institutions involved in the project), how the three activities reinforced each other, and the potential for the project's effects to be sustainable.
2. **Quantitative analyses.** The interim evaluation explored the WASH project's effects on households and utilities on Santiago by estimating differences over time and across areas. The evaluation included four groups of quantitative analyses: (1) analyses of the combined effects of the NIRR and URA on Santiago, comparing the experiences of Santiago households in 2011 to 2018 (2) comparisons of households in FASA and non-FASA areas in 2018 to estimate the additional impact of the FASA; (3) comparisons of FAS beneficiary households in 2015 and 2018 to estimate the additional impact of the FAS, and (4) analyses of AdS billing and payment data, AdS operational data, and ultrasonic water meters^a to assess the impacts of water tariff reform, the early experiences of AdS, and meters' accuracy.
3. **Case studies.** Using data from the process evaluation plus additional interviews, focus group discussions, and a document review, the interim evaluation explored the rationale, implementation, challenges, and results of three FASA projects that represent the diversity of the portfolio.

^a Ultrasonic meters measure the velocity of a fluid with ultrasound to calculate volume flow, so they can measure water consumption more reliably than mechanical household meters, which are pushed by the flow of water or air through the network.

C. Findings on short-run outcomes

In this section we present findings on short-run outcomes, most of which were expected to be complete by the end of the compact. These milestones were necessary precursors to the ultimate outcomes of interest that the WASH project aimed to improve.

The NIRR activity succeeded in consolidating authority in a few regulatory bodies and establishing new frameworks to guide policy-making. ANAS and CNAS were established in less than a year after the compact came into force. The National Strategic Plan for Water and Sanitation took longer to develop but was adopted in 2015, and reflected the findings of the Strategic Environmental and Social Assessment and the National Strategy on Social and Gender Aspects in WASH. These policy frameworks subsequently guided the development of the FASA projects. ARE aligned all of Santiago's municipalities on a single unified water tariff schedule for AdS and is exercising its authority to set water tariffs for corporatized utilities, although it relies on the technical expertise of external consultants. Of the three agencies involved in regulation of the WASH sector, DNA was the least affected by—or engaged in—the reform process.

Despite these impressive successes, there are still some uncertainties about the extent to which ANAS and ARE will fulfill their new roles, particularly since ANAS is still partially dependent on technical assistance which is being provided by another donor.

Not all stakeholders were satisfied with the plan for ANAS to regulate the quality of service provision, since it closely linked with the economic elements of AdS's business plan that are regulated by ARE. Some stakeholders were concerned about there being a potential conflict

of interest in water management with ANAS being part of the Ministry of Agriculture, which is a key user of water. Additionally, some stakeholders expressed concern that ANAS is too focused on its role as the technical regulator for the sector and is not yet leading decision-making on WASH priorities, which is also a vital role for ANAS. There are also related concerns about the extent to which ANAS will be able to use the Strategic Environmental and Social Assessment and the National Strategy on Social and Gender Aspects in WASH to guide prioritization and implementation of WASH investments and programming in the future. For its part, ARE has yet to fully exercise its new authority in terms of justifying the tariff for sewer services and regulating prices for treated wastewater.

The URA activity succeeded in establishing AdS as a multi-municipal corporatized utility, although the process took much longer than anticipated and it is still premature to judge whether the company is operating on commercial principles (see Section I.D for results on AdS's performance).

The FASA invested almost \$20 million in infrastructure projects that served 19 of Cabo Verde's 22 municipalities (the other three did not submit proposals). Roughly half of the FASA funds benefitted areas served by AdS, reaching more than 70,000 people on Santiago, but due to the diversity in the types of projects and the limited information available about the service areas for each project, it is not possible to quantify the benefits to AdS in terms of reduced technical losses (i.e. leakage), improved water quality, or strengthened environmental protection. It is worth noting, though, that of the 13 infrastructure projects funded by the FASA, only three were for sanitation and none were exclusively for non-revenue water reduction. MCA-CV required FASA contractors to address social inclusion and gender objectives, including by implementing IEC campaigns. Since this was beyond the expertise of the companies that were qualified to do the construction, they adopted a variety of strategies, ranging from subcontracting these activities to NGOs to bringing consultants into the team to lead these activities; notably of the three case studies, the most effective approach seemed to be partnering with an NGO whereas the contractor that attempted to just have in-house staff lead these activities fell far short of expectations in terms of community engagement and enabling disadvantaged households to benefit from the infrastructure.

Together, the FASA and FAS sub-activities contributed to substantial increases in the share of Santiago households that have access to piped water and improved sanitation (Figure I.3). The share of Santiago households that use an improved source⁵ was already very high prior to the compact (94 percent in the 2011 baseline) so there was little room for the WASH project to lead to an increase; in 2018 97 percent of households used an improved water source. Looking more specifically at the types of sources affected by the WASH project, the share of households that are connected to the piped water network rose from 46 percent in 2011 to 62 percent in 2018. Reliance on public fountains as a primary water

⁵ According to the Joint Monitoring Program for progress toward Sustainable Development Goal 6 (including the target for access to safe water), improved water sources have the potential to deliver safe water by nature of their design and construction, and include: piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water. As such, we include public fountains among our definition of improved water sources because they provide water from the piped network either directly or supplied by truck.

source fell from 27 percent to 9 percent over the same period, reflecting the fact that more households now have access to piped water (either through their own connection or by using another household's connection) as well as the closure of public fountains. The share of households that have access to improved sanitation⁶ also increased (from 62 to 74 percent). Specifically, households that use toilets connected to the sewer network as their primary sanitation facility increased by more than two-thirds, and the share of households that report having no sanitation facility decreased by nearly half. Households that received subsidies from the FAS program experienced even larger improvements in access to piped water (from zero to 93 percent of households) and improved sanitation (from zero to 78 percent of households) (not shown).

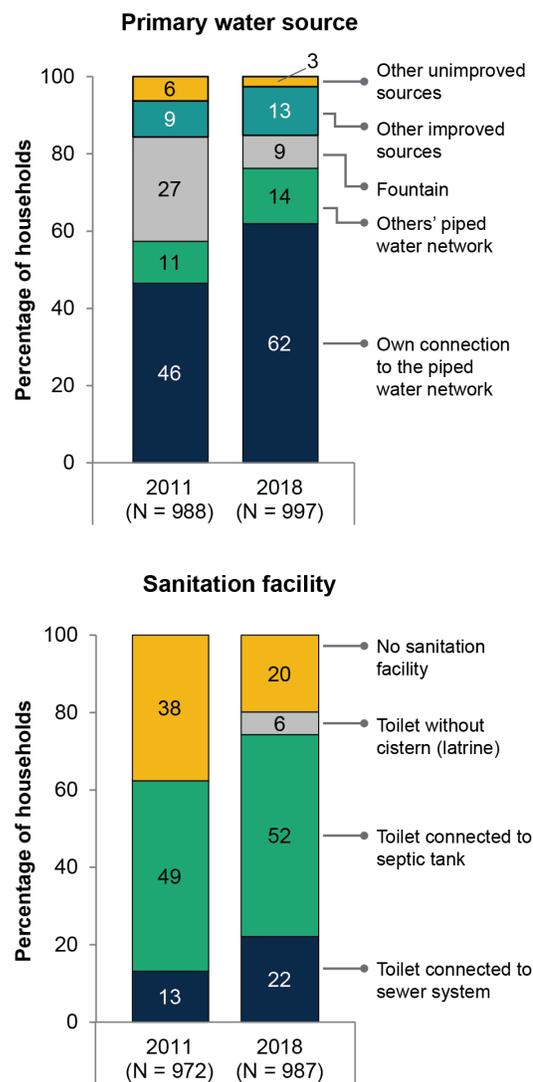
New domestic customers are not providing AdS with additional revenue that would help the utility achieve cost-recovery. Over 80 percent of the consumption billed by AdS to domestic customers connected to the network after 2014 fell under the subsidized price block.

Over half of survey respondents on Santiago report hearing WASH messaging during the year prior to the survey but there is still need for behavior change. The share of FAS beneficiary households that self-reported

handwashing at key times and use of soap increased between 2015 and 2018, but roughly a quarter still did not report washing their hands after using the toilet, which is consistent with the findings from the representative sample. Likewise, among households that rely on streams, wells, and springs, roughly half report not treating their water in the past week.

Roughly one third of FAS customers have struggled to pay their bills on time and are at risk of being disconnected. Based on AdS billing and payments data, on average FAS

Figure I.3. Access to improved water and sanitation (2011 and 2018)



⁶ According to the Joint Monitoring Program for progress toward Sustainable Development Goal 6 (including the target for access to safe sanitation), improved sanitation includes flush or pour flush to piped sewer systems, septic tanks, pit latrines; ventilated improved pit latrines; composting toilets; or pit latrines with slabs. Our survey data do not allow us to categorize latrines as improved or unimproved facilities so we conservatively consider them to be unimproved, although this would not have substantively affected our assessment because relatively few households had these types of facilities.

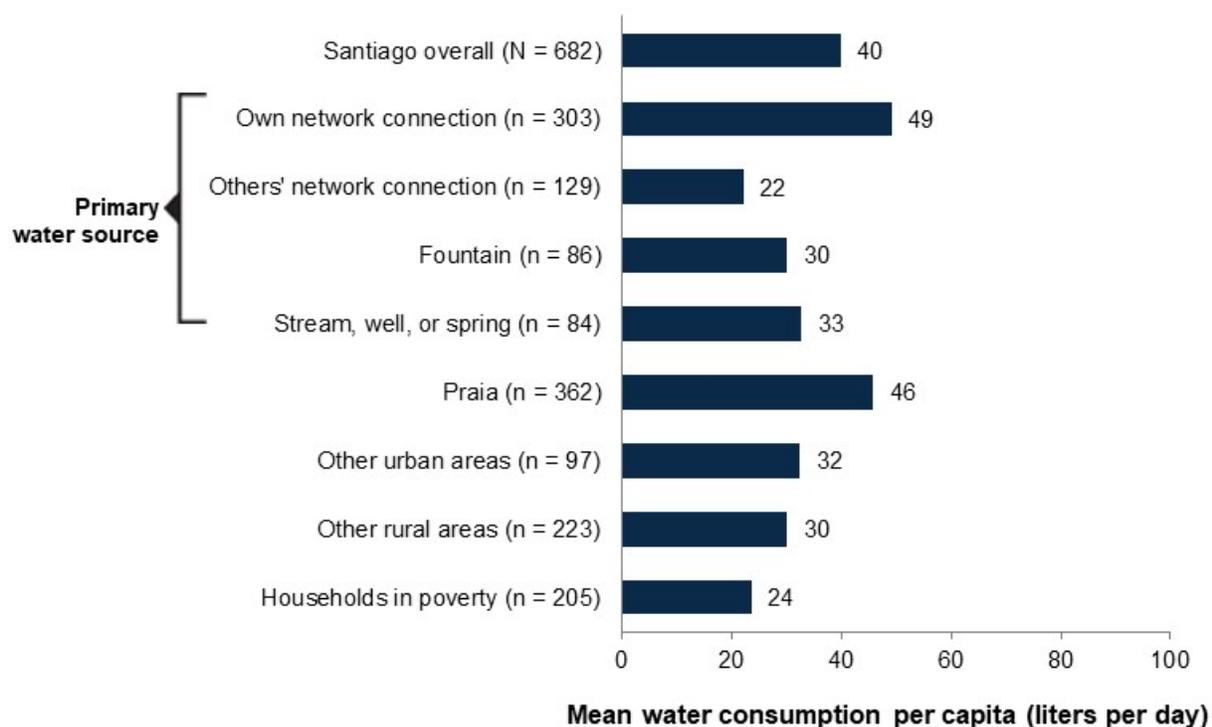
customers had paid off 73 percent of the total value of their bills. Sixty three percent of FAS customers had paid over three quarters of the amount they owed, 15 percent had paid between a third and three fourths of what they owed, and 22 percent had paid less than a third of what they owed. AdS only began systematically suspending the water supply of domestic customers in early 2019, so some of the FAS customers with 2018 debt may be at risk of having their connections suspended in 2019.

D. Findings on long-run outcomes

Although it is still very early to gauge long-run outcomes, in this section we document the status of a subset of key indicators six months after the end of the compact to document early progress and to set a benchmark for comparison for the final evaluation planned for 2021.

Water consumption is still relatively low on Santiago, and poor households consume far less water than non-poor households. According to data from the 2018 interim survey and AdS's billing database, the average household on Santiago consumes only 40 liters of water per person per day (Figure I.4), although the average masks differences based on the type of water source. Households with their own piped water connection consume almost 50 liters per person per day, but households that rely on another household's piped water connection consume less than half as much. On average, across all types of sources, poor households consume just 24 liters per capita per day. FAS beneficiary households consumed one-third more water in 2018 than in 2015 (31 versus 23 liters per person per day respectively).

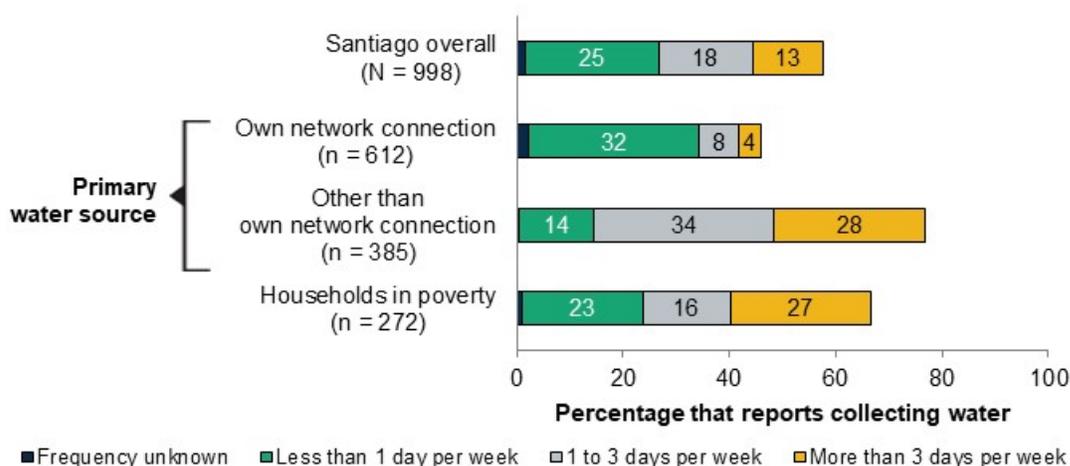
Figure I.4. Water consumption (2018)



Poor households spend about one-third as much on water and sanitation than non-poor households, but those expenses represent a greater share of poor households' total spending.⁷ On average, water and sanitation expenditures account for about 7 percent of household spending among households on Santiago (not shown).

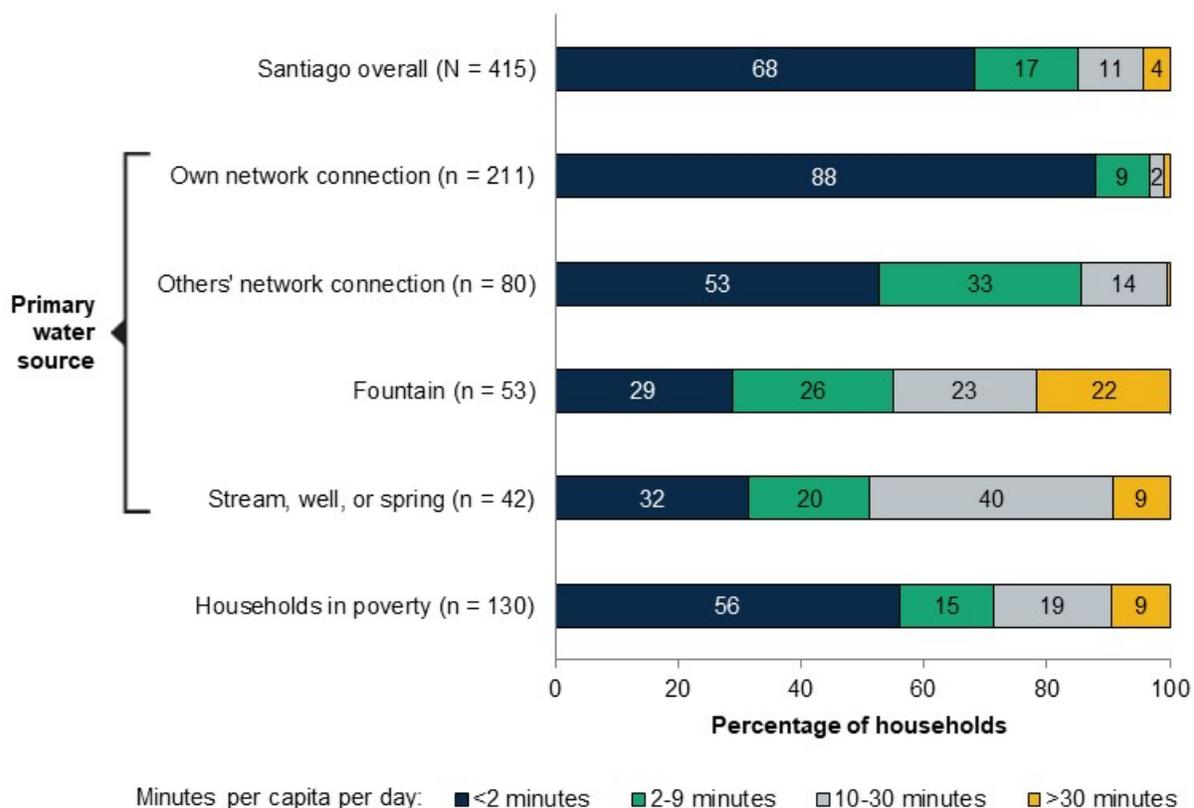
Households connected to the piped water network collect water less frequently (Figure I.5). Only 12 percent of households with their own connection to the piped water network collect water at least weekly, compared to 62 percent of households that do not. Households in poverty collect water more frequently than other households. There was a large decline in the share of FAS beneficiary households that collect water, from 95 percent in 2015 to 52 percent in 2018 (not shown).

Figure I.5. Share of households that collect water (2018)



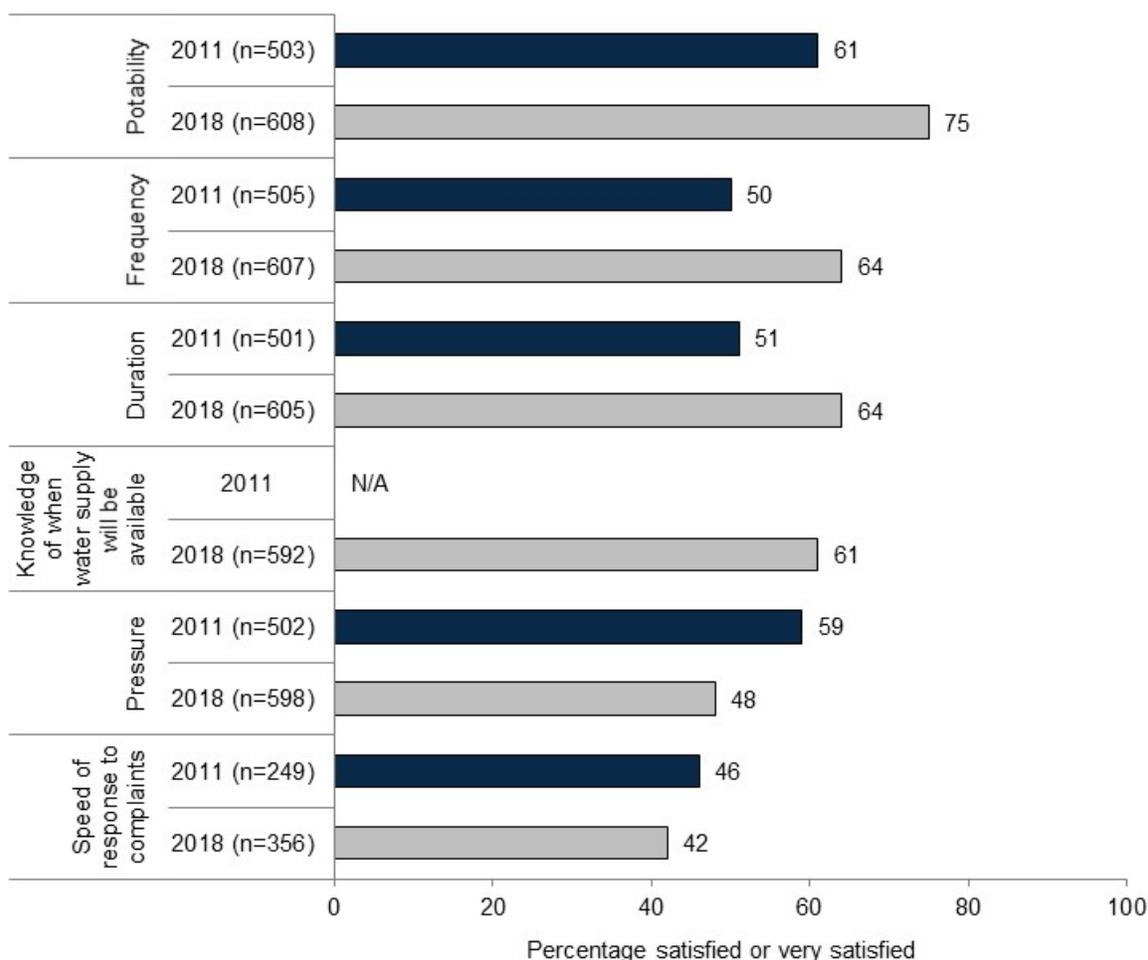
Although many households collect water regularly, they spend relatively little time collecting water, on average. The majority of households (and even poor households) spend less than 2 minutes per person per day collecting water (Figure I.6). On Santiago overall, only 15 percent of households spend 10 or more minutes per day collecting water; among households that rely on water from public fountains or groundwater sources, collecting water is more burdensome, with almost half of all households spending 10 or more minutes per person per day.

⁷ Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

Figure I.6. Average time spent collecting water, among households that collect (2018)

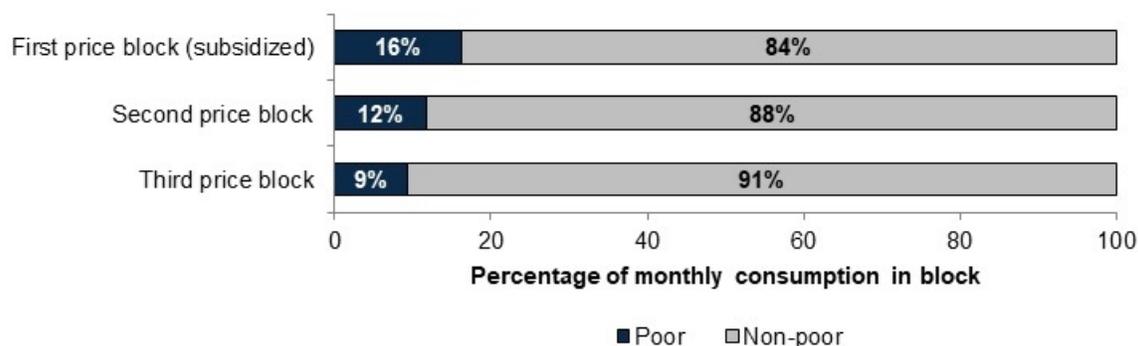
Though more than half of AdS customers are satisfied with piped water service and there have been improvements since 2011, there is still ample scope for AdS to improve service and customer satisfaction. Continuity of supply varies widely across AdS's service area: at one extreme, 30 percent of customers report that they typically receive piped water only 0-3 days per week and only 0-4 hours on those days, whereas at the other extreme, 22 percent of customers report round-the-clock service 7 days per week (not shown). This diversity notwithstanding, the majority of AdS customers were satisfied with the potability, frequency, duration, and knowledge of when supply will be available (Figure I.7). In contrast, AdS did not achieve increases in customer satisfaction with water pressure and the speed of response to complaints.

Figure I.7. Piped water customer satisfaction (2011 and 2018)



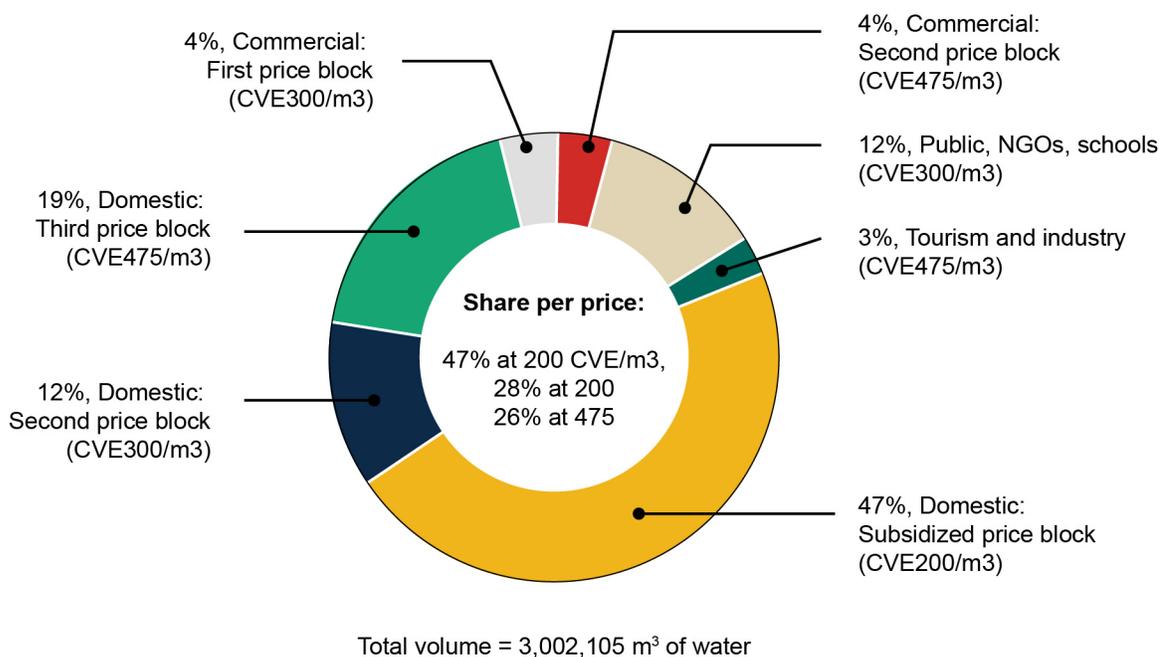
Poor customers consume only 16 percent of the water that is billed in the subsidized price block. Thus, it appears that the current block tariff structure is more regressive than progressive because the majority of the subsidized water goes to non-poor customers (Figure I.8).

Figure I.8. Share of monthly domestic water consumption (m3) consumed by poor vs. non-poor households in each pricing block



Forty seven percent of water consumption billed by AdS in 2018 fell under the subsidized block. The small share of domestic consumption in unsubsidized price blocks and by other types of consumers makes it difficult for AdS to recover the revenue lost from subsidized water consumption (Figure I.9).

Figure I.9. Share of AdS's total volume (m³) of water billed in 2018 by customer type and price block



AdS has shown mixed progress on a range of performance indicators during its first years of existence. AdS data from 2017 must be interpreted with caution, since Praia was incorporated into AdS's service area half way through the year, doubling the fledgling utility's number of customers and vastly complicating operations and billing. In 2018, AdS reached over 50,000 domestic connections, an increase of over 1,800 from 2017 (Table I.1). Commercial connections and other types of connections also increased by 6 and 2 percent, respectively. From 2017 to 2018, AdS increased billed water by 10 percent, billing slightly over 3 million m³ of water. Domestic water consumption represented over three-quarters of total billed water in 2018. Although accounting for less than one-quarter of billed water in 2018, consumption by other types of customers more than doubled. AdS had 4.2 staff per 1,000 potable connections in 2018, a slight increase compared to 2017, but far lower than the compact baseline of 15. The utility's operating cost coverage was stable at 73 percent in 2017 and 74 percent in 2018, but AdS's operating cost deficit was 51 percent higher in 2018 than in 2017. Non-revenue water increased from 46 percent in 2017 to 61 percent in 2018, likely due at least in part to more accurate measurement. At the same time, AdS was able to improve its bill collection rate in 2018, reaching 64 percent of the total billed value, compared to only 44 percent in 2017 when it was faced with extensive billing challenges related to the handover of Praia from ELECTRA.

Table I.1. AdS performance indicators

AdS performance indicator	ITT Baseline	ITT As of compact end date (Nov 30 2017)	2017 AdS operational data ^a	2018 AdS operational data
Number of connections				
Domestic	NA	NA	49,321	51,182
Commercial and services	NA	NA	1,782	1,891
Other types ^a	NA	NA	1,082	1,111
Volume of water billed				
Domestic	NA	NA	2,450,403	2,325,799
Commercial and services	NA	NA	107,743	245,383
Other types ^b	NA	NA	168,083	430,922
Other indicators				
Staff productivity ^c	15	3.9	3.7	4.2
Operating cost coverage	111%	45%	73%	74%
Value of implicit subsidy	\$11,797,509	\$8,705,504	NA	NA
Operational cost deficit ^d	NA	NA	\$2,354,339	\$3,552,487
Non-revenue water	39%	79%	46%	61%
Bill collection rate	68%	41%	44%	64%

Sources: Post-compact indicator tracking table (ITT), 2017 and 2018 AdS operational data.

Notes: We are unable to confirm how indicator numbers from the post-compact ITT were calculated, so we focus on comparing indicators based on 2017 and 2018 AdS operational data.

^a AdS took responsibility for service provision in Praia in July 2017 so annual data reflect the sudden growth of the company's responsibilities halfway through the year.

^b Public, non-governmental organizations, schools, tourism, and industry.

^c AdS staff per 1,000 potable water connections.

^d Since data were not available to calculate the implicit subsidy, we report the operational cost deficit in place of the implicit subsidy for 2017 and 2018 AdS operational data.

NA= not available.

The majority of AdS meters tested against an ultrasonic meter are fairly accurate. Roughly one-sixth of the meters we tested against an ultrasonic meter were under registering by more than 10 percent, contributing to non-revenue water. A similar share was over registering by more than 10 percent—probably because of air in the pipes, an issue AdS is already working to resolve.

Though there have been increases in access to improved water and sanitation, initial evidence suggests that there is minimal scope for the WASH project to lead to increased household productivity. As discussed above, while the time savings generated by the WASH project could be pivotal for a family that is able to switch from relying on a public fountain as their primary water source to having their own piped water connection (for example, thanks to a FAS subsidy), there are not likely to be major time savings among the population as a whole because most households that do not have their own piped water connection still do not spend much time collecting water. Though there was a 19 percentage point increase between 2011 and 2018 in the share of Santiago households relying on the piped water network, only a subset of those households would have experienced sizeable time savings. Moreover, it is unclear whether access to piped water will generate business opportunities. In 2018, few households were engaged in income-generating opportunities that relied on piped water; unless there is a drastic increase in economic activity enabled by expanded access or improved quality of service in the coming years, it is unlikely that the WASH project will result in the measurable increases in household productivity that were predicted in the program logic.

Similarly, despite the admirable success of the project on implementing significant institutional reforms and completing major infrastructure works, at present it appears unlikely that the WASH Project will lead to more productive government spending.

Although there are numerous positive signals that AdS is becoming a more efficient utility than the SAAS and Electra formerly were, and is providing a higher quality of service to more customers, it still faces many barriers to cost recovery. Moreover, without a successor to the FASA there is no sustainable mechanism for funding capital investments in the WASH sector.

II. INTRODUCTION

In 2010, Cabo Verdeans paid almost three times as much for water as residents of any other country in Africa did (Banerjee et al. 2010), even though they received poor quality service and suffered frequent outages (EBES 2013). There is only a scant amount of ground or surface water on the volcanic archipelago, and the country largely relies on desalinated sea water, which is a major driver of the high price. Poor management practices by municipal utilities and the large, partially privatized multi-utility (ELECTRA) that provided power, water, and sewerage services in the national capital (Praia) also contributed to the high cost of piped water. Nonetheless, even these high prices were not as bad as they could have been, because the national government indirectly subsidized many of the country's water utilities, diverting funds that could have been used for more productive purposes and consequently inhibiting economic growth.

To address some of these challenges, the Millennium Challenge Corporation (MCC) funded the \$41 million Water, Sanitation, and Hygiene (WASH) project. The WASH project was part of a larger \$66.2 million five-year compact, which began in 2012 and aimed to accelerate economic growth and alleviate poverty in Cabo Verde. In addition to the WASH project, the compact included a \$17.3 million Land Management for Investment project that was designed to strengthen protection of property rights and the investment climate. Both projects were implemented by the Millennium Challenge Account of Cabo Verde (MCA-CV).

The WASH project's objective was to “establish a financially sound, transparent, and accountable institutional basis for the delivery of water and sanitation services to Cabo Verdean households and firms” through the following activities: (1) the National Institutional and Regulatory Reform (NIRR) activity, designed to reform national policy in the WASH sector and strengthen the institutions that governed the sector; (2) the Utility Reform Activity (URA) which transformed ELECTRA and the eight inefficient municipal utilities on the island of Santiago into *Águas de Santiago* (AdS), an autonomous corporate entity; (3) the Infrastructure Grant Facility (IGF) activity, which included the Water and Sanitation Fund (FASA) to expand and improve the quality of infrastructure in the sector, and the Social Access Fund for Water and Sanitation Connection (FAS), which subsidized household connections to water and sanitation utilities.

MCC contracted with Mathematica to conduct a performance evaluation of the WASH project as a whole and of its different activities.⁸ The goal was to understand how the project was implemented, determine what its effects on key outcomes of interest were, and evaluate the sustainability of the project's investments in infrastructure and institutional reforms. This report presents findings from the interim round of the evaluation, based mainly on quantitative and qualitative data collected by the evaluation team between April and July 2018—about six months after the end of the compact (and the conclusion of most project activities)—and 2018 administrative data provided by AdS. The interim evaluation focuses on the implementation of activities and the project's short-term effects on national institutions, AdS, the population of

⁸ The findings in this report represent the independent assessment of the authors, and do not reflect the views of the Millennium Challenge Corporation or Afrosondagem, the data collection partner. The authors report no conflicts of interest.

Santiago, and FAS household beneficiaries in Santiago. We also include findings from case studies of FASA projects on two more of Cabo Verde's nine inhabited islands, Sal and São Vicente. A final round of the evaluation, focused on longer-term outcomes and sustainability, is planned for 2021.

The rest of this report describes the data sources and analysis methods (Chapter III), presents findings from a process evaluation of how the WASH project was implemented (Chapter IV), and summarizes results on the combined effects the project had on the population of Santiago (Chapter V), the effects of the FASA projects on households living in project areas on Santiago (Chapter VI), and the effects of subsidized household water connections on FAS beneficiaries on Santiago (Chapter VII). In Chapter VIII, we discuss AdS's performance over the first two years of its existence, and Chapter IX comprises three illustrative case studies of FASA projects on Santiago, São Vicente, and Sal. Conclusions and implications for the final round of the evaluation are covered in Chapter X.

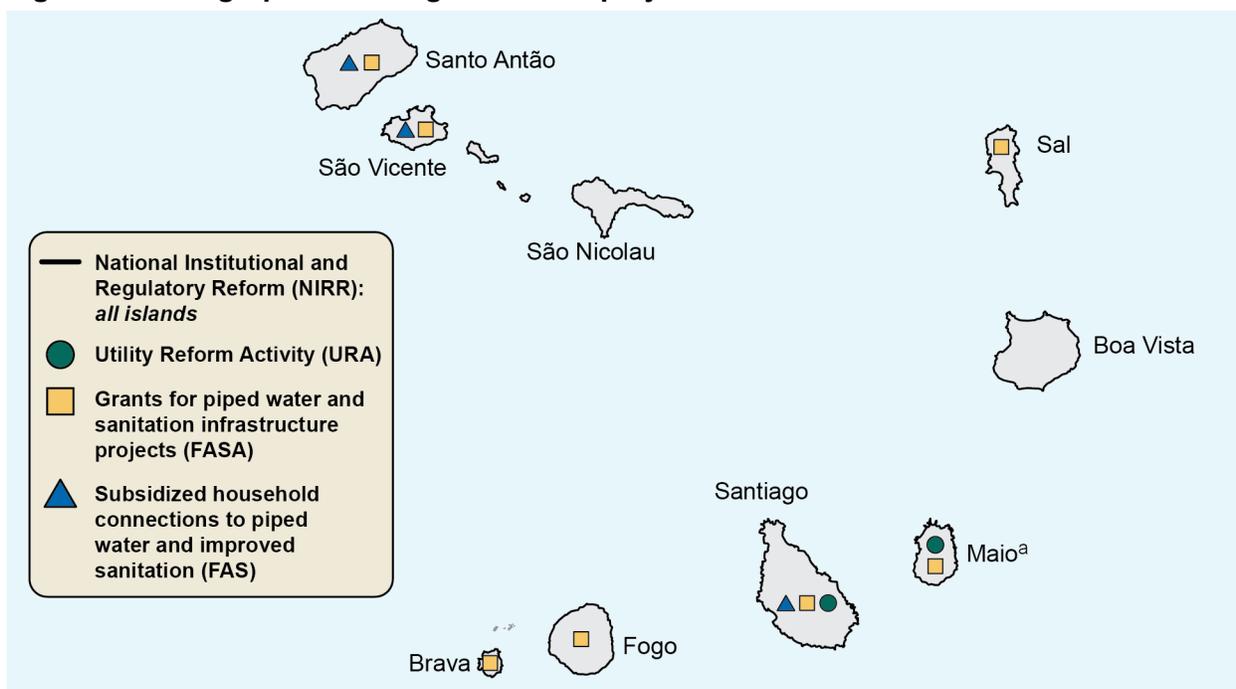
A. Overview of the WASH Project

Before the start of the WASH project, the government of Cabo Verde had already taken important preliminary steps to improve the legal and regulatory framework in the WASH sector. The WASH project advanced this work by reforming national policy and regulatory institutions through the NIRR activity; transforming inefficient utilities into autonomous corporate entities operating on a commercial basis through the URA; and improving the quality and reach of infrastructure through the IGF activity (Table II.1 and Figure II.1).

These three activities were designed to be synergistic, each contributing to the objective of establishing a financially sound, transparent, and accountable institutional basis for the delivery of water and sanitation services to Cabo Verdean households and firms. The policy and institutional reforms implemented as part of the NIRR and the progress toward corporatization spurred by the URA were both conditions for the funding provided as part of the IGF activity. Conversely, IGF funding was intended to help utilities make further progress toward becoming efficient corporations.

Table II.1. WASH project activities

Activity	Geographic scope	Implementing contractor	Timeline
National Institutional and Regulatory Reform (NIRR)	National	National Institutions Technical Assistance (NITA) contract to AECOM	Policy and institutional reforms gradually adopted starting in 2013 with the establishment of new entities to coordinate the WASH sector. Technical assistance ended in early 2017.
Utility Reform Activity (URA)	Santiago island, with some support to Maio island	<i>Assistência Técnica à Águas de Santiago</i> (ATAS) contract to Seureca	The new multi-municipal corporatized utility began serving most of Santiago in mid-2016 and took over service provision to Praia, the capital city and residence of roughly half the island's population, in mid-2017. Technical assistance ended in November 2017. A new corporatized utility on Maio was still being established at the end of the compact.
Infrastructure Grant Facility (IGF)			
<ul style="list-style-type: none"> Water and Sanitation Fund (FASA) 	Projects awarded on all islands other than Boa Vista and São Nicolau	Varied (construction firms)	12 projects, valued at almost \$20 million, serving over 140,000 Cabo Verdeans. Most projects were completed by the end of the compact or shortly thereafter.
<ul style="list-style-type: none"> Social Access Fund for Water and Sanitation Connection (FAS) 	Santiago, São Vicente, Santo Antão	<i>CitiHabitat</i> and <i>Movimento África 70</i> on Santiago, <i>Amigos da Natureza</i> on São Vicente and Santo Antão	4,343 households received subsidized water connections and/or improved sanitation between October 2014 and November 2015.

Figure II.1. Geographic coverage of WASH project activities

^a The URA provided limited support to Maio but helped to launch the process of corporatization.

The NIRR activity involved expanding the functions of some of the existing WASH agencies and creating several new agencies responsible for resource allocation, strategic planning, and coordination within the WASH sector (Box II.1). The activity was designed to create a national framework for a sector whose components had traditionally been scattered across various government entities at the national and municipal levels. The new and altered agencies were charged with improving management of the WASH sector by (1) developing policy frameworks and revised legislation to clarify the responsibilities of each entity and to define national priorities for scarce resources, (2) instituting a system for fair and transparent tariff-setting, and (3) enhancing environmental protection, including regulating wastewater and testing water quality. Because the institutional and regulatory reform activities were at the national level, the NIRR activity was expected to benefit the entire population of Cabo Verde.

Box II.1. Overview of key WASH entities

National Agency for Water and Sanitation (*Agência Nacional de Água e Saneamento [ANAS]*): newly-created agency responsible for policy and planning; includes Social and Gender unit, and also serves as technical regulator for water quality

National Water and Sanitation Council (*Conselho Nacional de Água e Saneamento [CNAS]*): newly created advisory board for the water and sanitation sector

Economic Regulatory Agency (*Agência de Regulação Económica [ARE]*): existing agency newly empowered to regulate water and sanitation tariffs

General Directorate of the Environment (*Direcção Nacional do Ambiente [DNA]*): existing agency's responsibilities expanded to include oversight of water and wastewater quality

Águas de Santiago (AdS): newly created autonomous multi-municipal corporatized water utility

ELECTRA: National power and water utility (predecessor to AdS in Praia)

SAAS (*Serviços Autónomos de Água e Saneamento*): Municipal water and sanitation departments (predecessor to AdS outside of Praia)

The URA focused on creating AdS, a new corporatized, multi-municipal utility (MMU) for the island of Santiago. Before the URA, households connected to the piped water network in Praia (the national capital, which holds roughly half the population of Santiago) were served by the national power and water utility, ELECTRA, and households that did not have a household connection to the piped water network were served by the Water Distribution Agency of Praia (*Agência de Distribuição de Água*, or ADA). Each of the other eight municipalities on Santiago had its own water and sanitation department (known by the acronym SAAS, or *Serviços Autónomos de Água e Saneamento* in Portuguese). In contrast, as a corporatized MMU, AdS was intended to have financial and managerial autonomy from the government. Although it is owned by the municipalities, as a corporation AdS has a distinct legal identity, transparent financial accounts that are segregated from those of other government operations, and the ability to make operational decisions independent of the government. By operating on commercial principles, realizing economies of scale, and eliminating redundancies, AdS was expected to improve operational efficiency and quality of service, reduce non-revenue water,⁹ and increase the number of water connections relative to the status quo. AdS was also expected to incorporate social inclusion objectives into its operations. The URA supported the creation and strengthening of AdS by providing technical assistance to facilitate the legal process of incorporating AdS and helping the new company establish its operating procedures, including social and gender practices and information, education, and communication (IEC) campaigns. The WASH project also gave AdS information and supplies to reduce non-revenue water by improving commercial and technical management practices.

⁹ Non-revenue water is the difference between the volume input to the water supply system and the volume of water billed to registered customers or consumed by authorized users (AWWA 2012).

The IGF funded infrastructure and capital improvements in the WASH sector. The IGF activity was intended to support the national reforms, incentivize utilities to enact corporatization reforms, and support corporatizing utilities by (1) reducing leakage or improving quality of service through improved infrastructure, (2) improving access to water and sanitation infrastructure and generating new revenue by expanding water and sewer networks, and (3) providing important health benefits by improving the quality of the water being delivered. During implementation, the IGF was split into two funds (see Box II.2).

Box II.2. IGF funds and types of grants

Water and Sanitation Fund (*Fundo de Água e Saneamento*, or FASA) provided grants to utilities for infrastructure projects:

- network rehabilitation
- network expansion

Social Access Fund for Water and Sanitation Connection (*Fundo de Acesso Social*, or FAS) provided grants to nongovernmental organizations to subsidize household connections to:

- the piped water network
- Both the piped water network and improved sanitation
- improved sanitation

The FASA. The FASA provided funding on a competitive basis to water and sanitation utilities nationwide to improve or expand their infrastructure. The FASA supported the URA by offering funding only to SAAS that were making progress toward corporatization. Municipalities and corporate utilities could apply for funding to build new primary or secondary distribution lines, replace leaky pipes, or rehabilitate or upgrade treatment facilities. Projects were selected by MCC on the basis of the economic rate of return and other criteria, including environmental aspects and social and gender inclusion. All FASA projects included an IEC component to explain the infrastructure development to households in the project's catchment area, encourage more households to connect to the network, and promote a culture of paying for water and sanitation services. The first FASA contract was signed in January 2015, and the last ones were signed just over a year later; most projects were not completed until just before the end of the compact in November 2017.

The FAS. The FAS provided funding to local nongovernmental organizations (NGOs) to increase access to water and sanitation infrastructure by subsidizing household connections and educating households about water, sanitation, and hygiene. The FAS project was targeted to poor or otherwise vulnerable households that met criteria specified in the activity's operating manual. The FAS provided three types of subsidies: domestic water connections for households that were not connected to the water supply network (Type 1), water and sanitation connections for households that did not have improved sanitation and were also not connected to the water network (Type 2a), and improved sanitation for households that already had a water connection (Type 2b). FAS projects also conducted IEC sessions on topics including, but not limited to,

creating demand for household water connections and/or sanitation, conserving and handling water at home, and using and maintaining toilets. From October 2014 to November 2015, three NGOs implemented FAS projects on Santiago, São Vicente, and Santo Antão. Funding for the FAS included about \$2 million from the WASH project, \$400,000 from the Coca-Cola Africa Foundation, and cash and in-kind contributions from beneficiaries, valued at about \$500,000 (RAIN 2015).

The project logic (Figure II.2) illustrates how the activities supported each other and were hypothesized to translate into the short- and long-run outcomes that the project was designed to affect. The NIRR activity was expected to lead to important changes in how the WASH sector functions and is regulated (Box II.1). Although the NIRR activity was the foundation for the URA and IGF, the latter two activities were expected to be the driving forces behind most of the changes that were anticipated at the utility and household levels. The URA was intended to address many of the challenges faced by AdS's predecessors, resulting in better performance on a variety of measures such as the volume of non-revenue water, the bill collection rate, and operating costs. As corporatized utilities became financially sustainable, the government would be able to reduce the implicit subsidy it provided to these utilities. Finally, the IGF supported the URA by offering a powerful incentive (FASA funding) for the eight SAAS on Santiago to agree to join in the corporatized AdS. In addition, both components of the IGF (FASA and FAS) were intended to improve access to water and sanitation for households and help strengthen utilities (including AdS). Finally, the IEC components of all three activities were intended to improve the population's knowledge about the importance of clean drinking water, proper hygiene, and sanitation, and to change attitudes about the importance of paying for water and sanitation services so that the increased access generated by the project could be sustained even after the compact ended.

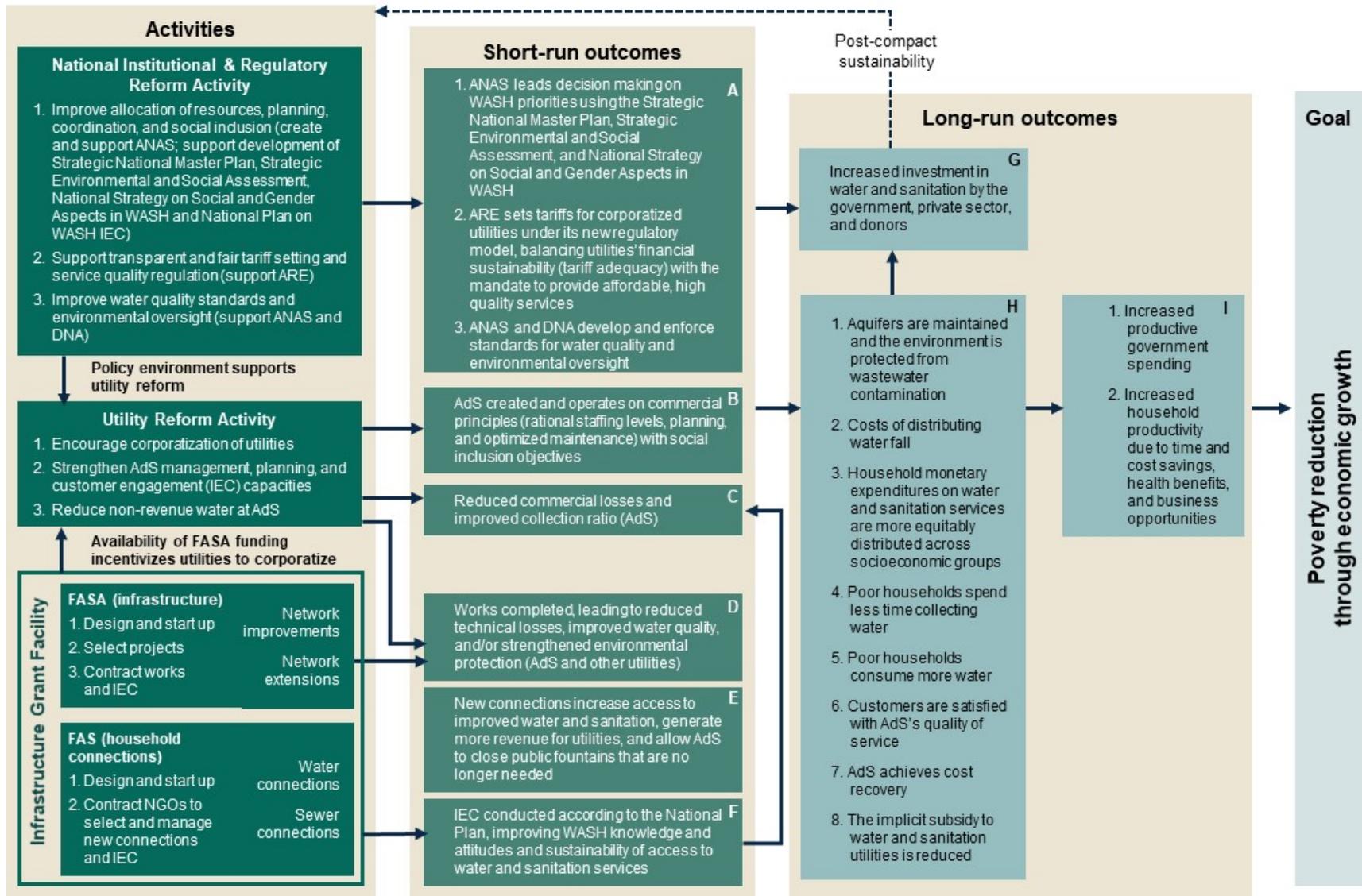
Together, the outcomes of the three WASH project activities were envisioned to lead to a financially sustainable and effective AdS that would provide a high level of service to customers on Santiago. Reductions in the levels of non-revenue water would reduce the cost of distributing water, and the new water tariff set by the Economic Regulatory Agency (*Agência de Regulação Económica*, or ARE¹⁰) for AdS was intended to distribute these costs more equitably across households so the poor would no longer pay more per unit of water consumed (either in monetary terms or in terms of the time they spent collecting water).¹¹ As AdS gradually became financially sustainable, the implicit subsidy¹² provided by the government would be reduced. Improved management and efficiencies of AdS would attract new investment in the WASH sector because the financial and social returns would be greater than they were before these improvements. This increased investment would then promote the sustainability of the processes put in motion by the WASH project.

¹⁰ After the evaluation was conducted, ARE was renamed Agência Reguladora Multissetorial da Economia (ARME) when regulation of the communication sector was added to the agency's responsibilities.

¹¹ Before the WASH project, many households that were not connected to a piped water network purchased water from public fountains or tanker trucks, often at a higher price per liter than piped water cost.

¹² Funding provided by the government through a channel that is not easily identifiable (such as budgetary support to the municipality) to cover the difference between a utility's costs and operating revenue.

Figure II.2. WASH project logic



Ultimately, the government could redirect the funds it spent on the implicit subsidy to productive spending, thereby stimulating the economy and alleviating poverty. At the household level, the lower cost of water (enabling poor households to consume more water) and the improved quality of service should allow households to be more productive by freeing up time and money for education or for income-generating activities and decreasing the amount of time lost to diarrheal diseases. All of those project benefits should directly work to lower poverty levels.

B. Highlights from recent additions to the literature

To situate the findings of the WASH project evaluation in the broader literature, we highlight some of the most recent evidence related to the project's activities, in particular, consolidation of water utilities (as achieved by the URA via the creation of AdS as a multi-municipal utility) and water utility performance in Africa. Please see the evaluation design report for a more thorough review of the literature through 2017 (Null et al. 2018).

Consolidation of water services. A report released earlier this year by the US Water Alliance and the University of North Carolina at Chapel Hill synthesizes the body of evidence on financial outcomes possible with water utility consolidations based on the experience of eight communities in the U.S. While the context is quite different from Cabo Verde, the report identifies the following potential benefits from water utility consolidation that might be relevant for AdS: (1) economies of scale and operating efficiencies (2) increased access to capital at a lower cost; (3) lower or equal customer rates for a specified level of service; (4) revenue stability; (5) reduced exposure to regulatory penalties; (6) improved planning and risk management; and (6) increased opportunities for economic development.

Utility performance. A recent World Bank report looked into how utilities in Africa are performing using a data panel of about 120 utilities in low-and middle-income African countries. The report finds that while many water utilities are focused on expanding access, they have been unable to keep pace with the maintenance of aging infrastructure and increasing demand. While Cabo Verde was not included in the report, it shares many of the same performance issues faced by other African utilities. Relevant themes from the report include (1) intermittent supply results in significantly lower levels of consumption per capita, thereby also affecting utilities' revenue base; (2) high operating and maintenance costs per cubic meter of water produced are correlated with lower utility performance; (3) high quality economic management is positively correlated with better utility performance; (4) large governments investments will be need to improve water coverage in Africa; (4) affordability remains a big issue for residential customers and while cross-subsidization may help, higher water tariffs charged to commercial customers should not exceed the costs of alternative water sources, otherwise utilities risk losing these customers (van den Bergy and Danilenko 2017).

C. Overview of the evaluation questions and design

The evaluation of the WASH project was designed to measure the different effects of the project, identify reasons why the expected outcomes were or were not realized, assess how the different activities worked in synergy, and gauge whether outcomes are sustainable. MCC charged the evaluation with answering the following research questions:

1. Were the Activities/Sub-Activities implemented as designed? What were implementation challenges and successes?
2. Is there evidence that the interventions have resulted in the outcomes outlined in the program logic?
3. How did the political and economic incentives of different sector actors affect the implementation, sustainability, and efficacy of the WASH project? In particular, how did these incentives affect the reform portfolio, and the effects of the WASH project on customers, utilities, and the management efficiency of the sector?
4. a) Has the FASA mechanism efficiently selected the most effective, high quality projects as measured by the effects of the FASA projects on the socioeconomic well-being of households, the finances and management of the utilities, economy value-added and business and household productivity? b) Is the FASA a sustainable institution in Cabo Verde that is and will catalyze additional financing for WASH infrastructure?
5. a) Was the tariff reform outcome pro-poor (progressive), regressive, or neutral in Santiago? b) Does the current tariff structure allow for cost-recovery by Águas de Santiago?
6. Was the WASH project as a whole effective at increasing the management efficiency and sustainability of the sector as measured by non-revenue water, collection ratio, and tariff adequacy? At reducing the [implicit] subsidy to the WASH sector at the municipal and national level?
7. What has been the effect of the WASH project on access to, quality and continuity of, and total costs of (direct and indirect) water and sanitation services for households and businesses in Cabo Verde? On gender and social equality in access to and cost of water and sanitation services?
8. How do the FASA and FAS projects' effects on these outcomes compare?

To answer these questions, Mathematica is conducting a mixed-methods performance evaluation of the WASH project. The first component is a **process evaluation** of all three project activities. Interviews, project documents, and administrative records will be used to document how each activity was implemented, how implementation was influenced by the context (including the incentives different actors faced and the characteristics of the individuals and institutions involved in the project), how the three activities reinforced each other, and the potential for the project's effects to be sustainable.

The second component of the evaluation is a set of **quantitative analyses** using household survey data from Santiago and secondary administrative data to explore the effects of all three project activities on households and utilities. At the household level, the quantitative analyses explore access to water and sanitation services, the quality of these services, WASH behaviors, expenses on WASH services, and outcomes related to household productivity. We use baseline household survey data collected before the compact and primary household survey data collected for the evaluation about six months after the end of the compact (and the conclusion of most project activities) to estimate the combined effects of the NIRR and URA on Santiago, using a household sample that is representative of the whole island's population. We also estimate the additional benefits of FASA and FAS for Santiago households that live in the FASA project zones or received subsidized household connections to the piped water network through FAS by oversampling neighborhoods in FASA project areas and complementing the representative sample with a separate survey of FAS beneficiaries. Whenever possible, we compare changes over time, but for outcomes without comparable baseline data we present only the estimates from this interim round of the evaluation; the final report will include more pre-post analyses comparing changes between the interim and final evaluation rounds for outcomes on which baseline data are not comparable.

In addition to the survey data, we draw from 2018 billing and payments data obtained from AdS for a subsample of surveyed households to determine whether the water tariff reform was good for the poor. We also use 2018 operational data provided by AdS to describe how measures such as the number of connections to the network, the bill collection rate, and the volume of technical losses (i.e. leakage) have changed over time. Finally, we use data from ultrasonic water meters¹³ temporarily installed alongside AdS's meters in a sample of Praia households to measure water consumption and assess the meters' accuracy.

The third component of the evaluation is a set of **case studies of FASA projects**. Using data from the process evaluation plus additional interviews, focus group discussions, and a document review, we explore the rationale, implementation, challenges, and results of three FASA projects that represent the diversity of the portfolio.

In Table II.2, we summarize the different data sources we used to evaluate each of the project activities during the interim round. Please see the evaluation design report for details (Null et al. 2018).

¹³ Ultrasonic meters measure the velocity of a fluid with ultrasound to calculate volume flow, so they can measure water consumption more reliably than mechanical household meters, which are pushed by the flow of water or air through the network.

Table II.2. Interim evaluation data sources and outcomes

Data source	Activity				Outcomes
	NIRR	URA	FASA	FAS	
Document review	X	X	X	X	<ul style="list-style-type: none"> • Implementation process, successes, and challenges
Stakeholder interviews (2018)	X	X	X	X	<ul style="list-style-type: none"> • Implementation process, successes, and challenges • Prospects for sustainability
Beneficiary focus group discussions (2018)		X	X	X	<ul style="list-style-type: none"> • Implementation process • Beneficiary perspective on outcomes
Representative household survey (2011 and 2018)	X	X	X	X	<ul style="list-style-type: none"> • Poverty status (to determine tariff's regressivity or progressivity) • Use of public water network and non-piped water • Water consumption • Sanitation facilities and practices • Expenditures on water and sanitation • WASH knowledge, hygiene practices, and diarrhea prevalence • Awareness of FASA projects
FAS survey (2015 and 2018)				X	<ul style="list-style-type: none"> • Household connections and water sources • Sanitation facilities • Water consumption and expenditures • WASH behavior and health
AdS operational data (2018)	X	X			<ul style="list-style-type: none"> • Non-revenue water volume • Collection ratio • Connections to public network • Public fountains in operation • Ratio of staff to volume of water supplied • Operating costs • Value of implicit subsidy
AdS billing and payment data (2018)	X	X		X	<ul style="list-style-type: none"> • Water consumption • AdS billing performance • Tariff's regressivity or progressivity
Ultrasonic and AdS meter data (2019)		X			<ul style="list-style-type: none"> • Water consumption • Meter accuracy

D. Objectives of the interim evaluation

The interim evaluation in this report has four main objectives. First, we document how the WASH project was implemented and present evidence on the extent to which project activities appear to have influenced key outcomes of interest at the utility and household levels in the relatively short run (that is, in the first year after the project ended).

Second, this report provides stakeholders in Cabo Verde with an independent assessment of the effectiveness of the WASH project and early evidence that could help attract more donors and/or identify potential risks to the sustainability of the institutional reforms and infrastructure. One component of the evaluation that is particularly urgent for policymakers in Cabo Verde is the question of whether the new water tariff structure is progressive (advantaging the poor), regressive (advantaging the rich), or neutral. To date, ARE and AdS have not had the data they need to determine whether the new water tariff set by ARE for AdS is achieving the objective of providing affordable piped water to all of the island's residents without jeopardizing the new utility's financial health.

Third, this report adds to MCC's portfolio of evaluations of urban WASH projects (including a recently completed evaluation in Tanzania and ongoing evaluations in Jordan and Zambia) and bolsters the sparse literature available to governments, donors, and utilities that are considering activities similar to those that made up the WASH project in Cabo Verde. Key contributions to the literature include this evaluation's findings on topics such as changes associated with the transition from government provision of water and sanitation services to a corporatized MMU, strategies for helping poor households get connected and stay connected to the network, and the potential for infrastructure grants to incentivize reforms.

Finally, the findings from this interim evaluation will be used to refine the data collection approach and instruments for the end-line round of the evaluation, to be conducted in 2021.

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III. DATA SOURCES AND ANALYSIS METHODS

The evaluation is based on several primary and secondary data sources. For primary data collection, Mathematica partnered with *Afrosondagem*, a local data collection firm in Cabo Verde. Mathematica worked closely with Afrosondagem to train both qualitative and quantitative enumerators and oversee the data collection process. Mathematica staff traveled to Cabo Verde to oversee trainings of both types of enumerators in April 2018, which included classroom instruction and conducting mock surveys for quantitative enumerators and mock interviews and focus groups for qualitative enumerators. The field work began immediately following the training workshop, and lasted around two months (with some exceptions noted below).

The rest of this chapter describes the data sources for the evaluation, including qualitative data from project documents, interviews with implementers and stakeholders, and focus group discussions with beneficiaries (Section III.A); two rounds of data from a household survey whose sample was representative of the population of Santiago, collected in 2011 before the compact and in 2018 for this interim round of the evaluation (Section III.B); two rounds of data from household surveys of FAS beneficiaries, collected in 2015 before the activity and in 2018 for this interim round of the evaluation (Section III.C); operational, billing, and payment data that AdS shared with us (Section III.D); and data from the ultrasonic meters that were temporarily installed for the evaluation (Section III.E).

A. Qualitative data

This section describes the qualitative data sources and analytic approach for the evaluation. The qualitative data include interviews and focus group discussions; project, government, and utility documents; and project monitoring data that describe program implementation, challenges, and successes for all project activities. The qualitative data enable us to explore how, why, where, and for whom the estimated changes in outcomes took place at the end of compact. We also viewed the same data through the lens of a political economy analysis to understand how the agents, institutions, and enabling environment interacted to facilitate or hinder the reform process.

1. Data sources

Primary qualitative data. Table A1.1 in Appendix 1 summarizes the final list of respondents, data collection methods, and number of interviews or focus groups; and also lists the project activities, evaluation questions, and main interview topics that were addressed during the primary qualitative data collection for the process evaluation. Below, we describe the different types of respondents, the number of interviews and or focus group discussions we conducted with each type of respondent, and a short description of the main topics covered with each type of respondent. The Mathematica team, working with the local data collection firm, conducted a total of 62 interviews and 18 focus groups for this interim round of data collection.

- **MCC and MCA-CV staff and consultants (11).** We interviewed 7 MCA-CV staff: engineers, monitoring and evaluation staff, the director for the WASH activities, social and gender inclusion specialists, and executive managers. We conducted 2 interviews with MCC staff in Cabo Verde and 2 interviews with consultants hired by MCC to help with compact oversight. The interviews helped us understand the design and implementation activities, implementation timeline, and perceptions about key outcomes. Information from MCA-CV is integrated into both the process evaluation and the case studies.
- **Stakeholders in national government ministries (6).** The Ministries of Health, Finance, Agriculture and the Environment, and Foreign Affairs all continue to play key roles in the water and sanitation sector. These ministries are responsible for providing financing to WASH, managing the sector, and negotiating with the donor community. We interviewed 6 senior staff for information on changes in the roles and responsibilities of respondents and the ministries they represent, perceptions of the new institutions and policies, factors that facilitated or inhibited the institutional changes and new policies, new developments that could influence the same outcomes that the WASH project is targeting, and changes in government spending that could be linked to the project.
- **Stakeholders involved in compact design (2).** We interviewed 2 other stakeholders involved in compact design. These stakeholders were hired as both local and international consultants to support the Government of Cabo Verde in the negotiation and design process. Their interviews helped us understand the original goals for the compact and the political environment it was designed in.
- **National Institutions Technical Assistance (NITA) and Assistência Técnica à Águas de Santiago (ATAS) (5).** NITA and ATAS played a large role in helping Agência Nacional de Água e Saneamento (ANAS) and ARE, and AdS, respectively, to operationalize the policies developed under the WASH project. Our interviews with these staff revealed their unique perspectives on the strengths and weaknesses of the institutions they supported and the feasibility of the WASH project's logic.
- **National Agency for Water and Sanitation (Agência Nacional de Água e Saneamento, or ANAS) (1).** We interviewed a senior manager at ANAS to learn about the agency's activities and interactions with other stakeholders. The interview also deepened our understanding of how ANAS uses the Master Plan to make decisions about WASH priorities; how ANAS works with the ARE and the General Directorate of the Environment (*Direção Nacional do Ambiente*, or DNA) to use instruments developed under the compact to create new regulations and standards to monitor the WASH sector (including utilities); whether roles and responsibilities are clear to the different government organizations, and especially whether the respective responsibilities are clear between ANAS and ARE; whether ANAS is becoming politically and financially sustainable; the extent to which the organization can carry out its role in the absence of technical assistance; and new developments that could influence the same outcomes that the WASH project is targeting.
- **ARE (2).** We interviewed 2 senior staff at ARE who were responsible for leading the tariff-setting process for water and sanitation services to understand how tariffs are set, the

agency's relationships with ANAS and the utilities ARE regulates, and their perceptions of whether the new tariff structure for AdS is advantageous for the poor.

- **AdS (2).** We interviewed 2 senior staff responsible for operating the network and for AdS's customer relations to understand how the new utility is evolving, how much it is able to use commercial principles in operations, and how strongly it is guided by social inclusion considerations. We also discussed the financial sustainability of AdS and AdS's relationship with ELECTRA.
- **ELECTRA (1).** As the producer of a large share of water in Santiago, ELECTRA still plays a pivotal role in the WASH sector even after the creation of AdS, because the new corporatized utility is still dependent on ELECTRA for its most important input. We interviewed a representative of ELECTRA to understand the business and financial relationship between AdS and ELECTRA, and how this influences the quality of service AdS provides and the two utilities' prospects for financial sustainability.
- **Santiago municipal government leaders and former SAAS¹⁴ staff (13).** We interviewed 7 former SAAS staff and 6 current municipal council members on Santiago island to discuss the process of creating AdS, the role of FASA funding in incentivizing them to join AdS, their perceptions of how corporatization has affected the quality of service provision and household access to and use of water on the island, and how the trends they observed might continue to evolve.
- **FASA and FAS implementers (12).** We interviewed 10 representatives of the construction companies (project directors), recipient utilities (CEO or directors), and NGOs (project directors) that implemented the FASA and FAS projects to get in-depth information on project design and implementation (including targeting of FAS subsidies); how the projects supported improved access to water; quality of service (FASA only); and decreases in non-revenue water.
- **Maio SAAS (1).** Águas do Maio is being created as an extension of the URA activity, and serves as an example case of corporatization's potential to improve the service quality and financial sustainability of utilities on other islands. We interviewed a senior staff member of the SAAS on Maio who worked to create AdM, helping to illustrate the incentives to corporatize and other themes similar to the ones we covered in our interviews with AdS representatives.
- **Maio municipal government (1).** As the first island to decide to corporatize its SAAS following the example of AdS, Maio has important input to offer on the factors influencing its decision. We were able to interview one municipality staff member to explore the motivation to corporatize (including availability of FASA funding); the expected and perceived effects for the government, utility, and households; steps in the corporatization process; challenges encountered or anticipated and their possible solutions; and contextual factors that could influence the process or effects of corporatization.

¹⁴ Mathematica planned to conduct focus group discussions with SAAS and municipality members. However, conflicting schedules and location issues kept the local data collection firm from bringing members together. We worked with the data collection firm to change from focus groups to interviews.

- **Project-specific beneficiaries (4).** We interviewed members of 4 organizations, including staff from the Praia airport management, the Chamber of Tourism in Sal, agricultural producers on Sal, and staff from Águas de Ponta Preta (APP), a local utility on Sal. These interviews focused on collecting data for the individual case studies, and the themes are detailed in Appendix Table A1.1.
- **LuxDev (1).** We spoke with a senior staff member at this donor agency that is providing continuing technical assistance to ANAS and helping to establish the new incarnation of the FASA in the post-compact period; the goal was to assess the sustainability of these two project activities.
- **Household focus groups (18).** We conducted 12 focus groups on Santiago, 2 focus groups on São Vicente, 2 focus groups on Maio, and 2 focus groups on Sal. The purpose of these household focus groups was to understand the effects that changes in the water sector—including the new tariffs and the switch from the former service providers to AdS and possibly to a new corporatized utility on Maio—have had on households. In all the focus groups, we explored issues such as choices in water sources, the cost of water from different sources, the benefits of having access to the piped network, quality of service, time use, and other aspects of household productivity such as health, schooling, and income-generating activities. We also conducted two focus groups on Sal about sanitation. The groups varied depending on whether they were eligible for or received FAS or FASA support (or both); their location on the island; and the type of water source (piped versus public fountains).

Secondary qualitative data. To inform and complement primary qualitative data collection, we conducted an extensive review of compact documents and reports produced by MCC, MCA-CV, and consultants to both organizations; national assessments and strategy documents; quarterly and final reports from technical assistance providers; implementation and evaluation documents from project implementers as well as monitoring organizations; and legislation resulting from the WASH project. Table III.1 summarizes types of documents we reviewed; more detail is provided in Appendix Table A1.2.

Table III.1. Key documents reviewed for secondary data collection

Topics	Key documents reviewed
Compact	<ul style="list-style-type: none"> • Compact agreement • Constraints analysis • Compact economic rate of return spreadsheet • M&E plan, indicator tracking table, post-compact annual summary • Project risk register • Trip reports (MCC and consultants) • Compact completion report (MCA-CV) and Star report (MCC)
NIRR	<ul style="list-style-type: none"> • NITA RFP • National Strategic Plan for Water and Sanitation and associated reports • Legislation to create CNAS and ANAS • The 2015 water code • NITA reports

Topics	Key documents reviewed
URA	<ul style="list-style-type: none"> • ATAS RFP • ATAS reports • Workshop documents
IGF: FASA	<ul style="list-style-type: none"> • FASA operations manual • FASA project RFPs and scores • Reports from contractors and evaluation firms • FASA economic rate of return spreadsheets
IGF: FAS	<ul style="list-style-type: none"> • FAS operations manual • FAS implementer applications and selection memo • FAS final reports

2. Approach to data collection and analysis

All interviews and focus groups were recorded and transcribed in Portuguese by each enumerator. The files were then sent to a translation firm for conversion to English. Mathematica staff (including a local consultant) conducted the interviews with high-level national stakeholders, MCA-CV interviews, and interviews with NITA and ATAS representatives. Transcribed and translated files were sent to Mathematica on a rolling basis over a period of about three months. Mathematica staff read through a sample of the Portuguese and English interviews to verify the transcription and translation process.

After receiving the majority of the translations, our team reviewed the data to assess the quality of the transcripts. We developed an initial codebook and created the coding scheme in NVivo. As a first step, we read through the transcripts and project documents. We then coded transcripts using topics aligned with the evaluation questions and project logic and ran queries, both thematically and using cross-tabulations, to understand findings across key stakeholders and different focus group participants.¹⁵ Whenever possible, we triangulated our qualitative findings across different interview groups and complemented our findings with MCC's indicator tracking table (ITT) data or administrative data from our document review.

Our next step was a contribution analysis, building on the triangulation process and using our logic model as the framework against which to assess the preliminary short- and medium-term outcomes. We consolidated both numerical and non-numerical evidence on activities implemented, outputs, and outcomes, and on assumptions underlying the results chain shown in the logic model. We then examined the strength of the evidence supporting the achievement of outputs and outcomes and linkages, giving considerable weight to stakeholders' perspectives on the program's contribution or influence, as well as evidence of the influence of other factors on outcomes (Mayne 2008).

¹⁵ Some transcripts which only contributed to one set of analyses (for example, interviews with project-specific beneficiaries for the case studies) were summarized rather than coded.

Finally, we conducted a separate political economy analysis (PEA) to understand how institutions are changing, the changes that are happening as a result of the social inclusion aspects of the NIRR and URA, and the sustainability of the reforms. The findings from the PEA are integrated as a sub-section of the process evaluation. We used a combination of USAID’s political economy analysis tool (found at usaidlearninglab.org) and DFiD’s Drivers of Change framework (DFiD 2009) to bring the PEA lens to our findings. Our PEA presented in this report examines (1) how power and resources were distributed and contested during implementation of the WASH project and (2) the implications of these dynamics for the evolution of AdS and the government agencies involved in the NIRR, and (3) the development, selection, implementation, and integration of FASA projects into existing networks.

B. Representative household survey

In 2011, before the compact, MCC funded the *Instituto Nacional de Estatística* (INE)—Cabo Verde’s national statistics agency—to conduct a household survey on Santiago to establish baseline demographic and WASH conditions. The survey sample of 999 Santiago households was designed to be representative of the island’s population once sampling weights were applied. Details on the sampling process and methodology for constructing the weights for both rounds of representative household survey data are in Appendix 2.

The 2018 interim survey, a repeated cross-section conducted about six months after the compact ended and most project activities were finished, is based on a randomly selected sample of 998 households that will be representative of the island’s population once weights are applied. Because of the need to characterize outcomes in FASA project areas, the 2018 interim survey sample was stratified by FASA project status. We included many of the same questions that were administered in 2011, as well as additional questions to explore exposure to, and effects of, aspects of the WASH project (see Table III.2).

Table III.2. Topics included in the 2018 interim household survey

Survey domain	Key topics covered
Identifying information, household demographic and socioeconomic characteristics	<ul style="list-style-type: none"> • Geographic information • Housing status, type and characteristics of dwelling • Asset ownership* • Household roster including age, education, employment status,* and time use* of household members • Household income and expenditures • Participation in economic activities that rely on water
Water sources and practices	<ul style="list-style-type: none"> • Water sources, including connections to the piped network • Satisfaction with water sources • Water collection and expenditures • Water storage facilities and practices • Water treatment practices
Sanitation facilities and practices	<ul style="list-style-type: none"> • Types of sanitation facilities, including connections to the sewer system and sharing of sanitation facilities • Sanitation practices, including pit emptying and disposal of children’s feces

Survey domain	Key topics covered
Piped water and sewer service	<ul style="list-style-type: none"> • Reasons for connecting or not connecting to the network* • Disconnections from the network* • Water availability and disruptions in supply • Utility response to connection problems* • Satisfaction with the public water system and the utility • Knowledge of water and sewer improvements*
Water and sewer billing	<ul style="list-style-type: none"> • Whether household receives a bill • Bill payment behavior* • Knowledge of billing practices and prices*
Water and sanitation messages and groups	<ul style="list-style-type: none"> • Exposure to WASH messaging, including the types of messages and sources
Health outcomes	<ul style="list-style-type: none"> • Prevalence of diarrhea among children younger than age 5 • Time spent caring for children with diarrhea* • Knowledge of causes of diarrhea • Handwashing behavior
Meter observation and consent to access billing records and meters	<ul style="list-style-type: none"> • Observations of water bill* • Consent to obtain billing data from the utility and to install ultrasonic meters to measure water consumption*

* indicates new topics that were not included in the baseline survey.

In general, the two rounds of the representative survey were comparable, although there are a few notable differences related to timing, question wording, and the questions that were included. There is no record of the months in which the 2011 compact baseline was conducted. The 2018 interim survey was conducted between mid-April and early June. (A revised water collection roster was administered between February and May 2019.¹⁶) It is difficult to know if seasonality could account for any differences between the two rounds; for example, there are some sources that households can only collect water from during rainy periods.

Most questions in the 2018 survey were based on questions that were either in the 2011 baseline survey or in the 2015 FAS baseline survey (see below), but the wording of many questions differed between those two surveys. We aligned the 2018 question wording with the wording in the 2011 survey if the outcome was expected to be more relevant for the representative sample analysis, whereas we aligned other 2018 questions with the 2015 survey if they were on topics especially relevant for the analysis of the FAS intervention. For some key outcomes, we asked a similar question two ways in order to replicate the wording in both baseline surveys. We tried to have the questions match as much as possible, but needed to make some revisions in order to ensure the accuracy or precision of the data. In some cases, these edits could have affected the responses. Also, in some cases, survey data anomalies point to likely differences in survey implementation even when questions appear to be similar, so we have flagged these cases in the findings and present only descriptions of outcomes at follow-up. In other cases, we have added

¹⁶ We administered a revised water collection roster because there were problems with the survey skip patterns in the roster originally administered during the main 2018 interim survey. The revised roster also included additional questions about the most recent trips taken by each household member to collect water.

questions to the survey based on our research questions, but no data on these outcomes are available from the baseline survey.

In cases where data are comparable between the 2011 and 2018 rounds of representative data collection, we use a regression framework to present a pre-post analysis of the change in outcomes between years, weighting to account for different probabilities of selection in different sampling units (census enumeration areas), and clustering standard errors by enumeration areas. In cases where data were collected on relevant outcomes in 2011 and 2018, but question wording between surveys was not comparable, we present descriptive statistics for both years, but do not give a statistical pre-post analysis. When baseline data were not available or sufficiently comparable, it is not possible to determine whether the project contributed to any changes in these outcomes.

Some outcomes of interest are presented by respondents' poverty status. We based our definition of poverty on INE's definition of relative poverty from its 2015 survey on household income and spending. INE defined relative poverty as household expenditures of less than 60 percent of the national median, and extreme relative poverty as expenditures of less than 40 percent of the median. Because our analysis is focused on Santiago, we used a threshold of the median expenditure on Santiago in each survey year instead of using the national median. We used appropriate weighting to calculate medians (described in Appendix 2).¹⁷

C. FAS beneficiary survey

In 2015, MCA-CV funded a baseline survey of (1) 1044 households expected to become FAS beneficiaries and (2) 583 households in comparison neighborhoods on the island of Santiago.¹⁸ The survey was conducted a few months before the households were expected to receive their subsidized water connection and/or improved sanitation (either a septic tank or a connection to the sewer network). In order to be eligible to receive FAS benefits, households had to be poor¹⁹ and not already have both a water and sewer connection. Households that had existing debt with ELECTRA, the power utility that was also the water utility for Praia at the time, were disqualified from receiving benefits. In addition, to qualify for the FAS, households needed to make a contribution toward the cost of connecting to the public network.

Ultimately, not all households that were expected to receive a subsidized connection at the time of the 2015 baseline survey ended up being eligible. In order to meet their targets for the numbers of beneficiaries, the implementing NGOs ended up enrolling some households in neighborhoods that had initially been designated as comparison areas.

¹⁷ In practice, median expenditures were very similar between 2011 and 2018, and there was very little inflation, so we have no concerns about the poverty threshold being different in the two years.

¹⁸ As described in the Evaluation Design Report, there were important differences in the observable characteristics of the beneficiary and comparison households in the 2015 FAS baseline survey, so we never intended to use a comparison group design.

¹⁹ The FAS considered a household poor if it met at least one social and one economic vulnerability criterion outlined in the FAS operations manual.

When developing the sample frame for the 2018 FAS follow-up survey, we attempted to include all households we could identify on the NGOs' beneficiary lists who had been interviewed in the 2015 FAS baseline survey, regardless of whether the household was expected to be a beneficiary or a comparison household at the time of the 2015 survey. Our sampling frame included 786 households, of which 7 percent were in the intended comparison group.

The target sample size for the 2018 follow-up survey was 435 dwellings, based on power calculations aimed at detecting changes between 2015 and 2018 in water consumption and in the time spent collecting water. We initially drew a simple random sample of 435 beneficiaries from the list of names we were able to match between the baseline data and the implementing NGOs' beneficiary lists; however, because Afrosondagem was unable to find many selected households, we drew additional households to reach the target. Ultimately, we attempted to survey 570 households, and 425 surveys were completed.²⁰

We initially attempted to match households surveyed in 2018 to households surveyed in 2015 to create a panel dataset of beneficiaries. Afrosondagem worked with the NGOs' former community mobilizers to locate the sampled households, but because there are many common names in Cabo Verde, many of the households sampled in 2018 were not the same households that had been surveyed in 2015 although they were also FAS beneficiaries; this did not become apparent until we began the analysis and compared households' characteristics between the two rounds of data.²¹ We were not able to create a panel dataset of beneficiaries but we can still use the two rounds of survey data as repeated cross-sectional survey samples.

For 2015, we focused on our analysis on 826 households that (a) lived in neighborhoods expected to benefit from the FAS, (b) were not designated as sanitation-only beneficiaries, and (c) did not have a sewer connection in 2015.

In 2018, we focused our analysis on 361 households from the NGOs' beneficiary list. We excluded households that likely did not receive FAS benefits, such as households that might have been included on beneficiary lists in error or that might have been interviewed in error: specifically, we excluded 34 households that had been connected to the piped water network before 2014, 11 households that indicated that they were not FAS beneficiaries, 14 households that were not (and had never been) connected to the piped water network, and 5 households that

²⁰ We originally intended to survey whoever now lived in a dwelling that had received a FAS subsidy, but since the implementing NGO did not keep records such as AdS customer IDs or GPS coordinates of the beneficiary households that could be used to locate beneficiaries, we could only look for individuals who were on the list of beneficiaries. If the beneficiary household no longer lived in the dwelling where they had received the FAS subsidy, we did not have a way of identifying the dwelling in order to survey whoever lived there at the time of the 2018 data collection.

²¹ Baseline survey data and beneficiary lists from implementing NGOs were matched based on names and phone numbers because there were no ID codes to match households between the survey data and beneficiary lists. Names and phone numbers did not match perfectly between the baseline survey and the NGOs' lists. These data issues were not known at the time of the design report.

indicated that they had only received FAS sanitation benefits.²² Households reporting that they received a subsidized connection but had since been disconnected were included in the analysis, so not all households in the FAS sample were receiving piped water at the time of the 2018 follow-up survey.

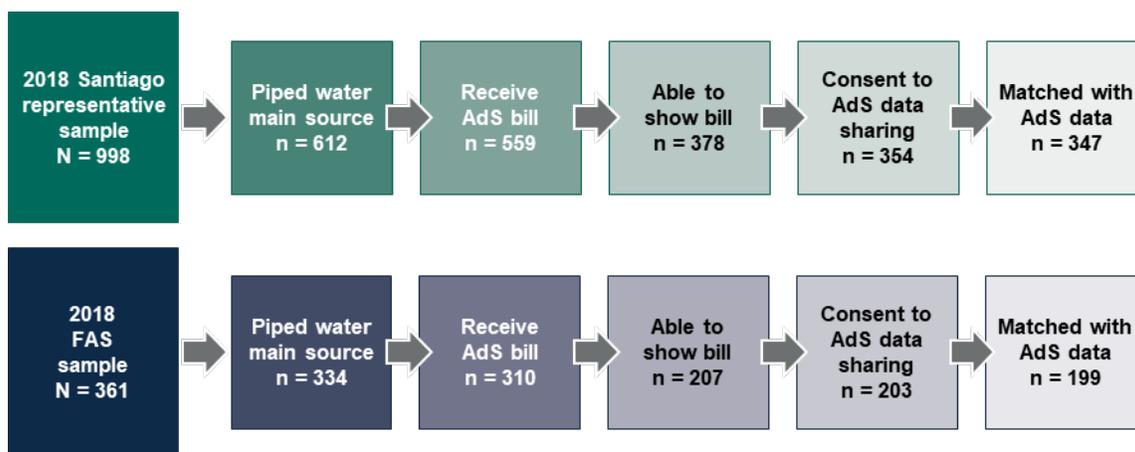
We used the same survey instrument to interview households in the 2018 FAS follow-up sample that was used for households in the representative sample, which in turn closely resembled the 2015 FAS baseline survey instrument. The 2018 FAS survey was conducted between April and June 2018 and the 2015 FAS survey was conducted between April and August 2015, so it is unlikely that seasonality would explain any differences between the two survey rounds.

Unfortunately, we have no way of quantifying how our sample of FAS beneficiaries differs from the population of FAS beneficiaries on Santiago, and thus no means of weighting our data to be representative. Beneficiaries were added to the FAS beneficiary list after the 2015 baseline, and according to staff at MCA-CV and the implementing NGOs, it is quite likely that these beneficiaries differed in systematic ways from the households included in the 2015 baseline. (Households that enrolled in the program later were probably more affluent.)

D. AdS billing and payment data

We obtained consent from a subsample of households surveyed during the interim round to access their billing and payment data from the AQUAmatrix database used by AdS. The subsample of 2018 interim survey households with AdS includes 347 households (out of 998) from the representative sample and 232 (out of 412) from the FAS beneficiary sample. As shown in Figure III.1, this subsample consists of households that indicated during the 2018 survey that the public network was their primary source of water, and that they received an AdS bill (as opposed to AdS not sending them a bill or the bill being sent to a landlord or a relative). Additionally, at the time of the survey a household had to be able to show its AdS bill in order for the enumerator to record its AdS customer number. Finally, the household had to consent to us matching its household survey data with its AdS data. Of the 557 households (across both samples) that provided consent and customer numbers, AdS was able to find 546 households in its database; we refer to this final sample as the households matched with AdS data. The data shared by AdS on these households cover information on water and sanitation bills issued from January to December 2018 and customer payment of bills from January to October 2018. Key billing and payment data shared by AdS are summarized in Table III.3.

²² Because of the weak link between improved sanitation and the long-run outcomes in the project logic, we intended to exclude households that received only subsidized sanitation. However, there were apparent errors in the NGOs' beneficiary list categorizing households' benefit types, and an error in the sampling process was identified during the analysis. Consequently, some households that received only improved sanitation were included in the sampling frame. We confirmed that all households receiving water connections were included in the sampling frame, so the error did not create any bias by excluding any households that should have been included in the sampling frame.

Figure III.1. Details on AdS sample**Table III.3. 2018 Billing and payment data obtained from AdS**

Type of information	Key information
Billing information (January–December 2018)	<p>Prior and current meter readings (used to calculate amount of water consumed)</p> <p>Prior and current meter reading date</p> <p>Bill issuance date</p> <p>Fixed water tariff amount (based on size of water pipes)</p> <p>Variable water tariff amount according to the following three pricing blocks for 30 days of domestic consumption:</p> <ul style="list-style-type: none"> • 200 Cabo Verdean Escudos per cubic meter (CVE/m³) for the first 5m³ consumed • 300 CVE/m³ for the next 6 to 10m³ consumed • 475 CVE/m³ for any water consumed above 10m³. <p>Sewer costs</p> <p>Type of bill: based on meter readings or AdS's estimate of consumption given customer's consumption history</p>
Payment information (January–October 2018)	<p>Bill payment due date</p> <p>Date bill paid by customer</p> <p>Amount paid by customer</p>

For our analysis, we present descriptive statistics on AdS billing and payment information, by households, using the representative and FAS samples. To determine whether the water tariff that ARE allows AdS is progressive (advantaging the poor), regressive (advantaging the rich), or neutral, we focus on the representative sample and compare water consumption amounts in the three different price blocks by poverty status. Without a means of identifying poor households, ARE's solution has been to require AdS to subsidize the first five cubic meters consumed by all customers so that the price of at least a minimal quantity of water is affordable to everyone. Because AdS does not know which of its customers is poor, it is not possible for the utility to determine how much subsidized water is going to customers who aren't poor. Through our analysis we seek to

answer this question, which is of critical importance for AdS’s financial health and the equity goals of the WASH project, particularly as a new social tariff is under consideration.

Because we have AdS billing data for only a subset of households that use their own public network connections (those that had a bill available, allowing us to record their customer ID)—and those households might be different from households we do not have AdS data for—we weighted our analysis of AdS data so that our estimates are representative of all households that use their own public network connections, not just the subset of households for which we have data. To do this, we constructed inverse probability weights that account for differences in key household demographic and socioeconomic characteristics. We construct weights separately for the Santiago representative sample and the sample of FAS beneficiaries.

E. Ultrasonic meter data

One objective of the evaluation is to track changes in water consumption over time, with the goal of AdS being able to provide more water to its customers. As noted, AdS shared customer billing data including monthly consumption, which we use as the primary measure of consumption in our analyses. However, to ensure comparability across time in water consumption as measured by AdS’s customer meters, it is also important to account for any changes in meter accuracy between the two rounds of data collection for the evaluation. Meters could become less reliable with age, or accuracy could improve if AdS were to replace meters between rounds of the evaluation. In addition, data on meter accuracy will allow us to assess the contribution of meter inaccuracy to non-revenue water, because of the revenue lost from meters under-registering water consumption. To assess meter accuracy, we installed ultrasonic meters, a more reliable measure of water consumption, alongside AdS meters in a subset of the households previously surveyed as part of the evaluation and in a new convenience sample of households in Praia.

The data collection from ultrasonic meters took place between September and March 2019 and involved temporarily installing (for about a week) ultrasonic meters in the water line just after AdS’s residential customer meters to measure water consumption and assess the accuracy of AdS meters. The data collector Afrosondagem worked with a plumbing company to install and remove the ultrasonic meters and administer three short surveys during eligibility screening, installation, and meter removal visits to households. During the screening visit, enumerators confirmed the household’s consent to participate in the ultrasonic meter activity, observed the household’s meter to determine if there were any safety or technical issues that would prevent installation of the ultrasonic meter, and scheduled an installation time during a “usual” week for the household (see Table III.4). At the time the ultrasonic meter was installed by plumbers, enumerators recorded the AdS and ultrasonic meter readings, as well as characteristics that could be predictive of the AdS meter’s accuracy, including the meter’s age, model, and any obvious wear and tear. During the removal visit, enumerators recorded the AdS and ultrasonic meter readings and collected household information on water availability and use during the days that the ultrasonic meter was installed.

Table III.4. Ultrasonic meter data

Type of information	Key information
Screening survey	<ul style="list-style-type: none"> • Obtained consent to install ultrasonic meter • Learned about any safety or technical issues that would prevent installation of the ultrasonic meter • Scheduled an ultrasonic meter installation time during a “usual week” for the household
Installation survey	<ul style="list-style-type: none"> • AdS and ultrasonic meter readings at the time of installation • AdS meter age, brand, and model • AdS meter abnormalities • Household characteristics, income, expenditures, and water sources (for convenience sample only) • AdS customer number and consent to link household survey data with AdS billing data (for convenience sample only)
Removal survey	<ul style="list-style-type: none"> • AdS and ultrasonic meter readings at the time of removal • Water availability and use during the installation week • Unusual activities taking place in the household during the installation week • People staying at the household during the installation week • Other households sharing water connection with the household

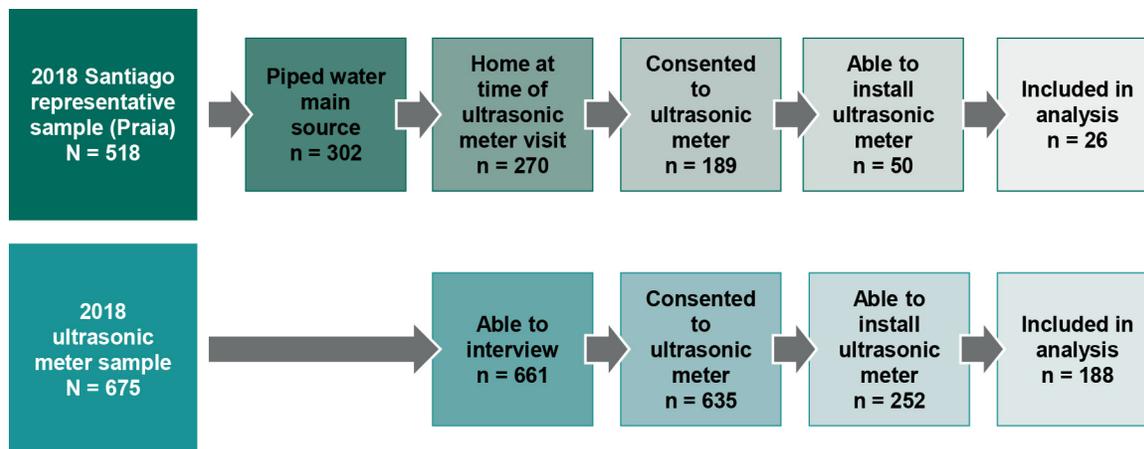
As shown in Figure III.2, Afrosondagem was able to conduct the screening visit with 270 households from the 2018 interim survey that were located in Praia, reported that the public network was their primary source, and were home at the time Afrosondagem’s enumerators visited. Although 189 of these household consented to the installation, it was only possible to install meters in 50 households. The most common installation problems were that there was no way to secure the ultrasonic meter or that there was not enough space to install it. Afrosondagem also attempted to install ultrasonic meters in piped households from the 2018 interim survey that were located outside of Praia, but it was only possible to install meters in 9 of these households. To reach the targeted number of 200 ultrasonic meter installations in Praia,²³ we decided to install ultrasonic meters in a new convenience sample of households located in Praia. Within approximately 25 neighborhoods spread across Praia, Afrosondagem used a random route approach for selecting households to visit for this activity. Afrosondagem visited 661 additional households, and by focusing on Praia, was able to install ultrasonic meters in a total of 252 households.²⁴ For this convenience sample, we added key questions from 2018 interim survey related to household characteristics, income, expenditures, and water sources. We used this

²³ The original target sample size for this activity was 400 households based on power calculations aimed at detecting an increase in water consumption of at least 8.7 liters per person per day between interim and end-line across Santiago. We reduced our target sample size to 200 households since this sample sizes would provide enough power to detect water consumption differences of just less than 9 liters per person per day between interim and end-line in Praia. This minimum detectable effect size was more conservative than the much more ambitious increase targeted in the project’s monitoring and evaluation plan (see Null 2018 for more details of the power calculations).

²⁴ We asked Afrosondagem to exceed our target of 200 ultrasonic meter installation because we were concerned about having to drop some households for which we could not confirm meter readings based on meter reading photos taken by enumerators at the time of installation and removal.

household information to compare and determine how similar these new households are to piped households in Praia from the 2018 representative sample.

Figure III.2. Details on ultrasonic meter sample



Notes: Data from 2018 survey of households in Santiago and 2018–2019 surveys taken at ultrasonic meter screening, installation, and removal. For the Santiago representative sample, Afrosondagem visited all 302 Praia households with a piped water connection to install ultrasonic meters, but was only able to locate respondents in 270 households. Afrosondagem attempted to visit each household from the Santiago representative sample in Praia up to three times before giving up on them. For the new ultrasonic meter sample, Afrosondagem attempted to interview 675 households, but was only able to find an appropriate respondent in 661 households. An appropriate respondent is someone who lives in the house and knows about water usage and billing.

As part of our data quality assurance process, we reviewed all meter reading photos to confirm that meter readings were correctly recorded. After dropping the households that we had data quality concerns about,²⁵ 214 households remained in the sample.

For our analysis, we compare water consumption as measured by AdS and ultrasonic meter readings and present descriptive statistics on the accuracy of AdS meters. Because ultrasonic meters were installed for a period of 5–10 days, we standardize reporting to the equivalent of a 30-day period, scaling readings by the length of time the meter was installed. We also use observable meter characteristics and information on water availability in the neighborhood to predict meter accuracy.²⁶

²⁵ Data quality issues included, among others, an inability to confirm the meter readings with photos taken at the time of installation or removal and cases in which the ultrasonic meter did not register any water flow during the period of installation. Our analysis sample includes 28 households for which we couldn't confirm any of the decimal places in the meter reading through their meter reading photos. Meter accuracy findings are not sensitive to the inclusion or exclusion of these households.

²⁶ To maintain respondent confidentiality, Mathematica will not reveal the AdS client number of households that consent to participate in the ultrasonic meter data collection, nor will Mathematica provide data on the accuracy of specific meters to AdS.

IV. PROCESS EVALUATION

This chapter draws from interviews and focus group discussions; project, government, and utility documents; and project monitoring data to describe program implementation, challenges, and successes for all project activities as of the end of the compact in 2017. The process evaluation considers all eight of the evaluation questions, from implementation successes and challenges and the influence of contextual factors (such as different actors' incentives) on the process and outcome of the reforms, to specific outcomes that the project activities were expected to generate. As the word cloud in Figure IV.1 shows, the most commonly discussed themes across the interviews include water, which was referenced mainly in the context of the importance of access and quality of water in a country facing huge limitations in access and high costs. Participants also discussed the role of new organizations in the sector (such as ANAS and the role of the government), sanitation, and management of the sector.²⁷ In the rest of this chapter, we document each of the

Figure IV.1 Cabo Verde WASH themes word cloud



Key findings

1. **The NIRR activity succeeded in consolidating authority in a few regulatory bodies and in establishing new frameworks to guide policymaking** but there are still some uncertainties about the extent to which ANAS and ARE will fulfill their new roles using the policy frameworks generated through the WASH project.
2. **The URA activity succeeded in establishing a new corporatized, multi-municipal utility to distribute water on Santiago**, although the process took much longer than expected, leaving the new utility with less time to benefit from the technical assistance provided by the WASH project.
3. **The FASA was a very effective funding mechanism for water and sanitation infrastructure**, particularly after switching to design and build contracts for the second tranche of grantees. The GoCV was so pleased with the FASA that it is setting up a new fund with the same operational model.
4. **The FAS helped over 4000 households connect to piped water and improved sanitation.** Information, education, and communication activities were an important complement to subsidies.
5. **Open communication and engagement of key stakeholders are among the most important strategies for an effective reform program**, but it is also clear that financial incentives helped to motivate and expedite the process.

²⁷ Word clouds are images made up of words from a text (or set of texts). The size of the words represents the importance and frequency with which they are used by participants.

major activities of the project. We begin by describing the implementation process, including successes and challenges, then discuss prospects for sustainability.

A. National Institutional and Regulatory Reform Activity

Before 2012, the water and sanitation sector in Cabo Verde was characterized by a lack of information sharing and coordination among key organizations, fragmented authority, lack of incentives to share information, and conflicting legislation (MCC 2016), leading to ineffective planning and inefficient operations. Prior to signing a second compact with the GoCV, MCC requested that the government take some preliminary steps to address these problems. In response, the GoCV improved the legal and regulatory framework; however, it was clear that deeper and more extensive reforms were needed, including restructuring the sector at both the national and municipal levels (MCC 2016). The hope was that the combination of national-level structural and legal reform (NIRR), municipal-level corporatization of water distribution (URA), and funds to expand and rehabilitate infrastructure and help households connect to the network would create a more efficient sector and encourage additional donor funding for the future (FASA and FAS).

The GoCV and MCA-CV had to make important changes to legislation, institutions, and policies to lay the groundwork for success of the compact activities. The NIRR activity involved expanding the functions of some of the existing WASH agencies and creating two new agencies responsible for resource allocation, strategic planning, and coordination within the WASH sector (Box IV.1). The activity sought to create a national framework for a sector that has traditionally been scattered through various government entities at the national and municipal levels. This national framework, detailed in the National Strategic Plan for Water and Sanitation, the Strategic Environmental and Social Assessment, and the National Strategy on Social and Gender Aspects, set in place a new structure by consolidating decision-making and management responsibilities across fewer government entities.²⁸ It also created new laws and regulations to support the new structure. The new and expanded agencies were charged with improving management of the WASH sector by (1) developing policy frameworks and revised legislation to clarify the responsibilities of each entity and define national priorities for spending in the sector, (2) instituting a system for fair and transparent tariff-setting for water and sewer services, and (3) enhancing environmental protection, including regulating waste-water and testing water quality. As detailed in the project logic model, the short-term outcomes expected from the investments in NIRR included (1) ANAS leading decision making on WASH priorities using the National Strategic Plan for Water and Sanitation, the Strategic Environmental and Social Assessment, and the National Strategy on Social and Gender Aspects; (2) ARE setting water tariffs for corporatized utilities under its new regulatory model, balancing the utilities' financial sustainability with the mandate to provide affordable, high quality services; and (3) ANAS and

²⁸ The National Strategic Plan for Water and Sanitation established national guidelines for planning and managing the WASH sector. The document also helps national entities understand how to encourage corporatization of utilities and prioritize investments in the sector. The National Strategic Plan also establishes clear guidelines for protection of the environment and social and gender inclusion, as laid out in the Strategic Environmental and Social Assessment and the National Strategy for Social and Gender Aspects. Criteria in the latter framework help ensure equal opportunity for women and support for social inclusion within organizations and in terms of government support for lower-income families.

DNA developing and enforcing standards for water quality and environmental oversight, including for re-use and protection of marine waters important to Cabo Verde's tourism industry. Figure IV.2 shows the timeline for implementing the NIRR activities. Much of the core work completed under this activity took place between January 2015 and April 2016. This work included submission of the draft water code legislation to parliament (April 2015), publishing of the water code (October 2015), and hiring of staff for ANAS. Although the water code was not passed until September 2017, publication of the code allowed MCA-CV and its government partners to move ahead with implementing the new framework for the sector. The following section discusses the implementation process for the NIRR activity and explores the short-term results at the completion of the compact in 2017.

Box IV.1. Achievements of the National Institutional and Regulatory Reform Activity

National Agency for Water and Sanitation

(Agência Nacional de Água e Saneamento [ANAS]): Newly created agency responsible for policy and planning, includes Social and Gender unit; also serves as technical regulator for water quality.

National Water and Sanitation Council

(Conselho Nacional de Água e Saneamento [CNAS]): Newly created advisory board for ANAS with the fundamental role of preparing policy and legislative proposals to be addressed to the government for decision.

Economic Regulatory Agency *(Agência de Regulação Económica [ARE])*: Existing agency newly empowered to regulate water and sanitation tariffs.

National Directorate of the Environment

(Direcção Nacional do Ambiente [DNA]): Existing agency's responsibilities expanded to include water and waste-water quality oversight.

National Strategic Plan for Water and

Sanitation: Provides guidelines and a detailed plan to guide the water sector.

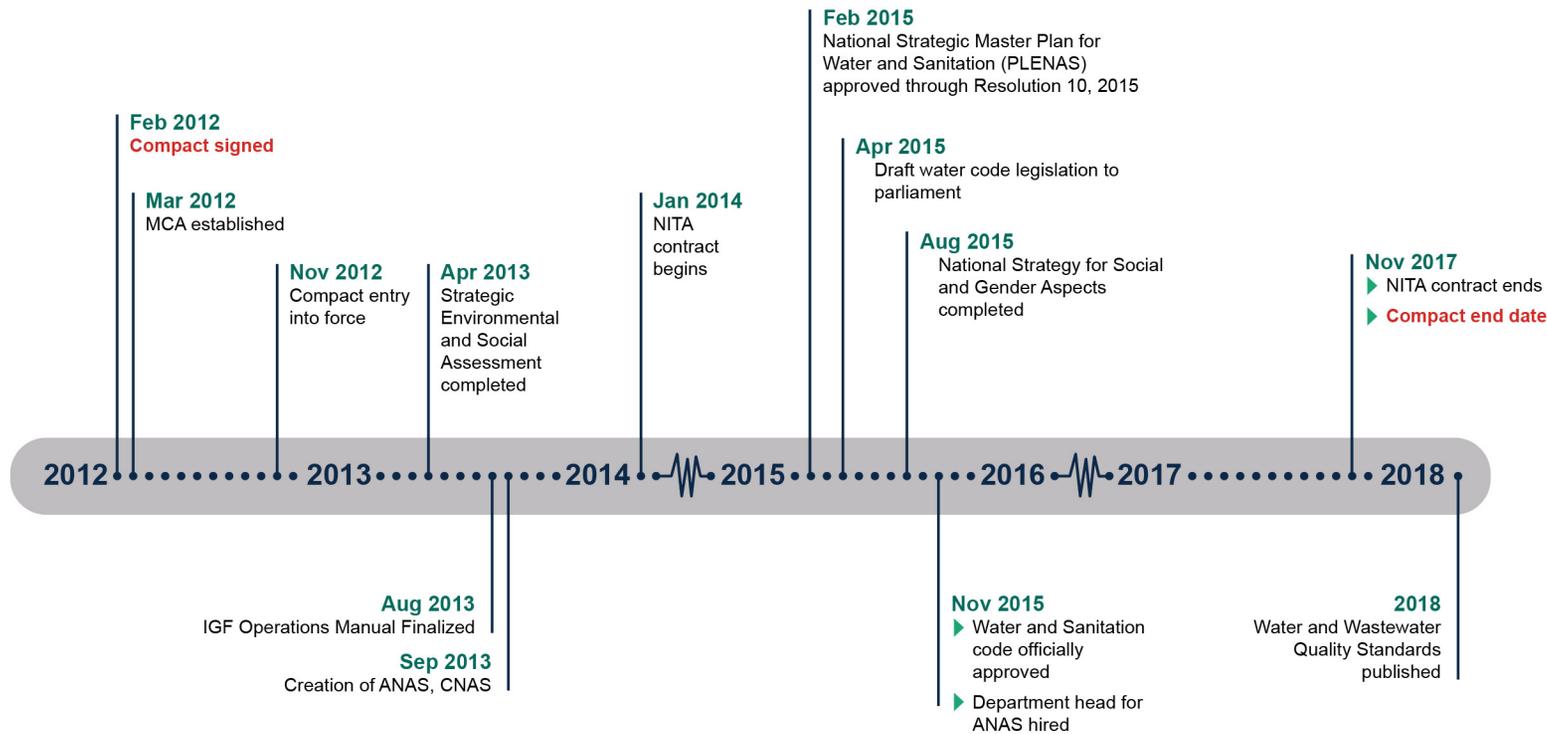
National Strategic Environmental and Social Assessment.

This assessment aims to incorporate environmental, social and sustainability values into the decision-making process associated with the National Strategic Plan for Water and Sanitation, contributing to the adoption of sustainable solutions that prevent or minimize the potential environmental and social negative effects and maximize the potential benefits (Ministry of Finance and Planning and MCC 2013).

National Strategy on Social and Gender Aspects.

The new strategy was informed by a study that used community-level qualitative research to learn lessons that could be integrated into the design of WASH project activities and ensure that project activities address the needs of poor and vulnerable people.

Figure IV.2. NIRR implementation timeline



1. Implementation and short-run outcomes

With the passage of laws by the GoCV to implement the National Strategic Plan for Water and Sanitation, the NIRR institutional restructuring and policy reforms consolidated decision-making power and laid an important policy foundation that should ultimately increase efficiency, support equity, and strengthen environmental protection. Technical assistance provided under the project successfully supported the development of the necessary legislation to establish CNAS and ANAS in September 2013. MCA-CV, along with international consultants and NITA, worked closely with ANAS, CNAS, ARE, and the DNA to fulfill their new mandates. The technical support from MCA-CV and its partners (including but not limited to hosting joint stakeholder meetings, helping draft legislation, and helping ensure the new organizations hired qualified staff) played a critical role in supporting the development of the new governing structure in Cabo Verde and consolidating regulatory authority in fewer entities. These entities, with continued support from LuxDev (post-compact), are beginning to operate in their new roles; however, it is too soon to judge how ANAS will grow into its new role as technical regulator and policy manager in the WASH sector.

The MCA-CV investments also supported the development of the National Strategic Plan for Water and Sanitation, the Strategic Environmental and Social Assessment, and the National Strategy on Social and Gender Aspects to guide investment decisions and regulation of various actors in the sector. Based on these policy guidelines, ANAS technicians led the development of new water quality standards that were put into operation in 2017, ARE adopted a block tariff structure for the new corporatized utility on Santiago with the intention of reducing the burden of the high cost of water on low-income families, and DNA, which oversees environmental standards, expanded to include water and waste-water quality standards. In the rest of this section, we describe these developments in more detail.

ANAS and CNAS are the most recent incarnations of government institutions that have been evolving for over 40 years, although the NIRR reforms are among the most substantive in those four decades.

Since the first water code was passed in 1984, the GoCV has steadily worked to consolidate the water sector through a series of regulations and laws that govern the sector. However, until the MCC compact, responsibility for the water sector was still distributed between more than half a dozen ministries (Box IV.2). In 1992, the *Instituto Nacional de Gestão de Recursos Hídricos* (National Water Resource Management Institute, or INGRH) was established, charged with planning, developing, and protecting water resources (Bosa 2015). There was another major push to restructure the sector starting 20 years ago when the GoCV set up the *Conselho Nacional de Águas* (CNAG) in 1999, followed by the creation of ARE and the *Direcção Nacional do Ambiente* (DNA) in 2003. Published in March 2015, the National Strategic Plan for Water and Sanitation set the groundwork for the restructuring of the WASH sector. The master plan consolidated responsibilities into fewer institutions, including CNAS (the successor to CNAG), ANAS (the successor to INGRH), ARE, and the DNA. Together, these agencies developed the new water and sanitation code that was sent to parliament in April 2015, published in October 2015, and passed by the legislature on September 9, 2017. The new water code set out parameters for governing the water sector at the national and municipal level, including setting the groundwork for the establishment of a new corporatized utility on Santiago Island (Republic of Cabo Verde 2015). The main delays in passing the law focused on revisions to the original codes to clearly delineate responsibilities between ANAS and ARE.

Box IV.2. Key ministries involved in WASH decision making prior to the compact

- **Ministry of Finance:** Determined funding allocated to government entities (including municipalities and therefore SAAS) and investments in nationally owned utilities (including ELECTRA)
- **Ministry of Foreign Affairs:** Interfaced with donors from other countries about investments in WASH
- **Ministry of Agriculture and the Environment:** Jurisdiction over water used for irrigation and was parent ministry to INGRH
- **Ministry of Infrastructure and Tourism:** Managed major infrastructure projects commissioned by the government and was concerned with implications of poor WASH environment on tourism
- **Ministry of Health:** Dealt with health consequences of poor WASH and involved in IEC

Despite some hurdles, ANAS was established as envisioned and is fulfilling its role as the technical regulator for water and sewerage utilities. Political and institutional support from the Ministry of Agriculture and the Environment and other government entities for ANAS has been prominent from the beginning of the WASH project. ANAS’s role is unique in that it was developed to be both an independent agency to manage the technical regulations for the sector as well as an implementer of public policy related to the sector. ANAS staff reported that the agency’s responsibilities include strategic planning, managing regulations on construction and management of infrastructure, integrated management of water resources, overseeing technical compliance to quality regulations (for subterranean, superficial, desalinized, and residual water), and the fulfilment of licenses for resource uses. Like its predecessor INGRH, ANAS is housed within the Ministry of Agriculture and the Environment, although it is expected to generate half its budget through licensing fees on water infrastructure and extraction and waste-water treatment, giving ANAS a degree of financial independence, if not complete political autonomy. ANAS staff noted that the relationship with the ministry is “collegial.” They explained that the organization receives guidelines from the government but is not told how to implement the policies in practice. For example, if the ministry wants to expand the water supply network for human consumption, it meets with ANAS, defines these objectives, and mobilizes resources. ANAS then develops the terms of reference specifications and contracts, supervises implementation, and delivers the final product to the government or municipalities. Most interviewees felt that ANAS has the independence it needs to manage the sector and that the Ministry of Agriculture and the Environment will remain a “guardian” over the sector, although there is some concern that ANAS could become vulnerable to political pressures in the future, depending on the administration, since it is still housed under the Ministry of Agriculture and the Environment (as was its predecessor INGRH).



“ANAS is totally autonomous, at least with...the new administration. ...Our decisions are taken collegially, when it is our responsibility, we inform the government but we operate autonomously.”

– ANAS staff

“If I ask myself if ANAS is able to be sustainable from the financial point of view, it clearly is. The volume of water utilized annually allows ANAS to satisfy all its treasury needs and others.”

– ANAS staff



Issues related to staffing have been one of ANAS’s greatest challenges so far. The GoCV underwent an extensive retrenchment process for INGRH staff before the INGRH was dissolved. ANAS was launched with 47 of the 88 staff envisioned in its organizational chart; by the end of the compact almost 80 percent of the positions had been filled. ANAS also experienced a change in leadership in September 2017 when the president of ANAS left to take up a role on another island and was replaced by the former advisor to the Minister of Agriculture and the Environment. Although ANAS still needs technical assistance to oversee compliance and respond to government policies, the technicians hired by ANAS have better training, including knowledge of the requirements for repair and maintenance of infrastructure, ability to work with new hardware and software, and additional management skills. ANAS leadership are also better

able to provide advice to other government stakeholders about risks associated with certain policies and to recommend alternatives. One example of ANAS leadership cited by several stakeholders relates to the decision about what to do with the IGF at the end of the compact. MCA-CV and its partners discussed locating the future IGF under ANAS. To prepare for potentially managing the new IGF, ANAS staff accompanied MCA-CV and NITA technicians to visit tranche 2 FASA projects and learn how to oversee the quality of infrastructure projects. Although it was later decided that the IGF would be located independently of ANAS, the experience served to further build the knowledge and skill capacity of ANAS staff.

ANAS and DNA developed standards for water quality and environmental oversight and were starting to ensure compliance at the end of compact. During the first two years of the compact, MCA-CV staff conducted a series of studies that looked closely at the existing legislation to determine what aspects of the laws and regulations needed to change to improve the functioning and efficiency of decision making in the sector. The MCA-CV staff then examined the existing water and sanitation codes and put together a series of complementary regulatory steps to support revisions to these codes, which came into force in late 2017 (Figure IV.2). As specified in the published regulations, ANAS has the authority to “terminate or modify agreements or licenses, initiate the sanctioning procedures in cases of administrative infraction...and apply the appropriate sanctions, apply the penalties included as a part of implementers’ contracts and licenses... and report infractions to relevant authorities in the case where punishment does not fall within their jurisdiction” (ANAS 2017).

“This team [working on water quality standards] involved DNA, but above all ANAS technicians, so the water quality standard for human consumption currently in force in Cabo Verde, which was approved in late 2017, is an initiative of ANAS—ANAS and the Ministry of the Environment—with strong commitment, strong commitment from ANAS technicians.”

– MCA-CV staff

“Today, everyone knows the costs of operations and maintenance and the cost of the capital investments. These factors have a strong weight in setting tariffs.”

– ANAS staff

Under the new regulatory model, tariffs for corporatized utilities balance financial sustainability with the utilities’ mandate to provide affordable, high quality services. Numerous government and public entity stakeholders in Cabo Verde commented that the new tariff framework is an improvement over previous frameworks because the new process is transparent. Specifically, ANAS defines the amount of water that a corporatized utility will source from boreholes and desalination plants. Based on the allocations, consultants supporting ARE then calculate the cost of water as an input for the utility, and work with the utility to estimate other operating costs,

along with the cost of maintenance and new capital.²⁹ Then ARE and ANAS work together to consider how the tariff will affect the quality of service that a corporatize utility can afford to provide, and vice versa (that is, if the utility will be required to provide a certain quality of service, for example 10 hours of service every day, then what will the costs be and how high does the tariff need to be in order to cover the costs). Tradeoffs in the number of customers the utility can serve versus the quantity of water it can supply to each of them also factor into the tariff decision. In this way, the two organizations work together to regulate the sector.

Although CNAS was established and was involved in the development of the National Strategic Plan for Water and Sanitation and the Strategic Environmental and Social Assessment, it was no longer very active by the end of the compact.

In all of our qualitative interviews with key stakeholders, CNAS was only mentioned twice, and none of the respondents talked about its role in the sector other than to say that it was largely a powerless advisory body and that ANAS had absorbed CNAS's role into itself. None of the stakeholders we interviewed suggested that CNAS might be reinvigorated.



“ANAS has incorporated this entire role into itself, and CNAS is advisory, therefore it has no mandated powers. ANAS has complete autonomy to apply the public policies that are in the program of the government and that are in its regulations.”

– ANAS staff



The NIRR also entailed empowering ANAS to carry out IEC campaigns and make gender equity a priority. Suggested topics for the IEC campaigns included encouraging a culture of bill payment, promoting water from the public network as clean source of drinking water, water conservation, and good use and storage of water, amongst other topics. ANAS's staffing plan included a gender specialist but as of September 2019 the person who initially filled the role had left the organization and the position was vacant.

2. Sustainability and remaining challenges

It is still too early to determine the long-term sustainability of the new institutions and related leadership in the WASH sector, but stakeholders in Cabo Verde believe that the MCC investments have laid a solid foundation for the country to build on in the water sector. As a result of the support from MCA-CV and its partners, today the regulatory agencies have more trained technicians, clearer regulations, and the tools to guide decision making on improving the quality and cost of water and sanitation. However, there are still challenges that the government faces in reaching its long-term outcomes of increasing donor funding for the sector and increasing productive government spending on water and sanitation. The rest of this section highlights a few of these challenges related to the NIRR activity.

²⁹ According to ATAS, ARE staff were not expected to be able to do the technical work of setting the tariff but instead only need to manage the process. Because tariffs are only reviewed every five years, it is not efficient for ARE to hire staff with this expertise. For the tariff review currently underway, LuxDev is funding the consultants who are preparing the tariff proposals for ARE staff to consider.

ANAS still needed technical assistance by the end of the compact and LuxDev had taken over MCA-CV’s role in providing that support to the fledgling institution. Although this could be interpreted as a symptom of donor dependency, it is also a very positive development to the extent that one of the WASH project’s objectives was to crowd in more donor financing by making investment in the sector more attractive. Indeed, although LuxDev has funded water projects in Cabo Verde for a long time and even helped establish one of the first multi-municipal corporatized water utilities in the country, it is only now that AdS has been established with support from the compact that LuxDev is devoting a large share of its WASH funding in Cabo Verde to strengthening utility-provided services on Santiago.

There is some concern that having regulators with potentially overlapping responsibilities will prevent effective decision making and management in the water and sanitation sector.

Multiple people interviewed during this study commented that the work of regulating the sector should be done by one entity. They noted that MCA-CV’s consultants had recommended that there be a single utility regulator for both technical and economic performance, but the government was committed to the division of authority between ANAS and ARE that emerged during the compact. Some stakeholders we interviewed had strong opinions about ARE’s expertise versus ANAS’s, which are consistent with the current division of authority. Nonetheless, despite the creation of an operations manual and guidelines for the two agencies to function, many stakeholders still agreed more clarity is needed in terms of which agency takes responsibility for regulating the quality of service provision. Several stakeholders gave examples of cases in which the agencies were not working together as expected, but an encouraging sign is that the two agencies have worked together to produce the WASH sector yearbook during the post-compact period . ANAS and ARE will continue to clarify their roles and responsibilities to facilitate the long-term success of the program with support from LuxDev in the post-compact period.



“For example, if you arrive at ARE ... you will see that regulation for them [ARE] is to fix tariffs—regulating a sector is to fix tariffs. All other functions of the regulator, [including organization of] the sector, making the sector efficient, giving the sector mechanisms to help institutions to create the laws—[is left to the other regulator]

– Technical assistance provider



There is concern about turnover and appropriate staffing in ARE and ANAS.

One of the concerns raised by multiple stakeholders centered on hiring staff with the appropriate skill sets and knowledge and then keeping them in their positions. This concern extends to the various boards that help manage ANAS, ARE, and AdS. NITA provided training to newly hired staff throughout the compact period; however, a number of staff from management to technical levels had already turned over by 2017. ANAS management raised the concern about having sufficient technical assistance in the post-compact period to continue providing support to new staff since ANAS was stretched between responding to government requests and undertaking its regulatory role. The new business plan predicts more growth for ANAS, which will require more staff. LuxDev will continue to support and build capacity at ANAS in the post-compact period.

“NITA gave several trainings, but it’s like this, not to vanish, right? The people who were in the institutions were trained, for example, the technicians received training but the people from management did not. The others who left the previous government were trained, but they were exchanged for these people.”

– ANAS staff

B. Utility Reform Activity

As shown in the logic model (Figure II.2), the long-term goals of the Utility Reform Activity were to (1) encourage corporatization of utilities; (2) strengthen AdS management, planning, and customer engagement capacities; and (3) reduce non-revenue water losses at AdS. On the path to these long-term goals, several short-term goals designated in the logic model are more likely to have been achieved within the time frame of this interim evaluation. These goals include (1) create AdS and ensure it operates on commercial principles with social inclusion objectives, (2) reduce commercial losses and increase the collection ratio, and (3) construct new infrastructure and/or refurbish existing infrastructure, leading to reduced technical losses, improved water quality, and/or strengthened environmental protection. Box IV.3 summarizes some of the achievements of the URA. The rest of this section presents the findings of our process evaluation of the URA.

Box IV.3. Achievements of the Utility Reform Activity

1. Creation of AdS and initial steps toward creation of Águas do Maio
2. Approval by the Economic Regulatory Agency (ARE) of the Provisional Water and Sanitation Tariff for Multi-municipal Utility AdS
3. Integrated social and gender policy within AdS

1. Implementation and short-run outcomes³⁰

MCA-CV and the GoCV were able to design and inaugurate a corporatized utility, AdS; however, it took much longer than anyone expected. A foundation of this activity—and the WASH project—centered on how to create a new multi-municipal, corporatized utility for Santiago. Other donors and government leaders had explored this possibility previously but concluded that it was politically infeasible since there were no real incentives for municipalities and their SAAS to give up the political opportunities that water distribution offered (including the potential to use jobs at SAAS and subsidized water to curry favor with voters or friends and family). MCA-CV and the GoCV began negotiating with the municipalities several years before the compact began, but still encountered significant delays in setting up and inaugurating AdS after the compact started (Figure IV.3). The biggest concern for SAAS was what would happen to their staff. In March 2015, the government and the municipalities signed a memorandum of understanding that detailed how the SAAS’s operating debts and employees would transition to AdS. The negotiating parties agreed that the workers would be selected for retention on a competitive basis, with the remaining workers being retrenched, and that the operating liabilities would not carry over to AdS. In the memorandum of understanding, the government paid for worker retrenchment and provided AdS with a loan for start-up activities. The loan of about \$1.7 million was approved in June 2016. The retrenchment process for workers required approval by the National Assembly and took nearly two years to complete as a result of national elections, loan negotiations, and issuance of severance funds, but was finally completed by the beginning of 2017. Retrenchment was an important step for the creation of AdS, since reductions in the wage bill and increased staff productivity must be important contributors to the new utility's financial sustainability.



“It took longer than we expected. It took 6 months longer than we expected. But there was a willingness. The communication existed between MCA, the stakeholders, the government, the municipalities, that made it possible, but at some moments we were a little worried that the political part of it, due to elections, that they would probably not go well, but finally I think it did...”

– MCA-CV staff

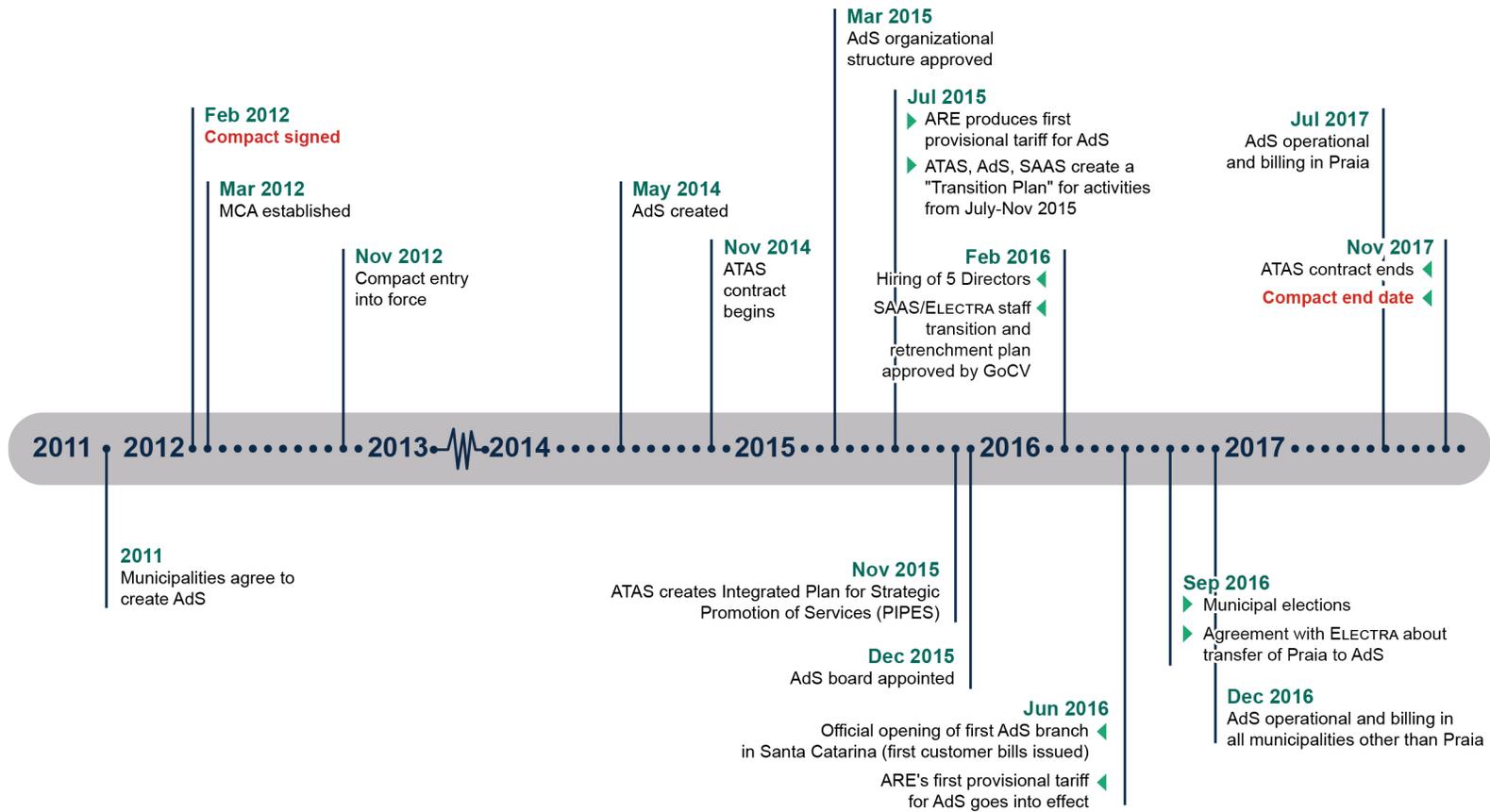


³⁰ AdS outcomes in boxes B and C of the logic model in Figure II.2 are presented in Chapter VIII.

Box. IV.4. AdS at a glance

- The nine municipalities on Santiago are AdS's shareholders (each municipality has the same number of shares)
- AdS is governed by a corporate board whose members are appointed by the municipalities
- AdS is responsible for operating and maintaining water distribution infrastructure, which is still owned by the municipalities
- AdS distributes water that it purchases from ELECTRA (which produces it using desalination) and extracts from groundwater sources, springs, and other desalination plants

Figure IV.3. URA implementation timeline



Strong national political will was critical to supporting the creation of AdS. Although it took time to help the municipalities understand the benefits of creating a corporatized utility and obtain their buy-in for the plan, the GoCV supported the creation of AdS from the start. They knew that several islands, including Fogo and Brava, had already created utilities, and many people felt that Santiago (as the largest island) needed to do the same. The GoCV was also moving toward a more centralized management of the water sector and was interested in reducing the number of utilities on the island in hopes of increasing efficiency and reducing the cost of providing water to the population.

A number of factors facilitated the establishment of AdS, including effective communication strategies and stakeholder engagement, financial support for retrenchment, and the example of other successful corporatized utilities in Cabo Verde. MCA-CV focused on effective stakeholder communication from the beginning. They involved the unions so that if SAAS employees began to complain or threaten to strike, the unions were engaged to help mitigate these difficulties. MCA-CV also helped to develop legislation to authorize retrenchment of SAAS staff so that AdS would not be burdened with a bloated payroll, and to secure government funds to facilitate the retrenchment of workers. MCA-CV staff and partners also worked closely with the GoCV to properly select/hire qualified personnel for AdS positions. The example of *Água Brava*, a successful multi-municipal corporatized utility created to serve the islands of Fogo and Brava, provided the government and members of SAAS with assurance that the process could work.



“What made it possible? Stakeholder communication, I think it was important. Political willingness, was important. And we were... quite keen to involve the unions in due time so they would be a part of everything from the start, so we didn’t have any moment of complaints, or strike, anything that everybody was afraid of, because we had elections, and the availability of the treasury department within the counterpart funds to guarantee all the retrenchment of funds to pay...”

– MCA-CV staff



The availability of FASA grants for infrastructure improvements and expansion also played an important role in facilitating the creation of AdS.

The project logic envisioned that the FASA grant funding would be the primary incentive for municipalities on Santiago to convert their SAAS into AdS, since the funding was only available to utilities that were making progress toward becoming autonomous corporations. Many of the municipalities recognized that they did not have sufficient resources to invest in maintaining their piped water networks, whereas their constituents wanted better water service. FASA grant funding served as an incentive



“[The municipalities] had to inject money into SAAS so that SAAS could really subsist financially. And because of this, there have been no deep investments in this sector, so the networks are obsolete, which affects the availability of water, the flow of water.”

–Former SAAS staff



for the local politicians, because they could tell their constituents that they had secured funding for something constituents indicated that they needed for improved quality of life. Although the stakeholders we interviewed were more focused on how the GoCV and MCA-CV engaged the municipalities and addressed the SAAS's concerns about retrenchment, as key facilitators to the creation of AdS, they also credited FASA as an important factor. The hope that over time AdS will become a corporatized utility that can support itself, along with the availability of grant funding (provided by the newly established IGF Fund) to upgrade and extend the infrastructure so that more people had access to piped water, helped drive the support for corporatizing AdS.

The transition from ELECTRA to AdS as the water distributor for Santiago was fraught with challenges. Initially, ELECTRA intended to remain the water distributor for Praia as a subcontractor to AdS. MCA-CV and AdS's shareholders reluctantly agreed to this arrangement for a trial period of three years, but after the elections in September 2016 the plan changed and ELECTRA lost the concession to distribute water in Praia. The negotiations with ELECTRA were protracted and Praia was not integrated into AdS until six months after the rest of the island. As a consequence, ATAS had much less time to work with AdS on improving operations in Praia than originally planned. The customer database used by ELECTRA was not compatible with AdS's database so all of the customer data had to be migrated and by the end of the data migration process AdS determined that it lost almost 60 million CVE in outstanding customer bills that could not be resolved due to unreliable data from ELECTRA. AdS struggled to identify ELECTRA's customers because ELECTRA outsourced meter reading and AdS could not agree on a price with the contracted firm to continue this work. Ultimately, AdS had to find the customers and inherited many customer billing complaints that originated with ELECTRA's subcontractor. Customers in Praia were especially confused by their bills during the handoff period since ELECTRA had recently changed its tariff rates and then they changed again when AdS took over. There were also problems integrating ELECTRA staff into AdS since Electra's salary structure had been much higher than AdS's but lowering their pay required passage of legislation that was delayed, putting a strain on AdS's finances for a few months. More importantly, though, AdS is stuck with a tariff set by ARE on the basis of poor quality data from ELECTRA which AdS believes is inaccurate and does not reflect the true costs of services for Praia residents. Moreover, AdS still depends on ELECTRA as the producer of desalinated water for Praia, the price of which factors heavily into AdS's financial sustainability. When the two utilities could not agree on a price, ARE eventually decided that AdS would pay ELECTRA 181 CVE per cubic meter, much less than requested by ELECTRA (235 CVE per cubic meter) but also barely below the price that AdS's customers pay for the first five cubic meters they consume (200 CVE per cubic meter). Finally, AdS must address very high rates of non-revenue water in Praia, due to both technical losses and commercial losses.

MCA-CV, with the support of ATAS, strengthened AdS’s management, planning, and technical capacities. ATAS was hired by MCA-CV to provide technical assistance in creating the institutional and technical foundation for AdS. ATAS was involved in defining criteria for recruiting staff, preparing training plans for employees, and working with the government on the implementation of compensation for the retirement and/or retrenchment of more than 500 staff from the SAAS. ATAS supported the establishment of all of the AdS operational departments, selected the software, proposed hardware, and even helped hire the right staff for open positions. From the commercial standpoint, ATAS helped AdS develop its business plan and taught staff how to manage its assets. ATAS staff worked hand in hand with AdS staff providing on-the-job training to ensure they developed the appropriate skill sets (for example, using the hardware and software, managing the work, maintaining the infrastructure) to attend to the needs of the company and its customers. The participatory nature of the design and implementation of AdS played one of the most critical roles in the success of getting the company established. ATAS’s technical assistance helped AdS learn how to operate and manage the utility. The challenge (discussed in more detail below) is that staff turnover (particularly on the board) meant that some new staff did not receive the level of training that ATAS provided to staff hired during the compact, raising concerns about their ability to support the management and operations of AdS.

AdS requires stronger leadership skills to resolve technical and institutional issues. Sustainability of a new company requires good leadership and a team with the vision and political know-how to keep it moving forward. Several stakeholders raised concerns about the leadership of AdS, including that the original board did not have members with water sector expertise. The original board was appointed by the government, so members were selected based on their political ties and not their knowledge or qualifications to help advise the water sector. The implication of these appointments was that the board was not able to provide strong guidance and support to AdS and did not take advantage of the technical assistance provided by ATAS at the time of implementation. Moreover, in May 2018, the president of the board of directors and two administrators were charged with embezzling more than US\$30,000 from AdS. These former board members are currently facing corruption charges. In the meantime, the GoCV has appointed new board members, who took over management responsibilities in June 2018. Although these board members were still appointed by the GoCV, they do appear to bring more technical expertise, such as economics and law. The hope is that LuxDev can provide training to these new board members under their post-compact contract with the GoCV and help AdS continue down the path of becoming a sustainable entity.



“I think the board did not take advantage of ATAS as they should, and even with ATAS, they [the board] are not doing administration as it should be done— according to what ATAS has been teaching them. For example, the board of directors, a company should think about the long run and look at it in a macroeconomic way, instead of having this kind of concern [politically visible], they worry about the toilet paper in the bathroom instead of setting a corporate strategic vision.”

–MCA-CV staff



AdS established a social and gender integration plan, but the extent to which it met its objectives at the end of compact was unclear. AdS established a social and gender policy, which influences how the company works with households. For example, several interviewees from AdS gave examples of how during the connection process, there are female customers in CV who do not have a land title to their homes. AdS has to have the necessary documentation to make the connection, so they work with the household and often exempt some documents to facilitate the process of water connection, particularly for low-income families and female-headed households. Although the studies and technical support contracts on Social and Gender Aspects in Cabo Verde sought to bring lessons learned into the design of WASH activities and ensure that the project addressed the needs of the poor—and women specifically—the management of AdS does not seem to have fully embraced gender and equity as a priority for the company. When asked about gender and equity concerns are reflected at AdS, one manager focused on gender balance among the staff rather than how AdS interacts with its customers. Moreover, as of September 2019, AdS had not yet hired a gender specialist as recommended by MCA-CV.



“[Gender and equity] does not reflect much [at AdS]. That’s the way it is. There are departments that have more women and there are other departments that have more men, this depends on the area and the function itself, because there are areas of operations that are more technical and the technical areas have more men. And the more commercial, more social part, there are more woman, but we’re all mixed together. In a way, it reflects the gender issue [in Cabo Verde].

–AdS staff member



Reducing non-revenue water losses at AdS remains a major challenge and one that still needed to be addressed at the end of compact. Stakeholders identified two main contributors to non-revenue water in Cabo Verde: (1) technical losses related to aging or poor infrastructure that leaks and (2) commercial losses. Many people throughout the interviews and focus group discussions talked about the challenge of non-revenue water and how it impacts the long-term sustainability of AdS. The issue of technical losses is one that was clearly being addressed throughout the last few years of the compact as AdS technicians were trained to repair leaking infrastructure. Although ATAS believes there is still much work to do to reduce technical losses, the process was well underway. Most key stakeholders agreed that, over time, AdS would be able to manage the technical losses by repairing infrastructure as long as they had sufficient financial resources, which should come from consistent billing of customers. By the end of the compact, AdS was not doing as much to address illegal connections, although this was one of the topics covered in the IEC strategy implemented as part of the FAS activity.



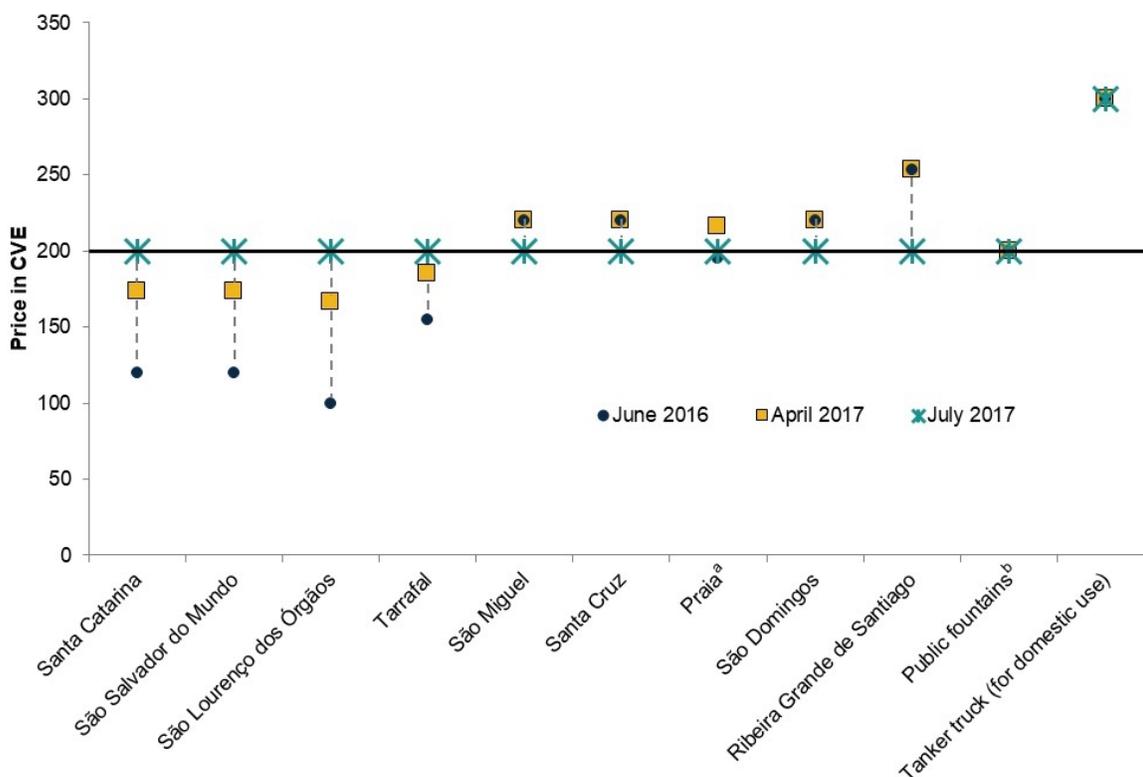
“On Praia since AdS took up service, AdS has been repairing many leaks. We [ATAS] are present every time we see a leak; it is reported to AdS... they have a lot of work to do because the legacy is heavy. So there are efforts, but to solve Praia’s problems, much more needs to be done.”

–ATAS staff



ARE approved a tariff schedule for AdS that harmonized the price of water across all municipalities and also equalized the price for domestic customers and public fountain users. Previously, each SAAS was entitled to set its own tariff schedule, which led to large differences across municipalities, driven in part by the different water sources, with desalinated water being much more expensive to produce than groundwater. As of July 2017, customers on all of Santiago pay 200 CVE per cubic meter for the first five cubic meters they consume, 300 CVE per cubic meter for 6-10 cubic meters, and 475 CVE per cubic meter beyond 10 cubic meters per month. The price for the first block is almost double the price customers previously paid in three municipalities, so tariffs were adjusted incrementally over the course of a year. As part of the tariff harmonization process, ARE determined that water collected from public fountains managed by AdS should also cost 200 CVE per cubic meter. Although this was viewed as a major achievement by MCC and MCA-CV, most participants in focus groups still believed that piped water was less expensive than water from public fountains, perhaps because that had been the case for many years.

Figure IV.4. Convergence of first block price in domestic water tariffs across municipalities, 2016-2017



Source: ARE

Notes: Tariffs shown in the figure are exclusive of VAT. AdS also charges a fixed daily rate as part of the bill.

^aUntil July 2017, Electra provided customers with up to six cubic meters per month at the lowest price (as of July 2017 the harmonized tariff schedule allows five cubic meters per month at the lowest price). Electra's tariff shown in the gold box was as of June 2016 rather than April.

^bThis timeframe might not reflect the price of water from public fountains prior to the harmonization with the price of piped water.

The introduction of a social tariff and revisions to the existing tariff schedules will likely affect AdS’s financial health, although it is too soon to know what the net effect will be.

ARE is currently conducting a review of the tariff schedule it previously approved for AdS and results suggest increasing tariffs by 15 percent. A new tariff for the water AdS purchases from ELECTRA is also under review. After the public consultation period, ARE is planning to implement the new tariff schedules by early 2020. In addition, a 2018 law approved the creation of a social tariff for water and electricity. According to this new law, eligible customers can request a discount of 30 percent on the variable component of their water bill if their monthly consumption is between 0 and 3 cubic meters. However, it is unclear how the law will be implemented since it is up to each municipality to verify eligibility. AdS is working on updating its billing processes to be able to apply the discount.

Support from the URA and the success of establishing AdS spurred three other islands to initiate the process of corporatizing their SAAS. The local government on Maio had already been considering corporatization and with support from MCA-CV through the URA, they began the process of creating Águas do Maio. At the end of the compact, ATAS was working with the GoCV, the local government, and the local SAAS to sign a MOU that would allow AdS to support Águas do Maio. ATAS developed manuals on how the new utility should operate, its structure, and the business logic. ATAS also conducted an analysis of the technology needs for the new utility. All of this activity notwithstanding, there seemed to be a disconnect between the planning that was occurring in Praia versus what was apparent to the local stakeholders on Maio, who had the opinion that ATAS had not engaged them enough. Indeed, none of ATAS’s recommendations had been operationalized by the end of the compact and participants in a focus group on Maio were unaware of the plans to create a new corporatized utility. MCA-CV also helped secure funding from the World Bank’s Public-Private Infrastructure Advisory Facility to conduct feasibility studies of how the SAAS on São Nicolau and Santo Antão could be transformed into corporatized multi-municipal utilities similar to AdS.

The URA also provided AdS with technical assistance to carry out IEC campaigns, but AdS experienced significant delays in launching these activities. The planned campaigns covered the following topics: the importance of reliable water supply, fair water pricing, efficient water use, and water treatment and storage. During the last phase of technical assistance, AdS launched an IEC campaign on tariffs and water service quality using community participation and AdS staff. The IEC campaign’s main message was “water is priceless, but costly—take care of it” (Seureca and CESO 2015).

2. Sustainability and remaining challenges

The road to sustainability will be a long one for AdS. The newly formed company has already encountered a number of serious challenges in the post-compact period, including corruption charges that led to the firing of the top three administrators in the company, the need for more training to ensure qualified staff are in place, and improving customer service. The following items highlight the areas that need additional technical support for AdS to reach its goal of becoming a financially and technically sustainable corporatized utility.

The GoCV and partner donor organizations need to provide additional support to ensure that AdS staff and the newly appointed members of the board of directors understand how to implement the business plan for AdS.

Although AdS staff have the foundational capacity to manage the new organization, MCA-CV and ATAS staff believe that AdS will continue to need technical assistance to be a viable company in the future. These stakeholders indicated that AdS staff still require support to help them implement their business plan and maximize the number of customers. They also need support billing and invoicing customers to ensure they can collect money to pay back to ELECTRA and guarantee maintenance of the infrastructure. Finally, AdS staff still do not have all of the necessary skills, resources, and procedures in place to adequately respond to customer concerns; many focus group participants noted that their service requests often go unanswered and that “AdS is an unresponsive” organization. As a result of the leadership shake-up after several of AdS’s top managers were convicted of corruption, the newly appointed president of the board of directors and his administrators joined the organization in the post-compact period and thus did not participate or receive training from ATAS related to the role the board places in managing AdS or in how to implement the business plan. LuxDev is currently providing support to AdS and its new board, but it is critical that the donor community step in and ensure this oversight capacity is strong and that the board understands how to lead AdS in implementing the business plan.



“AdS is a company for the future that is just in the initial phase and, everything in the beginning is a little complicated but it will find its way.”

–AdS staff



AdS needs more water to distribute. When AdS was created, it was expected that it would benefit from a major new desalination facility and distribution pipeline that is being financed by the Japanese International Cooperation Agency (JICA). That project is still underway but the timeline is much slower than anticipated and it will still be several years before the facility will be operational; there are also some key policy decisions that have yet to be resolved, including whether the facility will be operated by Electra or AdS, with major implications for AdS’s financial projections. Another consideration is that before AdS can make use of the water the new facility will produce, the utility will need investments in its existing infrastructure in order to be able to distribute the volume that will become available. In the meantime, three years of drought on Santiago has depleted aquifers so AdS is not able to pump as much from its boreholes as it needs. These supply constraints have been exacerbated by the fact that AdS now has more customers to provide with water thanks to the FASA and FAS, as described in the rest of this chapter.

AdS must reduce non-revenue water in order to be able to meet customer demand and to achieve financial sustainability. Water losses continue to be a problem and AdS will not be sustainable unless these losses can be corrected; it is also hard for the utility to argue for investments in additional supply when so much water currently leaks out through its system. If AdS could prevent these technical losses and redirect that water to customers who currently face service outages or low pressure, that could go a long way toward resolving the supply constraints described in the previous paragraph. Financing for investments in new pipes and staff time to identify and address sources of non-revenue water, and the capability of AdS management and technicians to handle the effort lie at the core of whether AdS will be sustainable.

AdS must ensure that customers pay their bills. The MCC WASH project conducted a number of interventions to help establish efficient billing systems and ensure households understand how to manage their water usage once the household is connected to piped water. The project helped AdS adopt new billing systems, (using the AQUAmatrix billing software), and as part of the FASA and FAS sub-activities local NGOs implemented information campaigns and meetings to teach families about the importance of managing water usage and paying their bills (see Chapter IV, Sections C and D for more details). However, at the end of the compact, AdS was still struggling to properly bill customers and collect payment. In some cases, customers were being charged for months of water usage due to delays in the billing system—and then could not afford to pay the entire bill. In other cases, families could simply not afford to pay their bills due to over-usage. Stakeholders noted that over time, with the implementation of the new tariff system and more consistent and predictable billing, AdS hopes to resolve this challenge.

Improving customer service is a critical component to AdS’s future success as a company.

AdS’s first year of operations was a critical window for establishing the new utility’s reputation among its customers. AdS inherited over 12000 service requests and 608 pending connections from ELECTRA and in addition to that many customers were quite confused by how billing was handled during the transition and as the tariff rate was being adjusted. Participants in the focus groups voiced dissatisfaction with AdS’s ability to respond to customer complaints, even noting that they feel that ELECTRA provided better service. Some stakeholders interviewed during the data collection suggested that AdS’s early poor performance on responsiveness and service-orientation might have stemmed from the fact that the Board came from the public sector rather than the private sector. In any case, it appears that AdS would benefit from continued support to develop these skills to ensure it moves forward with a strong, positive reputation, otherwise stakeholders fear that the population will refuse to pay their bills and will increase illegal tapping of the network. Stakeholders feel that more community messaging and training of technicians is needed from the donor community to overcome this challenge.

Financial sustainability is seen as the core constraint to AdS success in the long term. There is uncertainty around AdS’s ability to completely recover costs and create a sustainable funding model without government support and financing for investments. In fact, many corporatized utilities around the world often depend on some government funding to remain sustainable. Several key stakeholders noted that for AdS to make sufficient revenues to support itself in the future will take a combination of maximizing the number of customers they have, effective billing and payment collection, and strong customer service and response time. AdS is concerned that the municipal governments that are its shareholders do not understand that the utility is only responsible for maintaining the piped water network, and not for funding capital investments to replace or extend the existing infrastructure. Improving management and reducing operating costs is an ambitious goal for AdS, but that is not enough to achieve the mandate to provide piped water for all Santiago residents—additional investments in infrastructure to increase the supply of water entering the system and by reducing technical losses and to extend the network will be necessary. The municipalities or national government must fund these capital investments so AdS’s prospects for financial sustainability are partially dependent on what will happen with the successor to the FASA. It is too soon at this point in time to determine whether AdS will be financially sustainable, since the company was just starting up at the end of the compact. Much

will depend on the tariffs ARE sets for AdS to pay Electra for desalinated water and for AdS customers to pay for the water they consume (an analysis of AdS billing is provided in chapter 8). However, government stakeholders, including former members of the SAAS and ARE, believe the foundation provided by MCC and MCA-CV gives AdS a strong beginning.

C. FASA

The Water and Sanitation Fund (*Fundo de água e saneamento [FASA]*), was a new approach to funding WASH projects in Cabo Verde, with an open call for proposals from municipalities and utilities, a competitive selection process coordinated by MCA-CV, and a strong emphasis on gender and social inclusion. Decisions about how to allocate FASA funding were among the first opportunities to prioritize investments using criteria specified in the National Strategic Plan for Water and Sanitation, the Strategic Environmental Assessment and the National Strategy on Social and Gender Aspects. MCA-CV required that contractors for the FASA works not only build the infrastructure but also implement gender and social inclusion activities to provide vulnerable populations with support to connect and to manage their bills, which was an innovative approach in the Cabo Verdean context. Contractors took different approaches to these activities that were outside their normal operations, including subcontracting to NGOs and hiring consultants. FASA grants were managed by MCA-CV staff, including engineers who provided technical assistance in the design phase and monitored implementation, with the help of international consultants and oversight firms. Throughout the process, ANAS served as the technical regulator and was responsible for defining the technical parameters for the infrastructure projects.

1. Implementation and short-run outcomes³¹

The FASA primarily funded water network improvements and expansions (rather than sewer infrastructure, water supply, or non-revenue water reductions), reaching all but two of Cabo Verde’s populated islands. FASA investments in network rehabilitation and expansion were intended to reduce technical losses, improve water quality, strengthen environmental protection (that is, sanitation and hygiene), increase access to piped water, and allow the government to close the public fountains that would no longer be needed to provide water to the population. Of the 13 infrastructure contracts eventually awarded through the FASA, only three were for sanitation investments. There was more emphasis on expanding



“Cabo Verde is made up of 22 municipalities, and we have projects in 19 municipalities, so we managed to cover the country as a whole, [and] in terms of islands, we managed to reach practically all of Cabo Verde’s municipalities; within ... each council we also managed to go where there were no interventions, there was no water and sewage, so we still managed to get a little further on each island in relation to the urban centers.”

–MCA-CV staff



³¹ Outcomes measured at the household and utility levels (boxes E and B, C, and D in the logic model in Figure II.2) are presented in Chapters V-VI and VIII, respectively.

utilities' networks rather than increasing water supply or reducing non-revenue water, which would have also resulted in increasing the quantity of water that can be provided to customers.³² As shown in Table IV.1, slightly less than a third of the FASA's funding was allocated to the island of Santiago, with projects funded on all of the islands except São Nicolau and Boa Vista, which did not propose any projects to the FASA.

³² As mentioned in the previous section, at the time that municipalities were proposing projects to the FASA, the desalination plant financed by JICA was expected to be operational in the relatively near future, so supply did not seem like as much of a limiting constraint for the system on Santiago as it presently does, with the JICA facility still in development and after several years of drought.

Table IV.1. FASA infrastructure projects

Island	Tranche	Type of project	Signature date	Population served ^a	Project value (\$ million)	Status at the end of compact
Santo Antão	2	Expansion of water network	November 11, 2015	13,356	\$2.8	Incomplete – finished post-compact with funding from the GoCV
São Vicente	2	Expansion of water network	February 25, 2015	37,875	\$0.4	Completed
São Vicente	1	Extension of the sewer network	February 10, 2016	41,232	\$1.0	Completed
Sal	1	Improvement of the sewer network	June 5, 2015	17,081	\$1.8	Completed
Maio improvement and interconnections	1	Improvement and connection to water network	January 14, 2016	6,952	\$1.3	Completed
Santiago: São Domingos and Praia	2	Expansion of water network	August 7, 2015	30,557	\$4.2	Completed
Santiago: Ribeira Grande	2	Connection to water network	January 8, 2016	14,595	\$1.4	Completed
Santiago: Palmarejo	2	Wastewater treatment plant	December 16, 2015	N.A.	\$1.4	Canceled
Santiago: Santa Catarina, São Salvador do Mundo, São Lourenço dos Órgãos and Santa Cruz	2	Expansion and improvement of water network	December 30, 2015	15,436	\$1.6	Santa Catarina and Santa Cruz completed São Salvador do Mundo and São Lourenço dos Órgãos incomplete – finished post-compact with funding from the GoCV
Santiago: São Miguel and Tarrafal	2	Expansion and improvement of water network	February 1, 2016	12,794	\$2.2	Incomplete – finished post-compact with funding from the GoCV
Fogo network replacement	1	Improvement of the water network	April 13, 2015	3,919	\$0.8	Completed
Fogo network extension	2	Expansion of water network	November 1, 2015	3,074	\$1.5	Completed
Brava	1	Improvement of water quality	January 18, 2015	5,995	\$0.18	Completed

^aPreliminary estimates to be confirmed during the post-compact period.

FASA projects were implemented as envisioned and most were completed before the end of the compact. MCA-CV received 41 applications for the Tranche 1 of FASA funding and 37 applications for Tranche 2. Twenty-three projects were funded, bundled into 13 contracts—four in Tranche 1 in 2014 and nine in Tranche 2 in 2015 (Table IV.1).³³ Aside from the waste-water treatment plant on Santiago, which was canceled due to lack of funds, all of the other projects were finished in the months before or after the compact end date, despite some delays, such as those related to the time to order and receive infrastructure materials from overseas and clear the customs process, land conflicts, and resettlement of populations during the construction process. Of the \$22.35 million allocated for the IGF activity, \$19.8 was disbursed by the FASA during the compact. The amount of funding for each project varied, ranging from \$180,000 to improve water quality in Brava to \$4.2 million for the São Domingos-Praia Connector (see case study, Chapter IX). By October 2017, the FASA sub-activity had completed 227 km of new water pipeline construction, 27 km of new sanitation pipeline construction, and approximately 2,277 new sanitation facilities (MCC 2019). FASA projects varied greatly in terms of the size of the population they benefited, ranging from more than 40,000 people for São Vicente’s first project to only a little more than 3,000 people for Fogo’s second project; some of the smaller projects that were bundled into larger contracts only served fewer than 100 households, demonstrating that the FASA mechanism could address infrastructure needs of small villages as well as large cities.

The second tranche of FASA grants used a “design and build” approach in the proposal development and implementation process, which was more successful than the “design-bid-build” approach used during the first tranche of FASA projects. Under the latter approach, MCA-CV contracts with a single responsible entity that designs the project and then bids the construction services out to a third party which is responsible for implementing the project. During Tranche 1, projects were submitted by the municipal governments and MCA-CV had to provide extensive support to the municipalities to strengthen their designs and then help them learn to properly bid out and procure the construction component, which took additional time. Once the construction firm was procured, work could begin. As a result, the first tranche of projects fell behind the originally planned schedule.

³³ Evaluation question 3a asks whether the FASA mechanism efficiently selected the most effective, high quality projects as measured by the effect of the FASA projects on the socioeconomic well-being of households, the finances and management of the utilities, economy value-added, and business and household productivity. We were not able to answer this question because we did not have access to information on the full set of FASA projects, nor would we be able to know what the effects of unfunded projects would have been.

For Tranche 2 projects, MCA-CV used a “design and build” approach, in which the design and construction services are contracted together, which helped accelerate the procurement and design process. The “design and build” approach also gave MCA-CV more authority and a direct channel for communication with the contractor compared to the Tranche 1 projects in which the contractors reported to the municipalities. MCA-CV held an open competition with construction firms and companies, which then submitted proposals containing the bundled design-construction model. MCA-CV still had to work with the winning firms to finalize and strengthen some of the designs, but then work on the infrastructure could begin because the construction component did not need to be procured separately. Although the contractors still faced challenges, such as importing the materials they needed (that is, it took time to ship and clear customs), they were able to begin the build phase more quickly. Another reason this approach was more successful was because it allowed the MCA-CV technicians to support the contractors in finalizing the designs in a more efficient and feasible manner. It also allowed the technicians to be on the ground, supervising the work along with international consultants to ensure the highest quality implementation.



“...we sat together, the contractor, supervision, and MCA, to explain what was the objective of the MCA, ... the supervision [was] on the ground with the company [and] would be the voice of the MCA to be able to facilitate the work, and I think that in the second tranche things went much better.”

–MCA-CV staff



Implementers of FASA projects also were required to implement IEC campaigns. The purpose of the IEC campaigns was to increase awareness of WASH topics relevant to each type of FASA project. While IEC campaigns varied by project, suggested topics included understanding the cost of services, encouraging a culture of payment for services amongst beneficiaries, water conservation and efficient use, health outcomes and their relation to WASH practices, awareness of topics related to gender, and other topics focused on increasing FASA project impact and sustainability (see Box IV.5).

Box IV.5. Suggested topics for FASA IEC campaigns

- Understanding the cost of services
- Encouraging a culture of payment for services amongst beneficiaries
- Water conservation and efficient use
- Health outcomes and their relation to WASH practices
- Awareness of topics related to gender
- Other topics focused increase the impact and sustainability of the projects

Source: FASA implementer applications.

2. Sustainability and remaining challenges

The GoCV planned to launch a Revolving WASH Fund—a successor to the FASA—in recognition of the strengths of the grant-making mechanism set up by MCC and MCA-CV.

To continue upgrading and extending piped water and improved sanitation infrastructure, the GoCV worked closely with MCA-CV and its partners to design a Revolving WASH Fund, which the GoCV committed to fund, complementing seed money from LuxDev and the World Bank. The plan was for the Fund to adopt the operating manuals and eligibility processes established under the compact. In particular, like the FASA, the Fund would allocate resources based on the National Strategic Plan for Water and Sanitation, thereby disciplining donors and utilities to adhere to the priorities that the government had already laid out. Unlike the FASA, however, the Fund would not have been purely a grant facility, but rather would have used its funding to guarantee commercial loans so that utilities could get a lower interest rate from commercial banks. This blended financing model was expected to make the Fund more sustainable than the FASA had been. The Fund was originally envisioned to be housed within ANAS. However, in January 2017, the Minister of Agriculture and Environment elected to house the Fund as a public entity outside of ANAS. Further legal review determined that the Revolving WASH Fund could not operate as a public entity, so the government approved a statute defining the operating status of the Fund. This approval meant that the Fund could now raise private financing and operate autonomously, but the statute required re-drafting to reflect these changes, a process that was supported by LuxDev in the post-compact period.

Although the GoCV believed that setting up the Fund as an autonomous entity would have allowed it to operate independently, a number of stakeholders noted concerns about its sustainability.

First, there was the risk of lack of continuity. In the months leading up to the end of the compact, ANAS was managing the Tranche 2 FASA projects, conducting site visits, and receiving training to manage the Revolving WASH Fund.

Although ANAS was expected to retain a technical input role moving forward, several donors raised concerns about the need to train additional staff to manage the Fund.³⁴ Second, although the IGF business plan, resource mobilization strategy, and operations manual



“[The Revolving WASH Fund] is clearly identified as a risk, hiring a politician, or friends of the party to be in the management of [the Revolving WASH Fund], why? Because they may suddenly be funding projects that do not fill the requirements that guarantee the turnover of the fund itself. [They will end up] financing baby kisser projects ... someone promises to fund the project without having a detailed analysis. That is, if there is direct appointment of the board of [the Revolving WASH Fund], and we do not have a person with the profile that is already described in the study, which is a technical profile with the knowledge of the financial world, and with the knowledge of the banking, with the knowledge and logic of the pricing of the financial instruments, then we can fall into a problem.”

-Government stakeholder



³⁴ These concerns were expressed before and the former director of the WASH Project was appointed as the Fund’s manager.

provide a start for the Fund, these documents require additional updates and revisions to (1) reflect the impact of a more realistic income in the first years of the fund, (2) develop a resource mobilization plan for activities, and (3) more comprehensively define the process of operation of the Fund. Finally, some stakeholders raised concerns that placing the Fund outside of ANAS could allow politicians to drive the selection of projects to be funded rather than basing the awards on the strict criteria MCA-CV used when selecting projects. Had the Fund remained under ANAS, stakeholders believe there would be a better chance of following the operating procedures for project selection and implementation set out during the compact.

Despite all the effort to set up the Fund, as of September 2019 the Fund had been merged into another GoCV fund and it appeared that there would not be a dedicated investment mechanism for WASH infrastructure after all. The Fund was merged into the GoCV's existing Environmental Fund and LuxDev reported that the €4,000,000 it had contributed had apparently been reallocated to other uses by the GoCV. Some stakeholders view this as a positive development since the Environmental Fund has a revenue source (the ecological tax on imports of plastics), but it appears that the major effort invested in setting up the Fund has been lost and it is not clear if the seed funding contributed by LuxDev will still be used to support WASH infrastructure developments. Without a successor to the FASA, donor preferences (rather than national priorities) could once again drive investment in the WASH sector and municipalities will have to choose between WASH investments and other projects that the Environmental Fund could support.

D. FAS

During compact design, MCA-CV and MCC were concerned about the ability of the poorest households to be able to afford piped water connections so the compact included a fund to address this risk. This became the Social Access Fund for Water and Sanitation Connection (*Fundo de Acesso Social [FAS]*), which provided grants to NGOs to subsidize household connections and educate households about water, sanitation, and hygiene through an information, education, and communication (IEC) campaign. The FAS project was targeted to poor and/or vulnerable households that met criteria specified in the activity's operating manual. FAS provided three types of subsidies: Type 1—domestic water connections for households not connected to the water supply network, Type 2a—water and sanitation connections for households that did not have improved sanitation and were also not connected to the water network, and Type 2b—improved sanitation for households that already had a water connection. FAS projects also conducted IEC sessions (including local theater and visits to schools) on topics including, but not limited to, demand creation for household water connections and/or sanitation, water conservation and handling at home, and use and maintenance of toilets.

FAS took a similar approach to FASA in its selection criteria and bidding process. MCA-CV put out bids requesting local NGOs to submit proposals for doing the required gender and social inclusion work. After putting out a call for FAS works proposals, MCA-CV received 13 applications from local NGOs and associations, each of which made their own proposal for a target geography where they would offer FAS subsidies (MCA 2014). Many of these groups were not legally registered in Cabo Verde as NGOs, so they were automatically disqualified.

Three of these proposals were awarded FAS grants, with *Amigos da Natureza (AdN)* implementing the FAS on the islands of São Vicente and Santo Antão, and the NGOs *Citihabitat* and *Movimento África 70* implementing the FAS on Santiago. The selection of these projects—and islands—was grounded in the applicants’ ability to show they could meet the eligibility criteria, which MCA-CV had detailed in the terms of reference. Funding for the FAS included \$1.9 million from the WASH project, \$400,000 from the Coca-Cola Africa Foundation, and cash and in-kind contributions from beneficiaries valued at approximately \$500,000. Funds from the compact and the Coca-Cola Africa Foundation were pooled together and distributed to the NGOs to carry out the projects without any additional reporting burden on the NGOs.

The FAS projects were implemented between October 2014 and November 2015. The following section highlights our main implementation findings related to the FAS project.

1. Implementation and short-run outcomes³⁵

FAS enabled over 4,000 households to connect to the piped water network and/or networked sanitation or septic tanks. As shown in Table IV.2, FAS projects funded household connections for 4,343 households. The total number of FAS beneficiaries included an additional 300 connections that were added to the NGOs’ workplans after the program was expected to have ended, thanks to remaining resources from the Coca-Cola funding. According to the MCA-CV compact completion report, FAS connections exceeded targets by more than 1,800 connections, which included more than 27,000 individuals—of whom 50 percent were women (MCA-CV 2017).

Table IV.2. FAS beneficiaries by island and type of subsidy

	Piped water	Piped water and improved sanitation	Improved sanitation	Total
Santiago	2,148	267	614	3,029
Praia	1,020	111	459	1,590
Rest of island	1,128	156	155	1,439
São Vicente	478	247	32	757
Santo Antão	325	92	140	557
Total	2,951	606	786	4,343

³⁵ Household outcomes in E of the logic model in Figure II.2 are presented in Chapter VII.

With more households connected to the piped water network, AdS was able to close public fountains as part of its initiative to rationalize costs of water distribution.

Closure of the public fountains was confirmed by most focus group participants. AdS took a balanced approach to selecting which fountains to close. They knew that the drought had hampered many communities' ability to access and store water. They worked carefully with local utilities and the government to close public fountains but ensured that if a public fountain was closed, the community had alternative sources of water. In the end, not all community members received access to piped water, and had to purchase water from the tanker trucks (which they consistently noted delivered lower quality water) or from public fountains located in other communities. Those community members who were purchasing water from tanker trucks or public fountains noted the high cost of getting water and the time lost during the day if they had to travel to other communities because the closest public fountain was closed. These issues are discussed in more detail in Chapter V.

"... another problem is the availability of water quantity, there are [a] few municipalities like São Domingos that had almost no water, so we couldn't close the fountains. It was a balance—it's not just closing the fountains, it's having a satisfactory service everywhere to ensure that at least there's a source of water for people."

–ATAS staff

Throughout the FAS implementation process, the IEC helped improve household knowledge of WASH. According to international oversight consultants, key informant interviews, and household focus groups, the IEC campaigns were a success. The activity was largely implemented as planned and designed. MCA-CV created an IEC strategy, which included standard recommended hygiene practices as well as a focus on improving the population's knowledge around water management and nonrevenue water losses (Box IV.6). The strategy was implemented by the NGOs that administered the FAS subsidies. Together, the NGOs and MCA-CV developed awareness campaigns to teach households about the importance of paying for water and sewer connections, and helped them understand it was possible to have (and pay for) these connections legally. Focus group participants on both Santiago and São Vicente were able to recall and articulate various aspects of the IEC efforts.

"An even more important thing was to convince people that water can be paid, that through responsible management, with some care, both water and power can be paid for."

–FAS implementing NGO staff

"Connecting legally gives them some level of guarantee because as customers, they have the right to technical assistance, repairs, and so forth."

–Local NGO staff

Box IV.6. Topics covered in FAS IEC campaign

- Use and utility of bathrooms and toilets
- Water conservation and disinfection
- Hygiene, specifically related to toilet use
- Rational/smart water use
- Household budget management
- Awareness raising for the payment of water and sanitation services
- Notions of citizenship / prevention of water theft / non-revenue water
- Prevention of water-related diseases (dengue, malaria, diarrhea, etc.)

Source: FAS operations manual.

NGOs played a critical role in the communities. The IEC campaign had multiple goals, including helping households better understand the purpose of the project, what activities needed to be done in their communities, what the project expected from its beneficiaries, and then supporting households to sign up for the connections. MCA-CV’s local NGO partners played a critical role in this process (see Box IV.6). Key stakeholders noted that the knowledge local NGOs had of their communities, their experience on the ground, and the kind of dialogue they were able to create with communities formed the cornerstone of success for the IEC components of the FAS project. The NGOs created a sense of community ownership that was clear throughout the focus group discussions. Their ability to bond with communities led to increased community involvement in the FAS project; a willingness to donate materials and in-kind labor, and help educate neighbors; and drawing in of local government officials and technicians who provided subsidized services to extend the reach of FAS. Based on stakeholder reports, the work the local NGOs accomplished in Cabo Verde was one of the most resounding successes of the project.

Box IV.7. The FAS NGOs effectively partnered with local governments to support implementation

Amigos da Natureza: The head of the NGO was able to extend his work in Santo Antão through partnerships with the Municipal Councils who were the “owners” of water and sanitation services. The Municipal Council in Porto Novo assigned people to accompany the works of the contractors on the ground and extend the reach of FAS.

Movimento África 70 and CitiHabitat: Both NGOs worked closely with their respective municipal councils because staff at that time were very engaged and interested in the approach of some localities, and helped complete the IEC campaign quickly across municipalities.

Knowledge and awareness of their communities helped NGOs adapt their IEC campaigns so they resonated with households. Local NGO staff knew from the beginning that many communities needed to be educated about the project and the importance of water conservation,

hygiene, and sanitation use. They had worked for many years with these communities and understood the needs and challenges that households faced in their day-to-day lives. Their knowledge and awareness of the communities allowed each NGO to adapt their IEC campaigns to reach those communities. Although each NGO took a slightly different approach, geared to the communities in which they worked, the main steps were similar. Below we highlight the lessons and steps that made the IEC campaigns a success.

- **Raising awareness.** NGOs invited people to apply for beneficiary status. This process was done through meetings, door-to-door visits, local theater, pamphlets, flyers, schools, and even radio and television. NGOs focused on explaining the importance of water and sanitation but also emphasized the quality of the work that would be completed by competent technicians.
- **Sensitization of communities.** The NGOs drew on their previous experiences in working with the communities to emphasize that maintaining the works was the duty of the community. They had to be responsible for the public part of the network, not just the part inside the house. For example, *“If a water network is leaking, call ELECTRA. If it’s a sewage network, if it’s just a sewage cap, or if somebody sees neighbors lifting it up, either inform ELECTRA or make the neighbors become aware of it.”* The NGO representatives note that this sensitization also focused extensively on convincing people they could afford to pay for water through responsible management practices. The NGOs also worked to convince people to install the prepaid meters, which allowed households to shut off water when it reached a certain volume.
- **Beneficiaries selected based on FAS criteria.** These criteria included socioeconomic characteristics, proximity to the network, and need. The NGO representatives, staff from MCA-CV, and MCC’s consultants all agreed that the IEC campaigns were successful. However, local NGO representatives also noted that they often had to expand the areas from which they recruited FAS participants because many households among the original target populations were disqualified because they had outstanding debt to ELECTRA for electricity service or were unwilling—or unable—to contribute materials or labor. In addition to screening out some of the poorest households in the neighborhoods originally



“We have astonishing examples of people who cannot even read, but today they are able to monitor their meters.”

“If we go and see the communities today, you will see that almost no one has been cut off from the water. The IEC component allowed us to explain to people what the advantage is of having connected water at home versus buying at the public water fountains, not only the physical effort, but the financial effort itself. People have realized that piped water is cheaper [and] easier... than the water that is fetched from the public water fountain. People have also learned to control their water meter, to read the water meter and to control it.”

–Local NGO representatives



selected for the FAS, in some cases the NGOs had to expand to different neighborhoods in order to meet enrollment targets, but in doing so ended up serving less needy populations.³⁶

2. Sustainability and remaining challenges

The short-term nature of the FAS projects prevented staff from following up with households to determine the extent to which water saving strategies were implemented.

Reducing the anxiety and concern over payments required a longer-term IEC activity that followed up after connections were made to the network. Local NGO members and households were aware that some community members were still accessing water through illegal connections, which increases the costs for others who pay for water. Focus group participants indicated that these households continue to use the illegal connections because they feared not being able to pay for water if they connected legally. An extended IEC campaign might have helped mitigate some of these concerns over time.

E. Political economy analysis

Cabo Verde has gone through substantive institutional changes in its water sector over the past five years, from dismantling municipal water providers to create a corporatized utility on Santiago to creating a new independent technical regulator and expanding the authority of the economic regulator to oversee water and sewer service provision. Our political economy analysis of the WASH project provides qualitative evidence about the resources, political will, and institutional capacity that shaped the reform process, as well as insight into the effective management practices that took place during the MCC compact period to lay a strong foundation for sustainability. The political economy analysis offers a better understanding of additional research needed for exploring how the GoCV continues to strengthen and manage the sector, and how we measure the effectiveness of institutions at endline. Our team found widespread recognition by government institutions, local NGOs, donors, and households that WASH will play a critical role in the future of Cabo Verde. Further, the emergence of ANAS and ARE as key leaders in the sector create an important potential for fundamentally reorienting and strengthening the water sector through more consolidated decision making and quality oversight. Below, we highlight the key findings from the political economy analysis.

MCC's WASH project focused on changes throughout the political economy of the water sector and how in the end, through political and institutional will, those changes shifted the dynamics of the sector in a way that many believe will lead to behavior change. Stakeholder analysis is a methodology that helps us understand and facilitate institutional and policy reform processes by accounting for the needs of stakeholders who have an interest in the reforms. The analysis gathers information about key stakeholders, their interests, and their potential to support or oppose reform. By plotting each stakeholder and that stakeholder's position in a matrix, we can gain a sense of who has the power to make decisions; it highlights differing points of view toward reforms, highlights possible power struggles among potential winners and losers, and

³⁶ FAS implementers and MCA-CV staff did not provide us with any information on the neighborhoods to where they expanded in order to meet enrollment targets.

ultimately helps identify strategies for negotiating with opposing stakeholders (or those losing power) to help make changes sustainable (World Bank 2019).

Before the institutional changes, the power of decision making in the water sector was concentrated across a number of ministries, including the Ministries of Agriculture and Environment, Energy and the Economy, and Infrastructure and Tourism. Decision making for the WASH sector was decentralized, and roles and responsibilities regarding agricultural water, potable water, sanitation, and desalinization were siloed across these different entities. The SAAS (municipalities) held most of the power for distributing water on most islands, but lacked much ability to make decisions at the policy level.

The ability to influence decisions in the water sector has clearly shifted among organizations as several stakeholders have gained decision-making power, whereas other stakeholders have lost power. For example, in 2012, the SAAS were at the center of the process on Santiago because they were able to make decisions related to the provision of water and tariff setting for their municipalities. Today, the SAAS have been replaced by AdS which has much less decision-making ability within the sector since it is regulated by both ANAS and ARE. The sector has consolidated decision making into fewer institutions (that is, ANAS, Ministry of Agriculture and the Environment) entering the post-compact period. The creation of ANAS and changes in roles and responsibilities between ARE and ANAS have allowed the two regulators to take a stronger role in influencing the sector. The DNA continues to maintain its position around environmental regulations in the sector, whereas the SAAS were the clear losers of decision-making power, particularly on Santiago, where they lost their position in the water sector with the creation of AdS. This loss is the reason that they were one of the most critical players in gaining buy-in at the beginning of the reform process. Today, the operators (including AdS on Santiago) distribute water to the sector but have little influence on policy. Policy setting and regulation are led by ANAS and ARE as the regulators; they are supposed to work with their ministry counterparts to set regulations and laws to continue guiding the sector. If these organizations are able to fulfill their mandates, the changes have a good chance of improving efficiencies in the sector.

Future programming in the WASH sector should consider how to continue clarifying the roles of the key water agencies while building technical and administrative capacity to manage the sector. Because many other donors and partners are working to strengthen different systems within the WASH sector, it is important to focus strategically on developing ways to monitor and support the internal dynamics and principles that will help make the water agencies effective. An important dimension of the internal dynamics is ensuring that leadership is technically competent and has the management acumen to continue moving the sector forward. International consultants and key informant interviewees all noted that although grey areas of responsibilities between ANAS and ARE still exist, those roles are becoming more distinct, helped along by the continued support of the donor community. As regulators in the sector, their responsibilities need to be clear; otherwise, there is room for other people in the Ministry of Agriculture and the Environment, other ministries, or even outside organizations (like ARE) to take on decision making that should fall to ANAS and increase inefficiencies in the new system. For example, several stakeholders noted concerns that ANAS will end up solely with the water

resources management function and ARE will take over regulation of the quality service. ANAS needs to work at a higher policy level to oversee and regulate the sector.

Qualitative findings suggest that one of the most critical pieces for the success of this reform process is communication and the open and transparent engagement of stakeholders. Actors (or stakeholders) in the reform process can often make or break the success of institutional changes. From the beginning, there was a resounding commitment from stakeholders across institutions to change “how things worked” in the water sector. Those involved in the early stages of the design process believed that if they could get commitment from all of the actors to do the work, the project would be successful—and it was. Examples of the open and transparent communication process include the following:

- GoCV, donors, and consultants worked with SAAS members in agreeing to dismantle the existing system and establish one corporatized utility. People in Cabo Verde wanted more water; the municipalities were in debt, and MCC came in with extra resources and offered to fund the infrastructure. Through hands-on meetings and open communication, MCA-CV understood that the municipalities really wanted the new infrastructure, so they were able to use that desire as leverage when negotiating for the new corporatized utility. The meetings and negotiations also highlighted that at the root of SAAS concerns was a desire to ensure their staff were protected; it allowed MCA-CV and the GoCV to develop effective retrenchment activities to meet the needs of all actors. The effectiveness of these negotiations set a positive tone for the reforms and prevented resistance from those actors who would “lose” as a result of the changes.
- MCA-CV consistently encouraged open communication among implementers so they could learn from each other and increase the projects’ efficiencies. Strong communication across government entities and with external partners is a critical piece of effective institutional reform. For example, during the recruitment process for FAS and the IEC campaigns, the three FAS implementers shared best practices with each other, which helped them exceed their targets for the FAS component of the project. ANAS staff now participate in the Ministry of Agriculture and the Environment council, allowing the organization to contribute to any policies being developed for the water sector. These important institutional functions have changed substantively in the past five years and could lead to improvement in the management and regulation of the sector.
- MCA-CV and its partners focused on multiple goals when getting information out to the public. Implementers helped families to apply for subsidies through the FASA and FAS funding mechanisms, and AdS and MCA-CV helped the population to better understand the project and its purpose, what activities would be done, and what the project expected from those people who would benefit. Providing this information to communities increased their power to make decisions related to connecting to the pipeline network, managing their household use of water, managing their use and storage of water, and potentially changing their hygiene habits and thus helped move the needle on meeting program objectives.

Financial incentives helped motivate key actors. For example, municipal leaders on Santiago were persuaded to discontinue their SAAS and join AdS in part because they hoped to qualify for FASA funding. MCC was also able to use its financial leverage (i.e. the threat that disbursements to MCA-CV would be withheld) to accelerate achievement of key milestones like getting government approval of the retrenchment plan for SAAS workers that was a necessary step in creating AdS, issuing AdS's first bills in each municipality, and passing the water code shortly before the end of the compact.

Although the donor community may not be able to directly address the lack of water resources in Cabo Verde, it can play an important role in continuing to strengthen the capacity of the new institutions to ensure reduction of technical and commercial losses, improve customer service support, and build strong management capabilities across institutions. Essential to addressing these gaps is continuing to support the establishment of clear guidelines for operating in the sector, training staff in the agencies to enhance their technical and management capabilities, and helping the GoCV understand the importance of qualified technical leaders versus political appointees. Providing funding and resources to local NGOs to continue working within communities to improve the latter's knowledge of and ability to manage water resources is an important component of sustainability. The technical support from donors and consultants helps AdS fulfill its role as an entity that has the power to make decisions around shutting off water when bills go unpaid and helping households learn to manage their water resources. Resolving disputes and clarifying roles and responsibilities between ANAS and ARE require additional technical support and the political clout of both the donor community and the Ministry of Agriculture and Environment because they know and understand the working relationships and structure needed to keep the water sector moving toward institutionalizing the reforms.

AdS is still a new and evolving institution that requires significant technical and political support. Although islands like Fogo and Brava provide good role models for successful corporatization efforts in Cabo Verde, AdS still struggled to establish strong systems to manage water distribution on Santiago. The politically appointed board contributed to these difficulties and, although a new board is now in place, the organization continues to struggle to bill customers effectively, provide water consistently, reduce its technical and commercial losses, and respond to customer complaints. The difficulties have stemmed from both human capacity and financial resource deficiencies. Human capacity means that AdS still needs additional qualified technicians and management staff to lead the organization and respond to customer needs. Financial resources means having the capital equipment to maintain the infrastructure, reach customers across the islands, and repair nonfunctioning pipes. If AdS is to become a sustainable organization in the next three years, it will require continued political support and the belief by the GoCV that corporatized utilities will improve the sector's ability to manage water resources, as well as continued donor support to build capacity to do the work.

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V. THE WASH PROJECT'S EFFECTS ON SANTIAGO HOUSEHOLDS

This chapter describes the water and sanitation conditions and practices of Santiago households in 2018, and compares them to the conditions and practices of Santiago households in 2011. We begin by describing the demographic and socioeconomic characteristics of the sample of households included in the analysis (Section V.A) and then examine (1) how household connections to the piped water network have changed over time; (2) the continuity of supply (that is, how often water is available through the piped water network); and (3) satisfaction with the piped water network (Section V.B). We then describe households' use of non-piped water sources, including reliance on different types of non-piped water as primary and alternative sources of water, the closure of public fountains (standpipes or other public connections to the piped network where people could collect utility-provided water for a fee), and water collection practices (Section V.C). We then present estimates of how much water households consume, aggregating across both piped and non-piped water sources (Section V.D). The second half of the chapter covers sanitation facilities and practices, including connections to the sewer network and other types of sanitation facilities (Section V.E); spending on water and sanitation (Section V.F); and WASH knowledge, hygiene practices, and the prevalence of diarrhea (Section V.G).

Key findings

- **As of 2018, three in five Santiago households are connected to the piped water network in 2018, an increase from two in five households in 2011.** On average, connection rates in urban areas outside of Praia are the highest on the island. The share of households in Praia that use another household's piped water network connection also increased over this period.
- **In 2018, about 45 percent of piped water network users had water service for three or fewer days per week, on average.** Nevertheless, almost two-thirds of connected households are satisfied with the frequency and duration of water service.
- **More than half of all households collect water, including nearly half of households that are connected to the piped water network.** However, households that rely on public fountains, streams, wells, or springs as their primary water sources spend considerably more time collecting water.
- **Overall, households use 40 liters of water per person per day.** Households that rely on the piped water network use more water than other households.
- **Sewer connection rates did not rise significantly for the population as a whole between 2011 and 2018, but they more than doubled among poor households.** About one in four Santiago households has a sewer connection, most of which are in Praia or other urban areas.
- **Access to improved sanitation facilities increased between 2011 and 2018.** This was driven by an increase in the share of rural households having septic tanks and an increase in sewer connections in some urban areas outside of Praia.
- **Compared to other households, poor households were less likely to be connected to the piped water network and sewer network.**
- **In 2018, 21 percent of children younger than age 5 had diarrhea over a four-week period.** This level is similar in Praia, other urban areas, and other rural areas.

A. Demographic and socioeconomic characteristics

Before looking at differences in key outcomes of interest between 2011 and 2018, we assessed whether our sample of Santiago households in 2018 was similar to the sample from 2011 in terms of demographic and socioeconomic characteristics. Both samples were designed to be representative of Santiago; differences between the samples could reflect true changes over time, chance differences due to sampling, or differences in survey methodology.

Overall, Santiago households surveyed in 2018 are relatively similar to those surveyed in 2011 on key demographic characteristics (Table V.1). In both rounds, households in Santiago had just over four household members, on average, and roughly one-third of households had children younger than age 5. About half of the households in both rounds had a female household head. In addition, more than half of the households were located in Praia and about one-third were located in rural areas.

There are statistically significant differences between the 2011 and 2018 samples on two dimensions of socioeconomic status: (1) education of the household head and (2) home ownership. In particular, between 2011 and 2018, there was a decrease in the share of household heads with less than a basic level of education and an increase in the share with higher levels of education. These changes may be exaggerated, however, because there is uncertainty about how 2018 respondents classified their education level if they started but did not finish a particular level of education, as the 2018 survey did not have response categories that made this distinction. We also observe an 11 percentage point increase in the rate of home ownership between 2011 (when 71 percent of households owned the home they lived in) and 2018.

Expenditures and poverty rates are similar across years. Although average per capita household expenditures appear lower in 2018, the difference between the years is not statistically significant. In addition, there are no differences in estimated poverty rates (based on expenditures) across years, with one-quarter of households being characterized as poor in both years. On average, households spend less than USD100 per person per month (in 2018 USD).

Table V.1. Demographic and socioeconomic characteristics of Santiago households (2011 and 2018)

Characteristic	Sample size		Mean		Difference	p-value
	2011	2018	2011	2018		
Demographic characteristics						
Household size	998	998	4.16	4.32	0.16	0.26
Household has children under age 2	996	994	0.14	0.12	-0.02	0.16
Household has children under age 5	996	994	0.32	0.31	-0.01	0.67
Female household head ^a	998	998	0.53	0.53	-0.01	0.83
Education of household head ^b	965	990				$\chi^2=0.00^{***}$
Less than basic education			0.45	0.27	-0.18	0.00 ^{***}
Basic education			0.34	0.40	0.07	0.00 ^{***}
Secondary education			0.15	0.21	0.06	0.01 ^{***}
Higher education			0.07	0.12	0.05	0.03 ^{**}
Household owns its house	985	996	0.71	0.82	0.11	0.00 ^{***}
Geography						
Municipality	999	998				$\chi^2=0.51$
Praia			0.52	0.58	0.06	0.46
Other urban areas			0.14	0.12	-0.02	0.56
Other rural areas			0.33	0.30	-0.04	0.61
Household spending and poverty						
Monthly household expenditures per capita (in 2018 USD) ^{c,d}	575	998	94.91	78.85	-16.07	0.12
Household in poverty ^e	575	998	0.26	0.25	-0.01	0.79
Household in extreme poverty ^e	575	998	0.13	0.11	-0.02	0.45

Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates were weighted to adjust for differences in sampling probabilities. Statistical significance of differences was based on p-values that were adjusted for clustering at the enumeration area level. All comparisons presented in the text were statistically significant at the 0.10 level or better, based on two-tailed t-tests that were weighted to adjust for differences in sampling probabilities.

^aFemale-headed households include only households in which all designated household heads were female. If the household names both female and male heads, then it is not categorized as a female-headed household. If the household does not designate a household head, the household is categorized as not having a female household head.

^bEducation of the household head is the highest education level completed for the household head with the most education (if more than one head is designated) or the household member with the most education (if no heads are designated).

^cIn 2018, USD1 = CVE92.59, the average exchange rate from oanda.com between April 14, 2018, and June 16, 2018, the period of data collection. In 2011, USD1 = CVE84.58, accounting for 7.93 percent inflation between 2011 and 2018.

^dTo account for outliers, values are top-coded at the 99th percentile value within each year.

^ePoverty is defined as having household expenditures per capita lower than 60 percent of the median. Extreme poverty is defined as having household expenditures per capita lower than 40 percent of the median.

*/**/*** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

B. Use of the piped water network

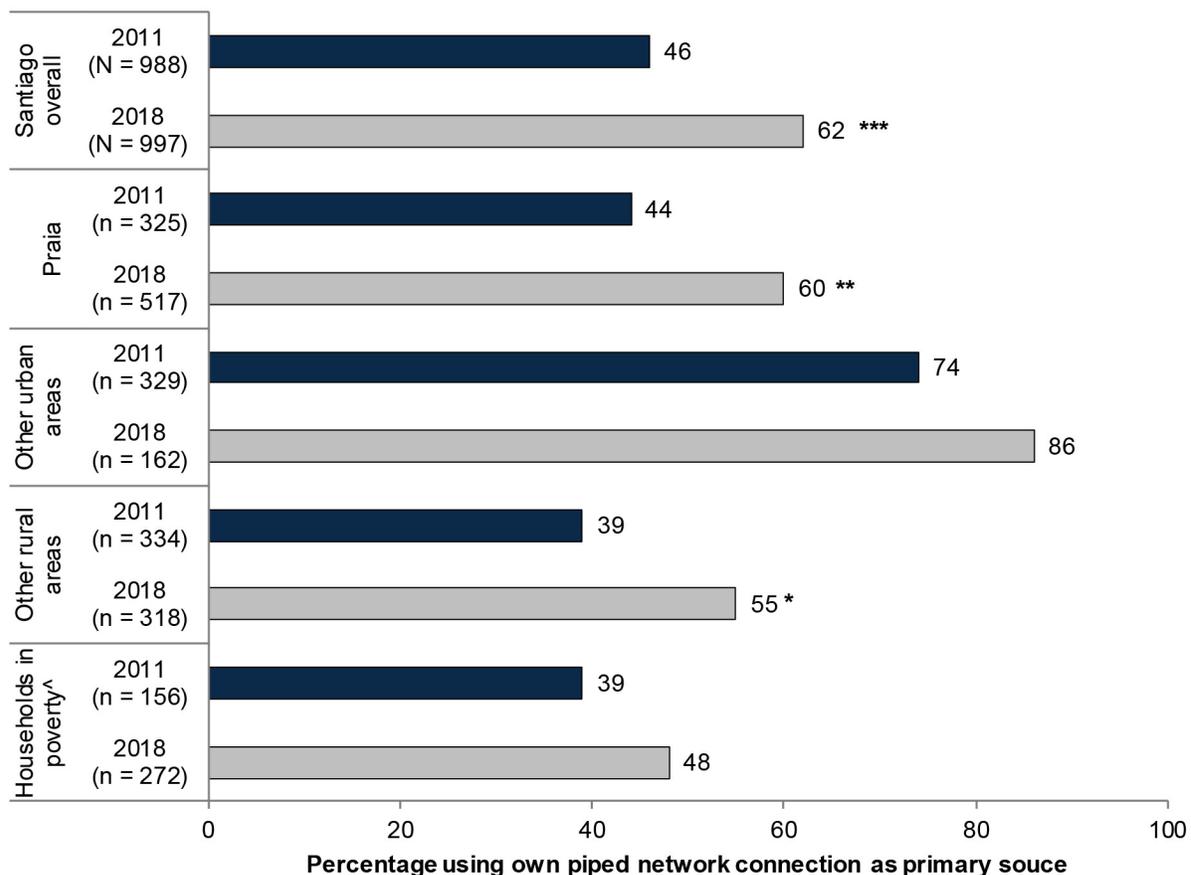
The WASH project was designed to increase the number of households connected to the piped water network while improving the quality of service provided by the water utility. Indeed, more households are now connected to the piped water network. However, there is still room for improvement in the quality of service provided by AdS, as evidenced by wide variation in the continuity of service (days and hours of service available) and relatively low levels of customer satisfaction along a number of dimensions.

1. Household connections to the network

Household connections to the piped water network³⁷ increased by approximately one-third across Santiago between 2011 and 2018 (Figure V.1). Connections increased across Santiago, with the largest increases in Praia and rural areas. Urban areas outside of Praia had higher rates of piped network connection in both years than either Praia or rural areas. As of 2018, more than three in five Santiago households use their own piped network connection as their primary water source. Poor households are less likely to be connected to the piped network than other households, but they experienced a similar increase in their connection rates to the population as a whole.

When we also consider households that use another household's connection in addition to those with their own connection, the percentage of households that use the piped network increases. The share of households that use a piped water network connection—their own or another household's—was 57 percent in 2011 and is 76 percent in 2018, with the growth driven by a large increase in Praia (not shown). Several focus group participants in Praia noted that they use a neighbor's or another household's connection because they cannot afford to connect to the network themselves.

³⁷ We categorize households as connected to the piped network if they report using their own connection to the piped network as their primary water source.

Figure V.1. Change in use of the piped water network (2011 and 2018)

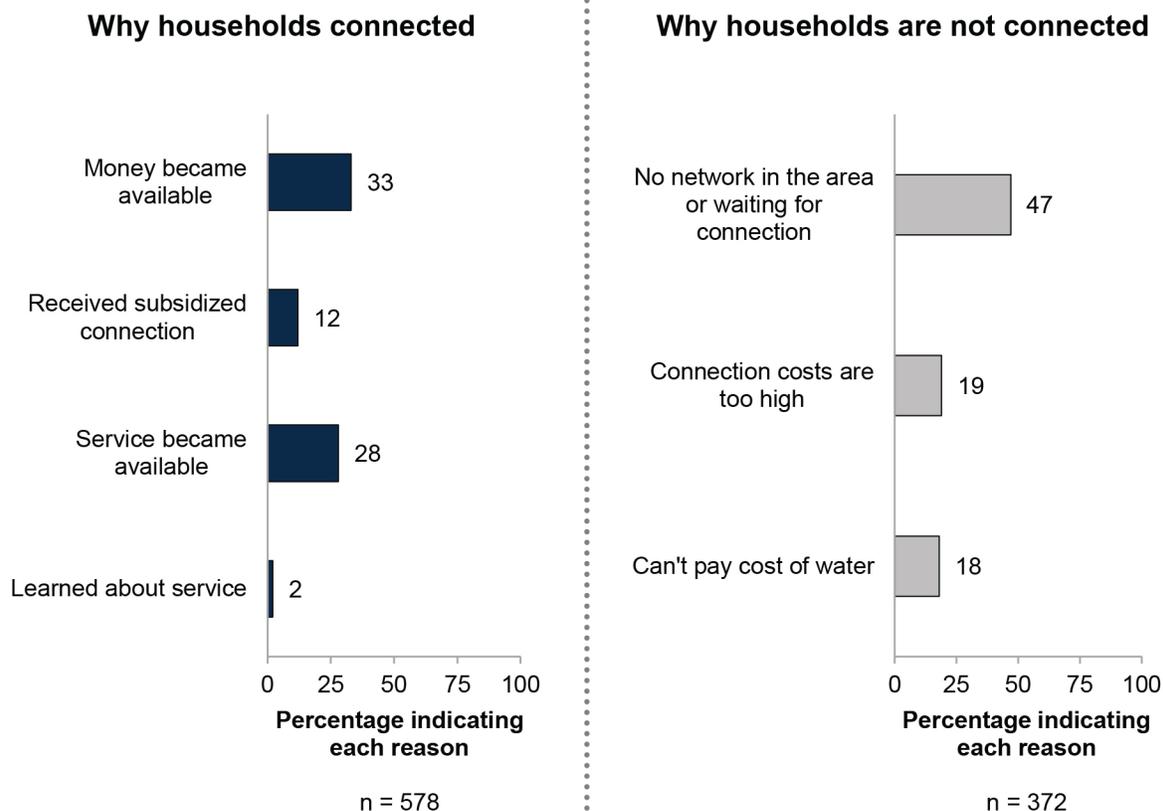
Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Statistical significance of differences is based on p-values that are adjusted for clustering at the enumeration area level.

[^]Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

*/**/** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

The survey data corroborate the qualitative finding that many household decisions to connect to the network are driven by financial ability. Nearly half of households that were connected to the network in 2018—both those that connected before the WASH project and newly connected households—say they connected once they had enough money to pay for the cost of connecting, either from their own funding source or from a subsidy (Figure V.2). More than one-fourth of households report connecting when they did because service became available, and only a small fraction of households connected because they learned that the service was already available. Households that are not connected reported similar reasons for not connecting: almost half are not connected because there is no network in their area or because they are waiting for a connection, and more than one-third of households are not connected because they cannot pay the cost of either the connection or the water service.

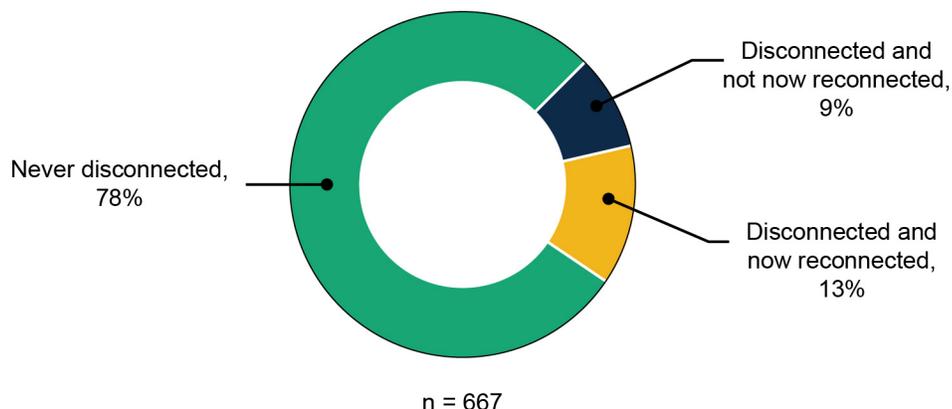
Figure V.2. Reasons households connected (or not) to the piped water network (2018)

Source: 2018 WASH Interim Survey (Santiago representative sample). These data were not collected as part of the 2011 Compact Baseline Survey.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. The percentage indicating each reason why households connected is based on households that used their own piped network connection as their primary source. The percentage indicating each reason why households are *not* connected is calculated among households that do not use their own piped network connection as their primary source. Percentages might not sum to 100 because respondents could have selected multiple response options and because some responses that were not given by many respondents are not presented here.

Most households that have been connected to the piped water network have never been disconnected from service (Figure V.3). Of those that report being disconnected in the past, most report that they have since been reconnected. The most common reason for disconnection is failing to pay the water bill (nearly 90 percent of households that were disconnected, not shown). Only a miniscule share (fewer than 2 percent) report being disconnected because they had an illegal connection; however, there might have been underreporting of illegal connections, so the true share could be higher.

Figure V.3. Share of households that have been disconnected from the piped water network (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). These data were not collected as part of the 2011 Compact Baseline Survey.

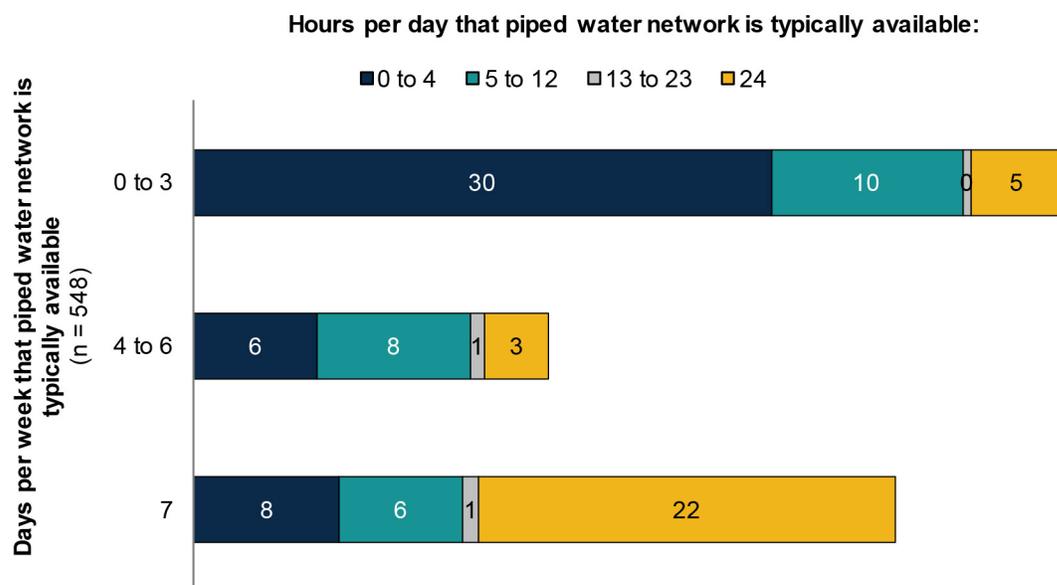
Notes: Estimates are weighted to adjust for differences in sampling probabilities. Sample is restricted to households that have connected to the piped water network and provided consistent information about connections and disconnections. A disconnected household is considered to have reconnected if its primary water source is its own connection to the piped water network.

2. Continuity of piped water supply

The project logic envisioned that improvements in the water supply infrastructure and the utility's capacity were expected to lead to improvements in the continuity of supply, including increasing the amount of time that water is typically available through the network and reducing the frequency of unexpected disruptions in access to water. However, most FASA projects were network extensions, which resulted in more connections but no changes in the amount of water supplied. In households that rely on their own piped water network connection as their primary source, self-reported continuity of supply varied. More than one-third report having water every day—most of those households reporting that they have water 24 hours per day—and more than half reported having water at least four days per week (Figure V.4). Continuity of supply is more consistent in Praia, where more than half of respondents report having water every day (not shown). In rural areas, fewer than 10 percent of households report having water every day.

There remain many households that spend more than half the week without water. In addition, even on days when water is available, it is often available for only a small part of the day. Among households that have water fewer than four days per week, two-thirds report having water for four or fewer hours per day. As a coping strategy, more than two-thirds of households that rely on a piped connection have water storage tanks, which could provide water on the days it is unavailable through the network.

Figure V.4. Typical continuity of piped water network service, among households with their own connection to the piped water network (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline Survey data on these questions includes too many implausible values to be included in the analysis.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Figure indicates the share of households reporting in each category.

Although we do not have a reliable baseline measure of the availability of water from the survey data, results from the qualitative focus groups suggest that continuity of supply has improved since the implementation of the WASH project, as expressed by participants in all seven focus groups conducted in Santiago. Even participants who did not receive FASA or FAS support noted the improved provision of water to neighborhoods since the creation of AdS. Focus group participants also commented that although the water supply is still inconsistent, there is more continuity than under the SAAS—which allows them to store water for times when the supply is unavailable.

Most households that use the piped network—including those that use their own or another household’s connection and those that collect water from a public fountain—experienced disruptions of service in 2018 (not shown). Fifty-four percent of respondents reported experiencing at least one disruption in service in the past month, and 72 percent of households experienced disruptions that lasted longer than one day. While the prevalence of disruptions does not vary across Santiago, on average the *duration* of disruptions is longer outside of Praia, with 78 percent of disruptions lasting more than one day compared to 68 percent in Praia (not shown).³⁸

3. Satisfaction with the piped water network

The survey asked households that rely on their own piped water network connection about their satisfaction with the piped water supply, focusing on a number of dimensions. The majority of piped water customers are satisfied or very satisfied with several aspects of the service they receive from AdS, including the potability, frequency and duration of service, and information on when supply will be available (Figure V.5).

Encouragingly, customer satisfaction on these dimensions increased between 2011 and 2018, although AdS still has room for improvement.³⁹ Focus group participants echo these results, often commenting on improvements in the access and frequency of water provision, though satisfaction levels are lower among focus group participants in São Domingos—a mostly poor and rural municipality north of Praia—and the poorer areas of Praia.

According to the 2018 survey, fewer than half of households are satisfied with water pressure—a sentiment shared by focus group participants. Several participants said that when AdS initially connected their homes, the pressure was good, but over time water pressure has become inconsistent. Although it appears that satisfaction with water pressure might have decreased since 2011, the difference is not statistically significant.



“Well, I think that in 2017 and 2018 the water supply has improved in our localities. Now we have water every week. I think it got better. [We used to buy] water every week ... because we did not have water. But now, from the end of 2017 to 2018, it is better because we no longer buy water.... In my case, I no longer buy water from the water truck.”

—Focus group participant, São Domingos

“What we can see is that in the last two years the water service has improved considerably. This is because, earlier in the summer months, people had difficulty in resupplying, and also the quality of water supplied was poor. Even with water shortages, the supply has improved quite a bit over the past two years compared to the previous supply.”

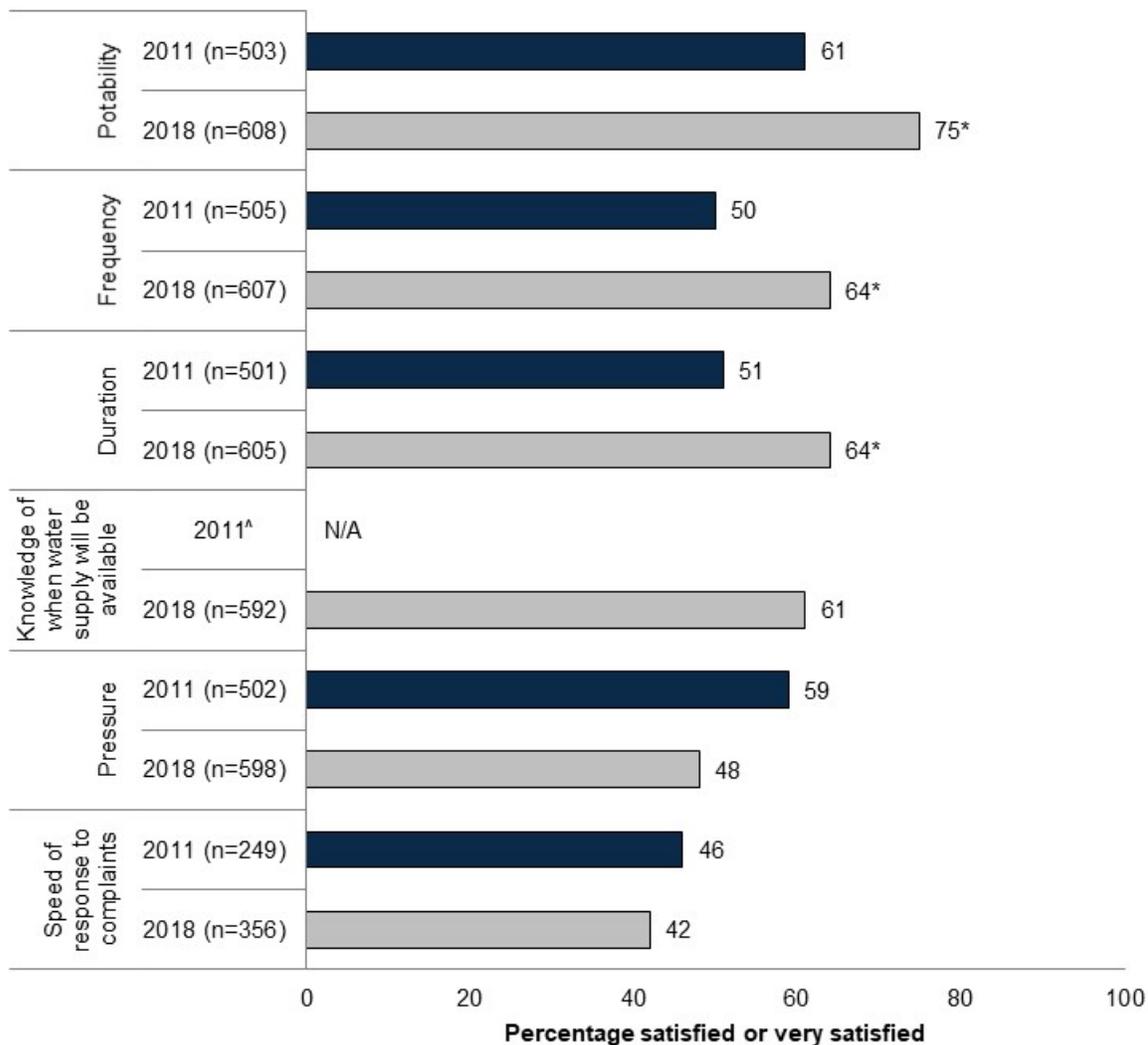
—Focus group participant, Praia



³⁸ We cannot accurately assess the changes in disruptions between 2011 and 2018 because the survey questions were not comparable from year to year.

³⁹ The 2011 Compact Baseline did not include a question about knowledge of when piped water would be available.

Figure V.5. Satisfaction with different dimensions of piped water network service, among households with their own connection to the piped water network (2011 and 2018)



Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Note: Estimates are weighted to adjust for differences in sampling probabilities. Statistical significance of differences is based on p-values that are adjusted for clustering at the enumeration area level.

[^] Knowledge of when water supply will be available was not included in the 2011 Compact Baseline Survey.

*/**/** Significant difference from zero at the .10/.05/.01 level, two-tailed test.

In 2018 only 42 percent of AdS customers who have an opinion about the utility’s responsiveness are satisfied or very satisfied with the time it takes the utility to address issues, very similar to the situation in 2011. Focus group participants are vocal about their displeasure with AdS customer service, commenting that AdS does not serve its customers well or give them enough information about the transition from ELECTRA to AdS. Although several households note that they learned of the transition to AdS through the media, television, or radio, a few people learned of the transition when they called ELECTRA about a bill and were told that AdS now handled billing.

The quantitative and qualitative findings on satisfaction with water quality are somewhat inconsistent. Three-quarters of surveyed households are either satisfied or very satisfied with the potability of piped water, whereas many focus group participants indicate that the quality of water is poor—with complaints about the taste, smell, and color of the piped water in their homes.

“The complaint system still does not work.”

“ELECTRA—when communicating some malfunction—took a long time to respond. AdS does not respond. The form of customer service has not improved.”

“At the moment of transition there was some deficiency, because there were five months without information about invoices to make payments. And whenever they were requested, they were not sent. And employees did not know how to answer the requests for information requested by the clients.”

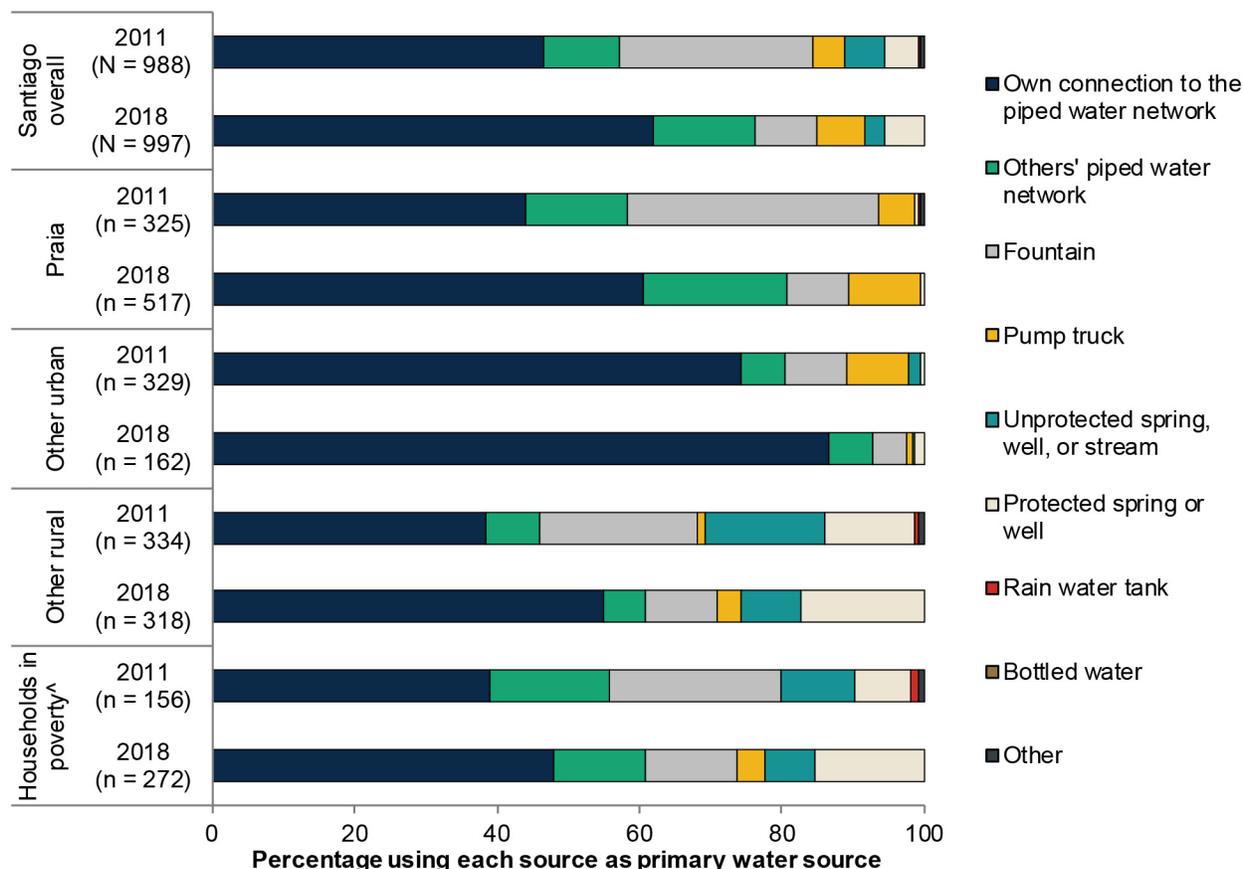
—Focus group participants, Santiago island

C. Use of non-piped water

1. Primary water sources

The WASH project was designed to decrease the share of the population that relied on non-piped water in hopes of reducing the time burden of water collection and the health burden of diarrhea attributable to unsafe water. Between 2011 and 2018, as the share of households using the piped water network increased, reliance on public fountains as a primary source of water decreased from 27 percent in 2011 to 9 percent in 2018 (Figure V.6). The decrease in public fountain use is most pronounced in Praia. Most other sources were not used by a large share of households in either year. There is evidence of an increase in the use of pump trucks—particularly in Praia—and of a decrease in the use of unprotected springs, wells, and streams—particularly outside of Praia—but these changes are not statistically significant.

Figure V.6. Households' primary water sources (2011 and 2018)



Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Note: Estimates are weighted to adjust for differences in sampling probabilities.

^Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

2. Alternative water sources

Most households drink from their primary water source, but about 15 percent of all households use an alternate source of drinking water (not shown). Among households that drink from a source that is different than their main source, bottled water is the most common source of drinking water. Households in Praia are more likely than those in other parts of Santiago to rely on a drinking water source that is different from their primary water source, especially relying on bottled water.

When their primary water sources are unavailable, most households turn to alternative water sources. The most common alternative sources of water include other households' piped network connections, pump trucks, and the household's own reserves. Compared to households that use the piped water network (through their own or another household's connection) as their primary source, households that do not use a piped network connection are relatively less likely to rely on reserves and more likely to rely on pump trucks as an alternative source. Many households use

the same type of source as both their primary and alternative source—for example, using a different stream if their primary stream is not available.

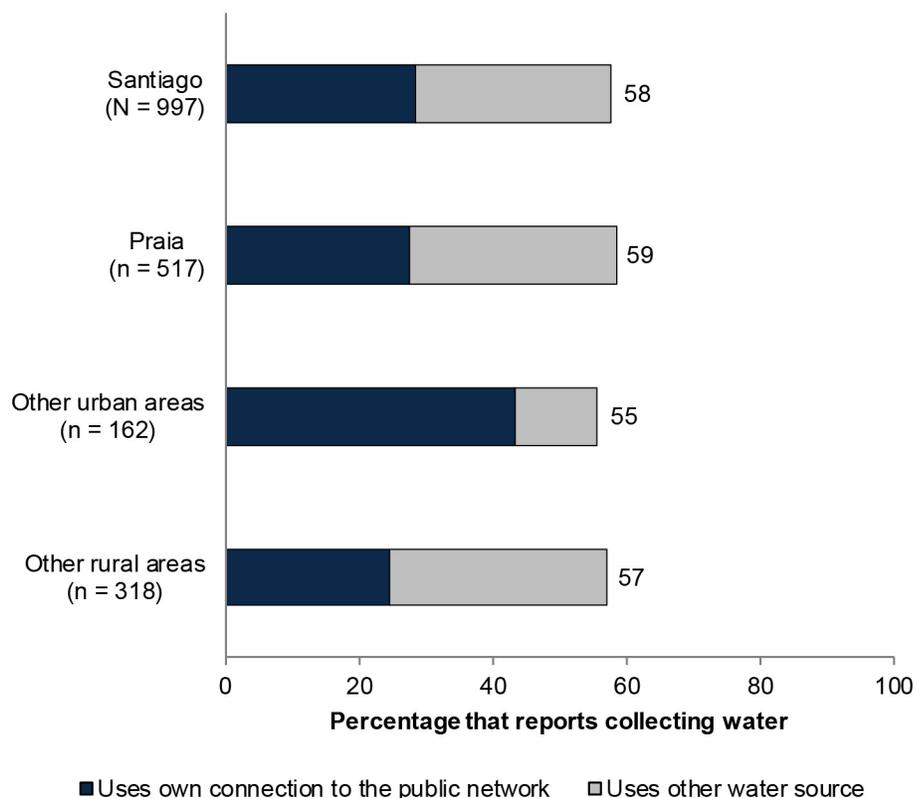
3. Closing of public fountains

As AdS expanded piped water service to homes, the utility was expected to close some public fountains. This appears to have been implemented, because nearly half of respondents in the 2018 survey report that a fountain they have used before is closed. There was some concern that the closure of public fountains could decrease access to water for households that had relied on them as their primary water source. However, more than 90 percent of households for which a fountain closed still have a public fountain within 250 meters of their home. There are households that currently have neither a piped water connection nor a fountain within 250 meters of their home, but most of them did not have a nearby public fountain in the recent past. Meanwhile, nearly two-thirds of households within 250 meters of a closed public fountain now rely on their own connection to the piped network as their primary source. Overall, nearly two-thirds of all households have a public fountain within 250 meters of their home; the share is the same for households with and without their own connection to the piped network.

Although the closing of public fountains has not negatively affected a large share of the population, some focus group participants who rely on public fountains talk about how many fountains have closed, causing problems for them. Some participants note that, since the fountains closed, those who do not have water from the network now have to ask for water from others.

4. Water collection

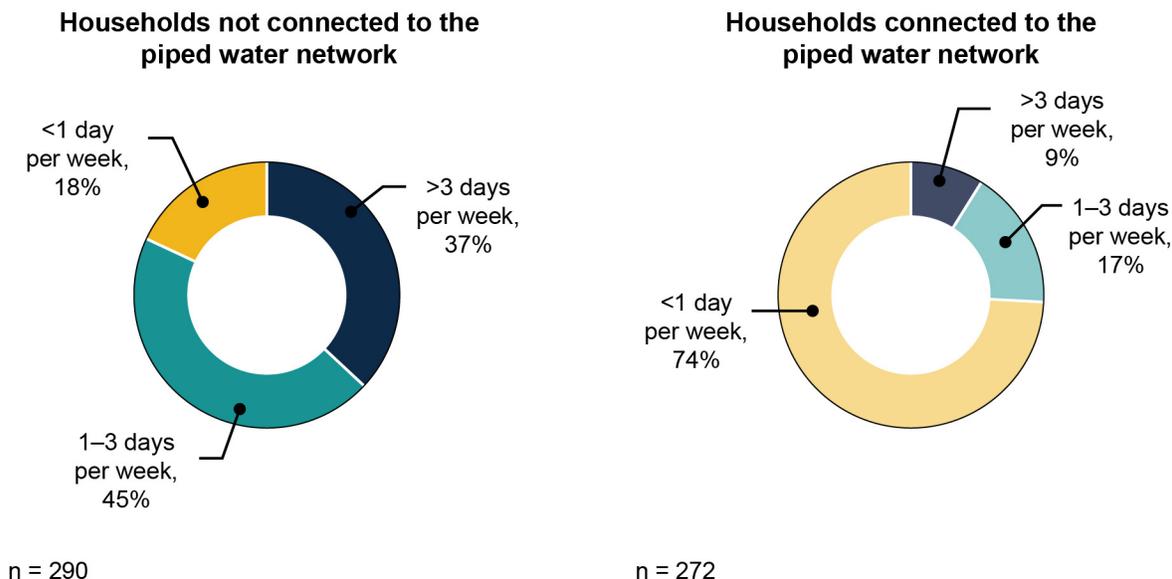
With an increase in connections to the piped water network, the project intended to decrease the amount of time households would have to spend collecting water. More than half of all households collect water as of 2018; the share that collect water does not vary appreciably across different regions of Santiago (Figure V.7). Collecting water is common even among households with a connection to the water network; nearly half of these households report collecting water at least sometimes. Households that do not collect water either rely on the piped network (and reserves) as their primary source, have water delivered or otherwise brought to them, or travel a minimal distance to collect water.

Figure V.7. Share of households that collect water (2018)

Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline Survey did not ask about water collection from alternative sources so it is not possible to calculate the share of households that collect water from any source.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Share that collect water included households that indicate they collect regularly or occasionally.

Among households that collect water, those with a piped water connection collect much less often than those without a connection, with most connected households collecting less than once per week (Figure V.8). Focus group participants with their own connection to the piped water network usually only collect water when the network has been down for a number of days.

Figure V.8. Frequency of water collection, by primary water source (2018)

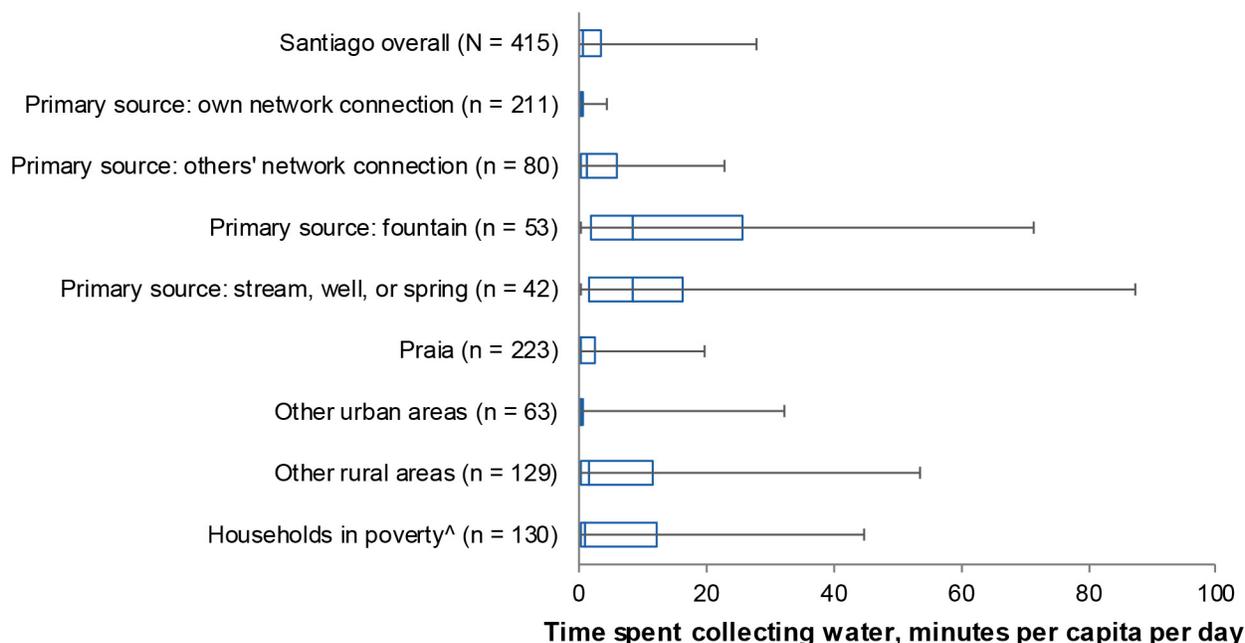
Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline survey asked how many trips the respondent's household makes to collect water per day but did not ask how many days per week the household collected water.

Note: Estimates are weighted to adjust for differences in sampling probabilities.

Most households spend relatively little time collecting water: the median time spent collecting water is less than one minute per person per day, and three-quarters of households that collect water spend less than four minutes per person per day, after accounting for the fact that many households do not collect water every day and not all household members participate in water collection (Figure V.9).⁴⁰ However, 5 percent of households spend considerably more time—more than 28 minutes per person per day. Households in rural areas and poor households spend relatively more time collecting water, on average, but the median rural or poor household still spends less than two minutes per person per day collecting water. Households that rely on fountains, streams, wells, or springs as their primary water source typically spend more time collecting water than those that rely on their own or another household's piped network connections.

⁴⁰ A small number of households report collecting water but collected it so infrequently that the time spent on it is negligible; those households are excluded.

Figure V.9. Average time spent collecting water, among households that collected water (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline Survey collected only very rudimentary data on time for water collection by asking about the number of trips per day (but not the number of days per week that water was collected) and the time spent per trip. The 2018 Interim Survey includes data on multiple sources and is scaled by the number of days per week that the household collects from each source.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Medians and percentiles are not top-coded. Blue box indicates the 25th percentile value (left), median (middle), and 75th percentile value (right). The bars (“whiskers”) indicate the 5th and 95th percentile values.

^Poverty is defined as having household expenditures per capita lower than 60 percent of the median

If we look at each trip that households take to collect water—rather than the total amount of time per person per day—we see that trips take different amounts of time depending on the source. At the median, households collecting water from others’ network connections spend about 7 minutes per trip, compared to 25 minutes for those collecting from fountains and 39 minutes for those collecting from springs and wells (not shown).

Contrary to perceptions that water collection is a woman’s task (as expressed repeatedly in the focus group discussions conducted as part of the interim evaluation), the 2018 survey data suggest that both men and women and both adults and children collect water. Of households that collect water, on their most recent day of water collection, about 30 percent had water collected only by women, 24 percent had water collected only by men, 24 percent had water collected by both men and women, and the remainder of households had water collected by children (sometimes with men or women) (not shown). Men collect water even if there are women in the household: in 85 percent of households in which men collected the water, there is at least one woman in the household.

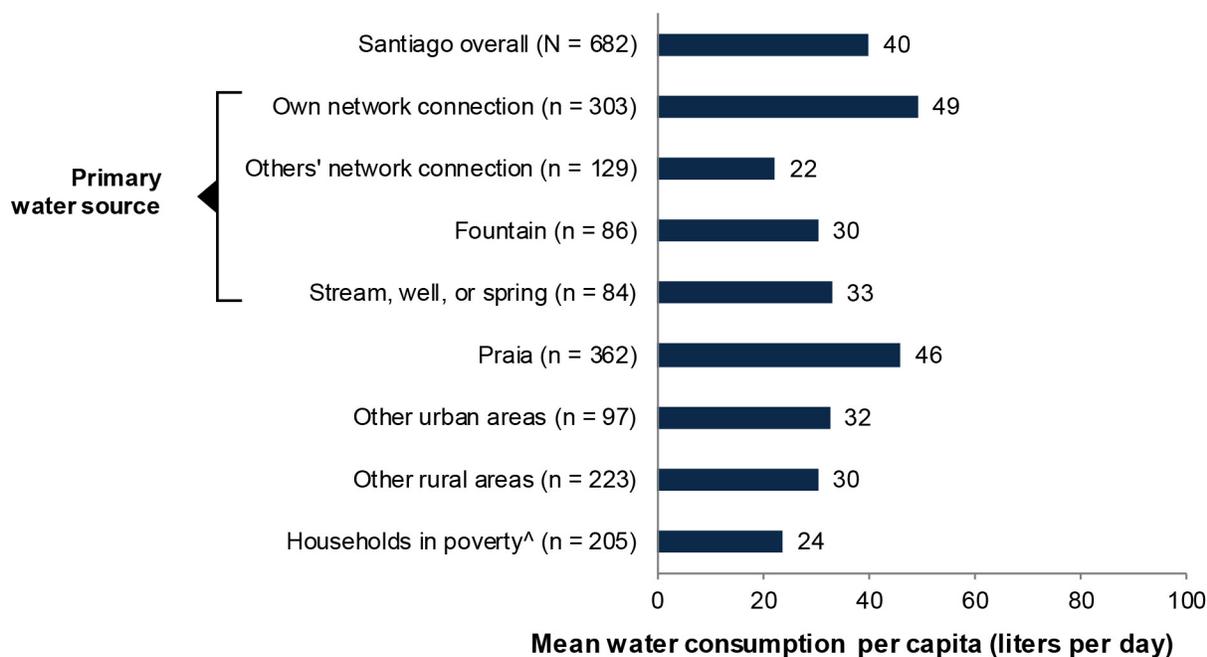
D. Water consumption

The WASH project was expected to increase water consumption—particularly for poor households—through improvements in the quality of service offered by the new corporatized, multi-municipal utility, AdS (through the URA).⁴¹ Overall, households on Santiago used 40 liters of water per person per day in 2018, on average (Figure V.10), reaching the bottom of the 2030 target of 40-90 liters per person per day laid out in the Santiago Strategic Plan for Water and Sanitation. Water consumption was higher among households with their own piped water network connections compared to households that primarily rely on other sources.⁴²

Interestingly, households that report having piped water seven days per week and 24 hours per day do not have significantly higher consumption than households with limited piped water supply (less than four days per week or less than five hours per day), perhaps reflecting that many households have adapted to intermittent supply and are able to pump and store piped water when it is available so that they do not run out when it is not available. Consumption levels are higher in Praia than in other areas (urban or rural), driven by higher consumption among users with their own piped network (not shown). Households living in poverty consume less water, on average, than other households.

⁴¹ Although water consumption is a key outcome for the evaluation, we do not present a baseline figure because the methodology for collecting baseline data differed in important ways, rendering the data from the two years incomparable. Most importantly, for 2018 we rely on billing data for piped households which was not available in 2011 (estimates of piped water consumption are likely to be very inaccurate because the quantity consumed is not as observable as when the water is collected from a source outside the home). In addition, in 2011, INE collected data on water consumption among Santiago households, focusing on water from each household's primary source. Those data are not directly comparable because they do not include all sources of water, including non-primary sources.

⁴² Some households with their own piped network connections share their connection with other households. Therefore, consumption measures for households with piped network connections—which are based on meter readings—might overstate consumption at the household or individual level. However, excluding households that share their connections has a negligible impact on these estimates.

Figure V.10. Water consumption, liters per capita per day (2018)

Source: 2018 WASH Interim Survey (Santiago representative sample) and 2018 AdS billing data. Billing data are not available for 2011.

Notes: Estimates for households that rely on their own piped network connection are based on billing data, whereas estimates for households that rely on other sources are based on self-reported water use data from the survey. Estimates are weighted to adjust for differences in sampling probabilities and, for households with their own piped network connection, differences in the availability of AdS billing data. To account for outliers, values are top-coded at the 99th percentile (overall).

[^]Less than twenty four hour piped water supply includes households that reported having piped water less than five hours per day or less than four days per week.

^{^^}Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

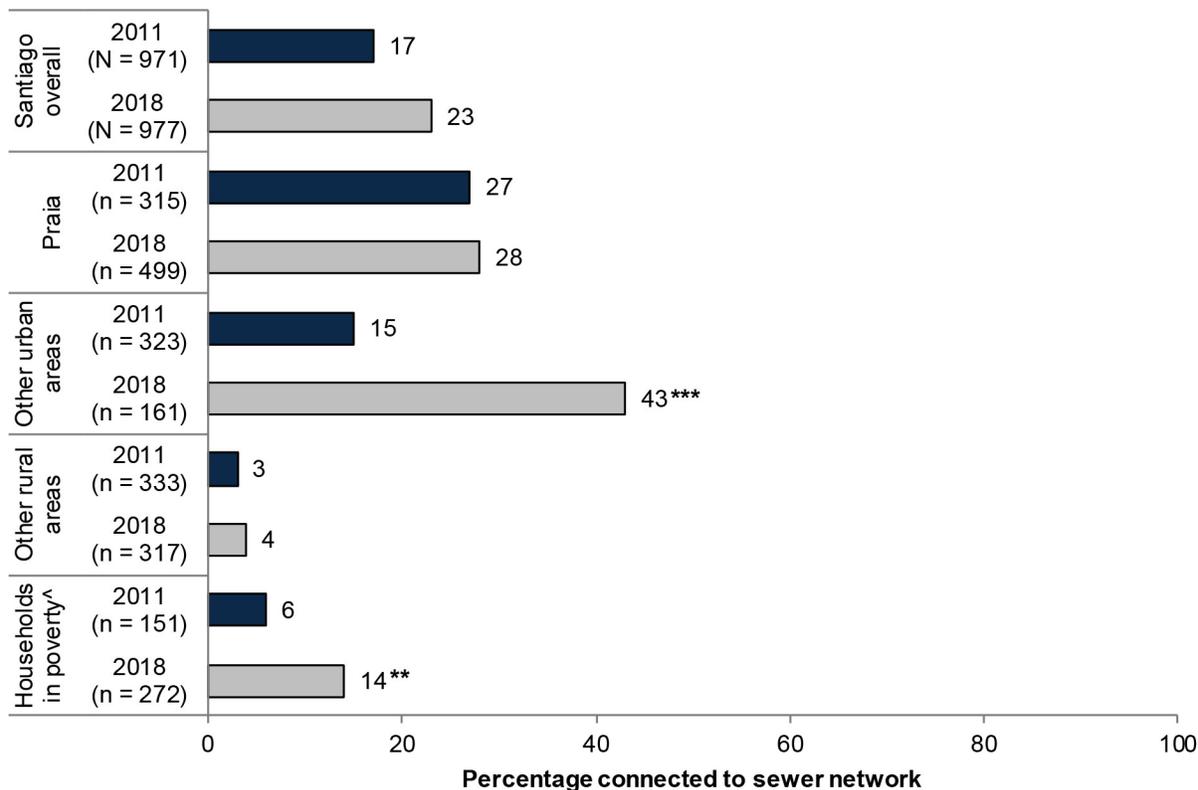
The WASH project was expected to increase consumption of water for other purposes as well. In particular, as piped water becomes more accessible, reliable, and affordable, households might use more water for businesses or other purposes. Thus far, there has not been widespread use of piped water by household businesses. The share of households that rely on water for income-generating activities—such as animal breeding and agricultural production—is 6 percent among households that use the piped water network as their primary source, which is similar to the share overall (not shown).

E. Sanitation facilities and practices

About one in four Santiago households was connected to the sewer network in 2018, a small and statistically insignificant change from 2011 (Figure V.11). In 2011, sewer connection rates were higher in both Praia and other urban areas than in rural areas, where only 3 percent of households were connected. Although sewer connection rates did not increase in Praia between 2011 and

2018, they nearly tripled in other urban areas. In 2018, connection rates in other urban areas were 50 percent higher than those in Praia. The increase in sewer connection rates appears to have been driven primarily by a substantial increase in the northern municipality of Tarrafal, where rates quadrupled to reach nearly half of the households in 2018. Tarrafal is the only municipality where there is a statistically significant increase in sewer connection rates. Overall, poor households were less likely than nonpoor households to be connected to the sewer network in both 2011 and 2018; however, the share of poor households connected increased over this period.

Figure V.11. Change in sewer connection rates (2011 and 2018)



Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Statistical significance of differences is based on p -values that are adjusted for clustering at the enumeration area level.

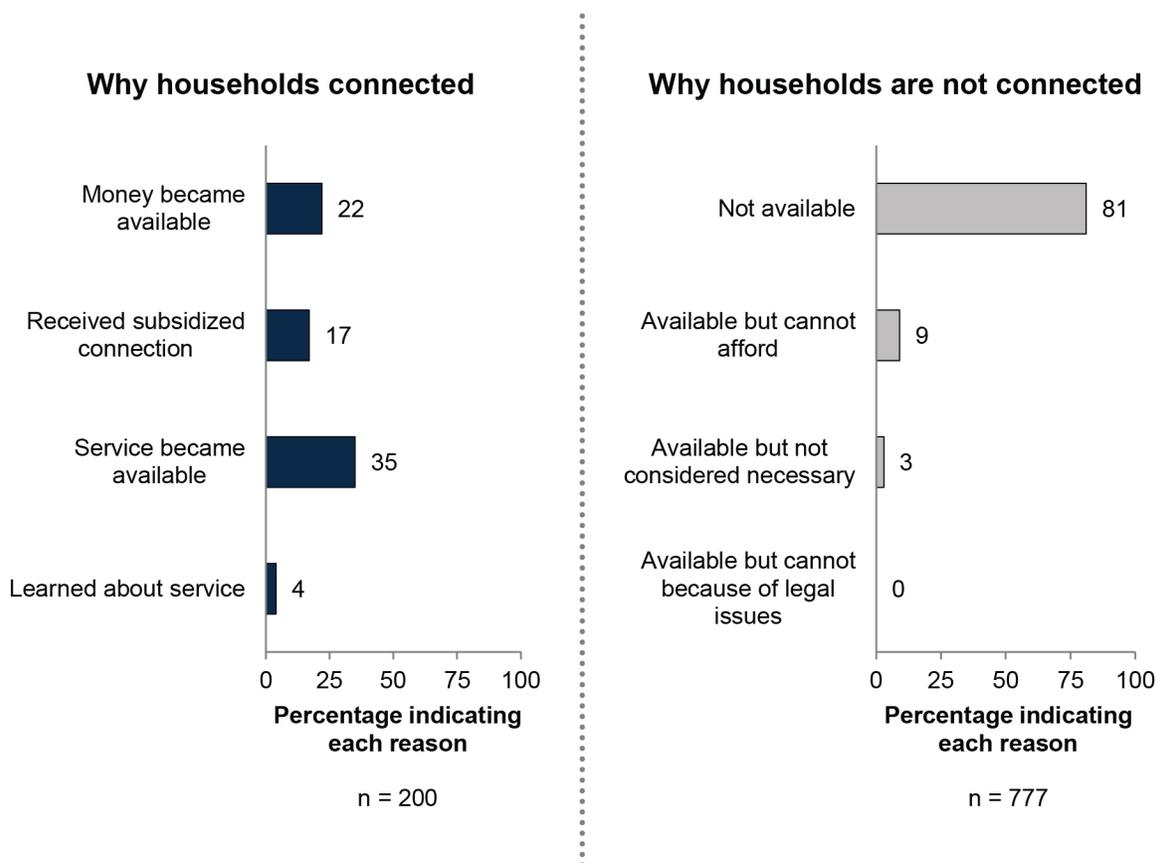
[^]Poverty defined as having household expenditures per capita lower than 60 percent of the median.

*/**/** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

Households' reasons for connecting to the sewer network are very similar to those for connecting to the piped water network (Figure V.12). Nearly 40 percent connected when they had the financial means to do so, either on their own or by receiving a subsidy. More than one-third of households connected to the sewer network when they did because service became available. Respondents in urban areas outside of Praia—where most of the growth in connections to the sewer network happened—were more likely to report connecting because service became

available than those in other areas (not shown). As with the water network, only a small share of households reported that learning about the availability of service prompted their connection.

Figure V.12. Reasons households connected (or not) to the sewer network (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). Reasons for connecting to the sewer network were not collected as part of the 2011 Compact Baseline Survey.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. The percentage indicating each reason that households connected is calculated among households that are connected to the sewer network. The percentage indicating each reason why households are not connected is calculated among households that are not connected to the sewer network. Percentages might not sum to 100 because respondents could have selected multiple response options and because some responses that were reported by only a few respondents are not presented here.

Lack of availability of the sewer network appears to be the most important obstacle that prevents households from connecting, with roughly 80 percent of households that are not connected reporting this as the reason for not connecting. Nine percent of households report not being connected because they could not afford to connect. Only a small share of households were not connected because they do not believe a sewer connection is necessary. Findings from the qualitative focus groups mirrored the household survey, with participants in all seven Santiago focus groups mentioning access to sewer connections and affordability as reasons that households are not connected to the sewer network. However, of those households that were

connected, several participants commented that the long-term cost of connecting to the sewer network was significantly lower than the cost of using a septic tank.

Access to improved sanitation facilities increased between 2011 and 2018 (Figure V.13).⁴³ The share of households across Santiago that use toilets connected to the sewer network as their primary sanitation facility increased by more than two-thirds, and the share of households that report having no toilet facility decreased by nearly half. In both years, poor households were less likely to have a toilet (connected to either a sewer or a septic tank) and more likely to report having no sanitation facility than nonpoor households. However, the share of poor households that report using a toilet connected to the sewer network more than tripled between 2011 and 2018. The share of households that use a septic tank increased in rural areas and among poor households, whereas it decreased in urban areas outside of Praia.

We find suggestive evidence that the improved availability of piped water might have increased the use of flush toilets. Although the share of households connected to the sewer network did not increase significantly between 2011 and 2018 (Figure V.11), the share of households that used a toilet connected to the sewer as their primary sanitation facility did increase significantly (Figure V.13), reflecting the fact that even households that have flush toilets might not always use them. In the focus group discussions, some participants explained how the availability of piped water influenced their ability to make use of the sewer system. In our 2018 sample, all but one household that had a connection to the sewer network used it as their primary sanitation facility, whereas nearly one-fourth of households with a connection to the sewer network did not use it as their primary sanitation facility in 2011.

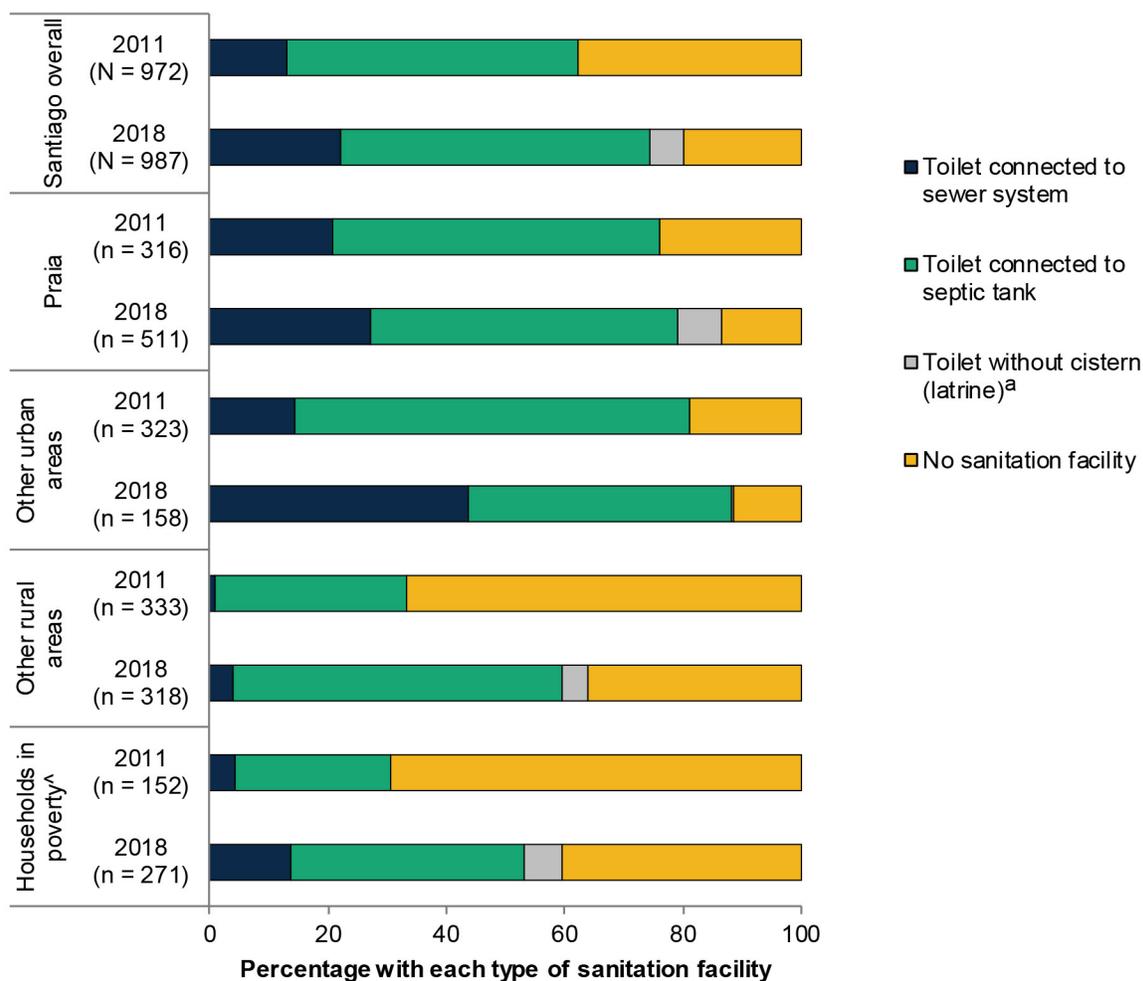


“I always had a bathroom. But, from 2017 to 2018, we use it more often, because we have more water. By the way, I can say that it has improved, because before there was little water and we did not use it so often. Now we have water, so we can use a flush toilet and improve hygiene.”

—Focus group participant, São Domingos



⁴³ According to the Joint Monitoring Program for progress toward Sustainable Development Goal 6 (including the sanitation target), improved sanitation includes flush or pour flush to piped sewer systems, septic tanks, pit latrines, ventilated improved pit latrines, composting toilets, or pit latrines with slabs. Although our survey data do not allow us to categorize latrines as improved or unimproved facilities, this would not have substantively affected our assessment because relatively few households had these types of facilities. We were likewise unable to determine the share of households that had access to “safely managed” sanitation, the new top rung of the sanitation ladder for Goal 6, which goes beyond improved sanitation to also reflect safe disposal or transport and treatment of excreta. It is unlikely that many households with improved sanitation in Santiago actually have safely managed sanitation because there is relatively little treatment capacity; however, the 2018 WASH Interim Survey did not attempt to measure this.

Figure V.13. Sanitation facility type (2011 and 2018)

Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Note: Estimates are weighted to adjust for differences in sampling probabilities.

^aSeveral types of latrines were included as options in the 2011 Compact Baseline Survey instrument; however, no respondents reported using a latrine.

[^]Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

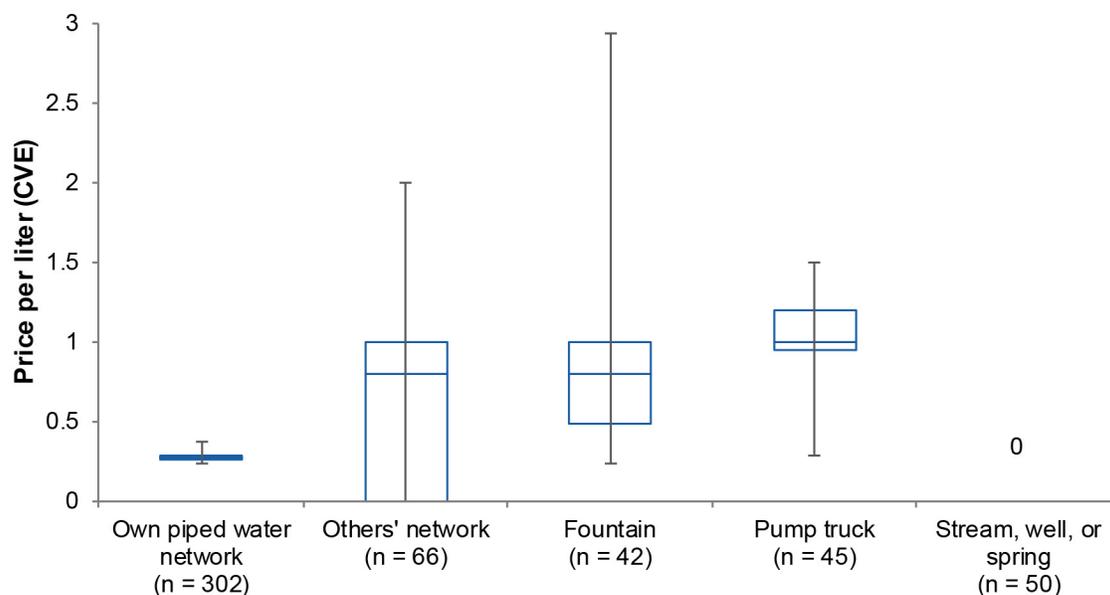
Among households with a sanitation facility that needs to be emptied—latrines and toilets connected to a septic tank—only one in nine households reported having ever emptied their pit or septic tank. Of those that have emptied their pit or septic tank, one-third report that it has been at least two years since it was last emptied. (Nearly all households that emptied their latrines or septic tanks had the job done by a service provider.)

F. Expenditures on water and sanitation

The WASH project was expected to lead to changes in water sources, prices, and consumption, all of which could lead to changes in water expenditures. In addition, technical assistance provided through the NIRR activity was expected to lead to a more equitable distribution of water expenditures across households.

Households that use different sources of water face different prices (Figure V.14). Households that rely on their own piped network connections typically pay about CVE0.27 (USD0.003) per liter at the median, with relatively little variation in price.⁴⁴ In contrast, households that obtain water from other households' network connections, public fountains, or pump trucks pay about CVE0.8 to CVE1 per liter, at the median, depending upon the source. For these other sources of water, the price per liter varies considerably across households. However, some households do not pay for water, including one-third of households that collect from other households' piped network connections and almost all households that collect from streams, wells, and springs. (Another cost of collecting water is the time spent collecting it, which was discussed in Section V.C.)

Figure V.14. Water price by source (2018)



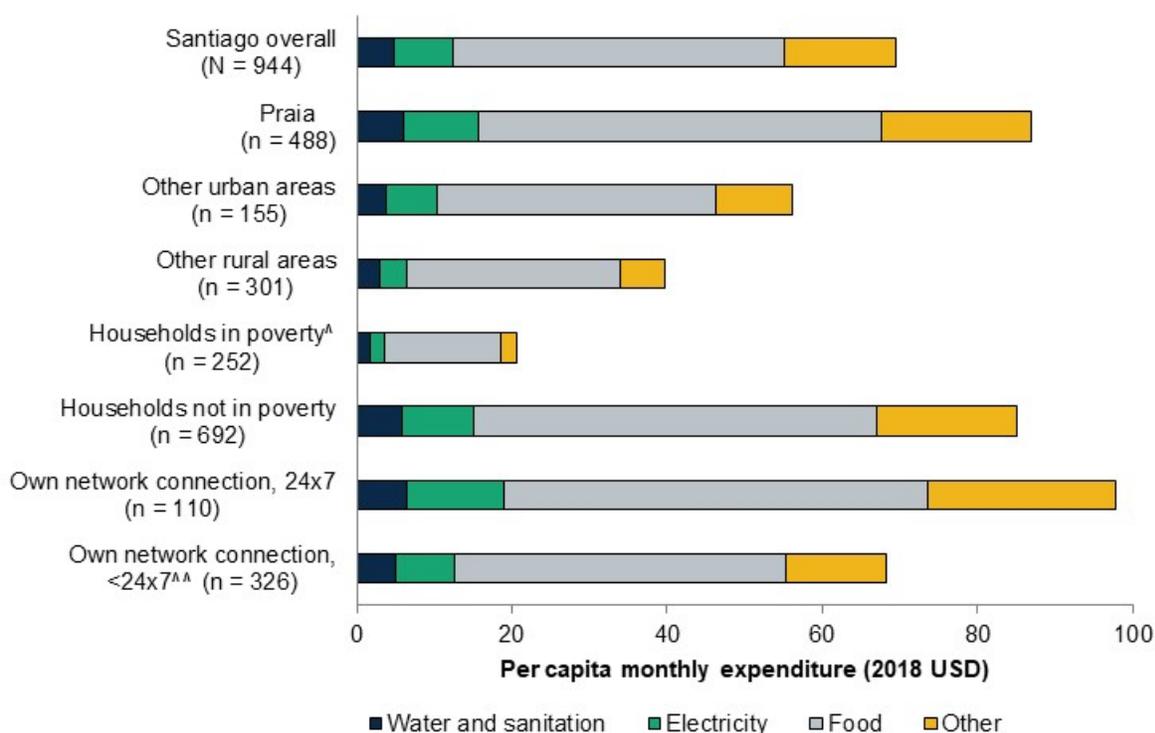
Source: 2018 WASH Interim Survey (Santiago representative sample) and 2018 AdS billing data. Billing data are not available for 2011.

Notes: Estimates for own piped network connection are based on billing data, whereas estimates for other sources are based on the experiences of households that provided detailed data on water collection (those that collected regularly or spent considerable time collecting). Estimates are weighted to adjust for differences in sampling probabilities and, for households with their own piped network connection, differences in availability of AdS billing data. Medians and percentiles are not top-coded. Blue box indicates the 25th percentile value (bottom), median (middle), and 75th percentile value (top). The bars (“whiskers”) indicate the 5th and 95th percentile values.

⁴⁴ The marginal cost of water through AdS is CVE200 per cubic meter in the first tier, or CVE0.20 per liter. The reported costs differ from the marginal cost because they include fixed costs and tax.

Households report spending just under USD5 per month per capita—approximately 7 percent of their monthly spending on the categories included in the survey—on water and sanitation (Figure V.15). Households in Praia spend nearly twice as much on all categories, including water and sanitation, than households in other regions do. Overall expenditures are 40 percent higher in urban areas outside of Praia than in rural areas; however, water and sanitation expenditures are not significantly different. Households in poverty—which were identified based on their lower levels of expenditures—spend about one-third as much as nonpoor households on water and sanitation. Households that report having piped water seven days per week and 24 hours per day do not have significantly higher WASH expenditures than households with limited piped water supply (less than four days per week or less than five hours per day), consistent with the finding that continuous supply does not translate into significantly higher consumption. In all areas, food constitutes a large share—more than half—of monthly spending.

Figure V.15. Expenditures on water and sanitation and other household expenses, monthly per capita (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline Survey data on expenditures include too many implausible values to be included in the analysis.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. In 2018, USD1 = CVE92.59, the average exchange rate from oanda.com between April 14, 2018, and June 16, 2018, the period of data collection. To account for outliers, values were top-coded at the 99th percentile value within category.

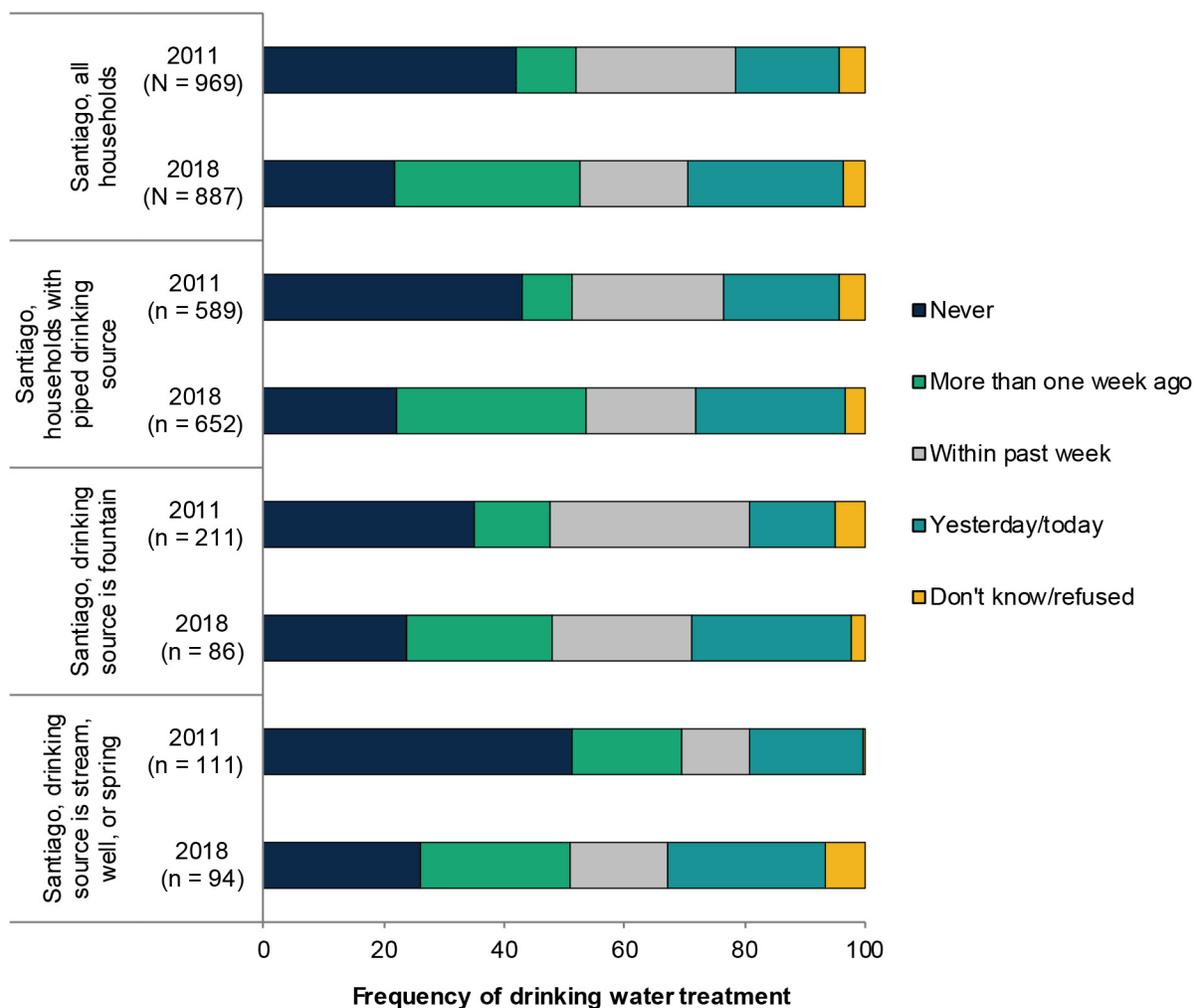
^APoverty was defined as having household expenditures per capita lower than 60 percent of the median.

^{AA}Less than twenty four hour piped water supply includes households who reported having piped water less than five hours per day or less than four days per week.

G. WASH knowledge, hygiene practices, and the prevalence of diarrhea

There is some evidence of changes in water treatment behavior (Figure V.16). The share of households that reported never treating their water fell by nearly half between 2011 and 2018. The share of households that treated their water in the past week did not change, but the share that reported having treated their water either in the past two days (that is, yesterday or today) or more than a week ago increased. Water treatment behaviors did not vary substantially by the type of water source in either year. In particular, households that relied on the piped network for drinking water were as likely as other households to treat their water. This finding may be interpreted as evidence that some households do not trust the piped network water to be clean without treating it. On the other hand, households with a network connection were generally likely to be better off than those without a connection; those households are potentially better educated about the importance of treating water.

Figure V.16. Changes in water treatment habits (2011 and 2018)

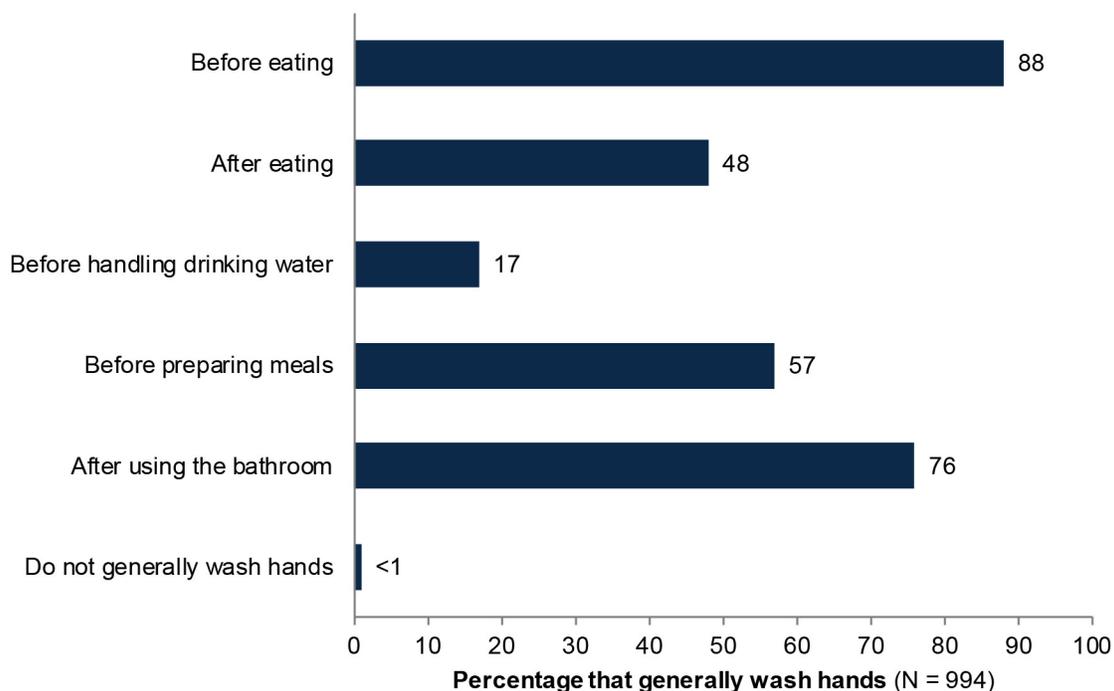


Source: 2011 Compact Baseline Survey and 2018 WASH Interim Survey (Santiago representative sample).

Note: Estimates were weighted to adjust for differences in sampling probabilities.

In 2018, households report relatively high rates of handwashing (Figure V.17) and soap use (not shown). Fewer than 1 percent of respondents report that their household members generally do not wash their hands, and more than 90 percent report using soap when they wash their hands. Most households report washing their hands before eating or preparing meals and after using the bathroom. Unfortunately, the data on handwashing behavior from 2011 are not comparable to the 2018 data because the 2011 Compact Baseline Survey included different questions about handwashing.⁴⁵

Figure V.17. Handwashing habits (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample). The 2011 Compact Baseline Survey asked about handwashing in the past 24 hours rather than occasions when respondents generally wash their hands.

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Percentages might not sum to 100 because respondents could have selected multiple response options and because some responses are not presented here.

Few households reported defecating in the open, even though in 2018, one-fifth of households still had no sanitation facility (not shown).

The reported four-week prevalence of diarrhea among children younger than age 5 was just above 20 percent in 2018 (not shown).⁴⁶ The prevalence of diarrhea is similar in Praia, other urban areas, and other rural areas.

⁴⁵ In the 2018 WASH Interim Survey, we chose to use the question about handwashing from the 2015 MCA–Cabo Verde FAS Survey so that we could compare handwashing behavior among FAS beneficiaries before and after connection to water.

⁴⁶ Due to concerns about data quality, we do not report diarrhea prevalence in 2011.

VI. FASA'S EFFECTS ON SANTIAGO HOUSEHOLDS

In this chapter, we compare the water and sanitation conditions experienced by Santiago households in neighborhoods impacted by FASA projects to the conditions experienced by those living in other neighborhoods. FASA projects are as diverse as their expected impacts, and we are not able to compare outcomes for specific types of projects. Instead, we focus on comparing results for households in FASA areas to those in non-FASA areas.

First, we compare the demographic and socioeconomic characteristics of households in FASA neighborhoods to those in non-FASA neighborhoods, because FASA was intended to benefit disadvantaged areas (among other selection criteria) (Section VI.A). We then examine whether FASA and non-FASA households were aware of the network expansion and rehabilitation projects (Section VI.B), and whether there were different rates of connection to the piped water network and different levels of satisfaction with the network based on whether the households were in FASA or non-FASA areas (Section VI.C). Finally, we examine the types and sources of WASH messaging heard by both FASA and non-FASA households, because all FASA projects were expected to include IEC activities (Section VI.D).

Key findings

- **The selection criteria for FASA projects successfully focused the projects on less affluent neighborhoods.** Households in FASA areas have lower monthly expenditures and are more likely to be living in poverty than households in non-FASA areas.
- **Fewer than half of respondents in FASA areas are aware of network expansions or improvements, and almost three-quarters of FASA households that are aware of the projects do not know the source of funding.** Households in non-FASA areas are as likely to be aware of network improvements or expansions as those in FASA areas are.
- **FASA and non-FASA areas do not differ in terms of either the share of households connected to the piped water network or the reported level of satisfaction with the network.** There might not have been enough time between the completion of FASA projects and data collection for the projects to have had an effect on households, however.
- **More than half of the households heard WASH messaging in the six months before the survey, whether they were FASA or non-FASA households.** Electronic media—radio, TV, and social media—were the most common source of those messages.

A. Demographic differences between households in FASA and non-FASA areas

FASA projects were intended to benefit disadvantaged areas, and indeed, we find that households in FASA areas are more likely to be living in poverty and have lower monthly spending levels than households in non-FASA areas (Table VI.1, next page). Household expenditures are 18 percent lower among FASA-area households, and these households are 39 percent more likely to be in poverty than non-FASA-area households. This is evidence that the FASA project served its intended base of less affluent households. Households in FASA and non-FASA areas are equally likely to have female heads. Fewer FASA households are in Praia, and more are in other urban areas, reflecting that FASA focused on urban areas outside of the capital. However, these comparisons between FASA beneficiary areas and non-FASA areas do not shed light on how the beneficiary demographics for selected projects compare to those *of other proposed projects that were not selected* (rather than to the population as a whole), because we do not have information on areas that were proposed for FASA projects but not chosen.

Table VI.1. Demographic and socioeconomic characteristics of households in FASA and non-FASA areas (2018)

Characteristic	Sample size		Mean		Difference	p-value
	Non-FASA	FASA	Non-FASA	FASA		
Demographic characteristics						
Household size	498	500	4.27	4.45	0.17	0.31
Household has children under age 2	496	498	0.11	0.15	0.04	0.08*
Household has children under age 5	496	498	0.30	0.33	0.03	0.36
Female household head ^a	498	500	0.54	0.50	-0.04	0.27
Education of household head ^b	497	493				$\chi^2=0.47$
Less than basic education			0.26	0.29	0.02	0.51
Basic education			0.40	0.42	0.02	0.49
Secondary education			0.21	0.21	-0.01	0.86
Higher education			0.13	0.09	-0.04	0.21
Household owns its house	497	499	0.81	0.87	0.06	0.05**
Geography						
Municipality	498	500				$\chi^2=0.02^{**}$
Praia			0.64	0.41	-0.23	0.02**
Other urban areas			0.08	0.25	0.17	0.01**
Other rural areas			0.28	0.34	0.06	0.53
Household expenditure and poverty						
Monthly household expenditures per capita (2018 USD) ^{c,d}	498	500	82.50	67.36	-15.14	0.09*
Household in poverty ^e	498	500	0.23	0.31	0.09	0.04**
Household in extreme poverty ^e	498	500	0.10	0.14	0.04	0.13

Source: 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates were weighted to adjust for differences in sampling probabilities. Statistical significance of differences was based on p-values that were adjusted for clustering at the enumeration area level. All comparisons presented in the text were statistically significant at the 0.10 level or better, based on two-tailed t-tests that were weighted to adjust for differences in sampling probabilities.

^a Female-headed households include only households in which all designated household heads are female; if the household named both female and male heads, it is not categorized as a female-headed household. If the household did not designate a household head, the household is categorized as not having a female household head.

^b Education of the household head is the highest education level completed for the household head with the most education (if more than one head was designated) or the household member with the most education (if no heads were designated).

^c USD1 = CVE92.59, the average exchange rate from oanda.com between April 14 and June 16, 2018, the period of data collection.

^d To account for outliers, values are top-coded at the 99th percentile value.

^e Poverty is defined as having household expenditures per capita lower than 60 percent of the median; extreme poverty is defined as having household expenditures per capita lower than 40 percent of the median.

*/**/** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

B Awareness of FASA projects

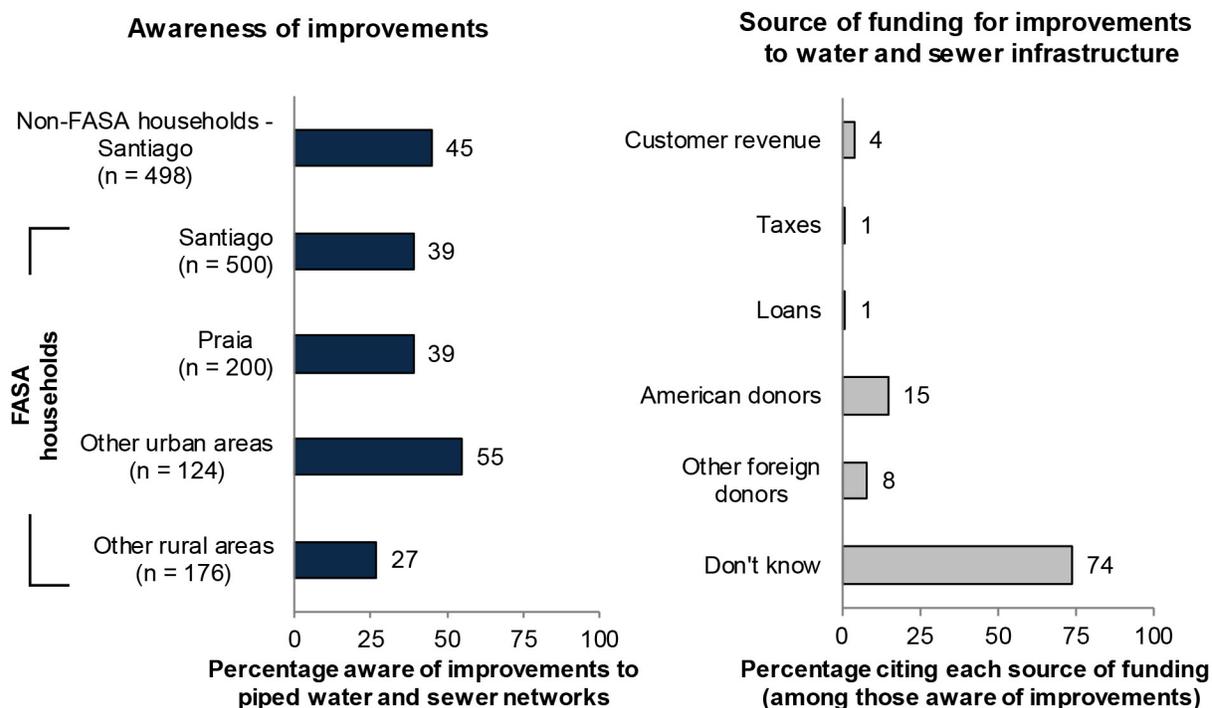
Fewer than half of respondents in FASA areas say they are aware of network expansions or improvements, and awareness levels in non-FASA areas are comparable (Figure VI.1). Among households in FASA areas, those in urban areas outside of Praia are most likely to be aware of the projects, and those in rural areas are the least likely to be aware. Focus group discussions in Santiago corroborate this: many FASA beneficiaries in those groups have never heard of FASA projects.

Among FASA respondents that are aware of network expansions or improvements, almost three-quarters say they do not know the source of funding for the projects. Among those that say they do know the source of funding, most believe the projects are funded by American donors. Focus group participants are unsure of who funded the construction and rehabilitation projects, though most assume the funders have some government connection or are foreigners.

“I heard that the support came from the foreigners, but I do not know.”

–FASA beneficiary, focus group participant

Figure VI.1. Awareness of improvements and sources of funding (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Percentages might not sum to 100 because respondents could select multiple response options, and responses that were not chosen much are not shown.

C. Differences in connections and satisfaction with the piped network between FASA and non-FASA areas

Households in FASA and non-FASA areas are equally likely to be connected to the piped water network, with about 60 percent of households connected in both kinds of areas (not shown). The FASA projects were completed in late 2017 and early 2018, so when data were collected in mid-2018, not enough time had passed to reveal a noticeable increase in project-related water connections. Consequently, only a few connected households in either FASA or non-FASA areas reported that their connection to the piped network had been made in 2017 or 2018. A number of participants in FASA-targeted areas did say their homes were marked to be connected to the new network, but that they could not afford to pay what was required for the connections. Because FASA targeted disadvantaged areas, and in some cases provided subsidized connections, the financial cost of connecting was an obstacle to some households and reduced the overall number of new connections the projects were able to bring about.



“Someone came and painted our walls. They said we were being marked for water and sanitation, but that we had to pay 18,000 Escudos. I couldn’t pay, so they never came back.”

–FASA beneficiary, focus group participant



In general, participants in the focus group discussions viewed FASA projects as a great benefit that increased their access to piped water. Overall, households that participated in the focus group discussions felt strongly that the FASA projects were a benefit to their communities—particularly if they were also awarded FAS grants that offset the cost of connecting to the new infrastructure. Focus group participants discussed a number of benefits to receiving piped water as a result of the FASA projects, including increased savings (that is, reduced trips to the public water fountains, not paying someone to get water); not having to resort to water from trucks, which is of lower quality; and savings in time. The benefits of the FASA projects were also mentioned frequently by focus group participants in the non-FASA areas. These participants noted similar benefits to receiving piped water and often lamented that their household/neighborhood was not selected for the project.



“For me, the advantage is in the time that I spend to go and queue at the public water fountain. Now, at home, whenever I need water I have it available, and I spend my time advantageously.”

–Focus group participant, São Domingos

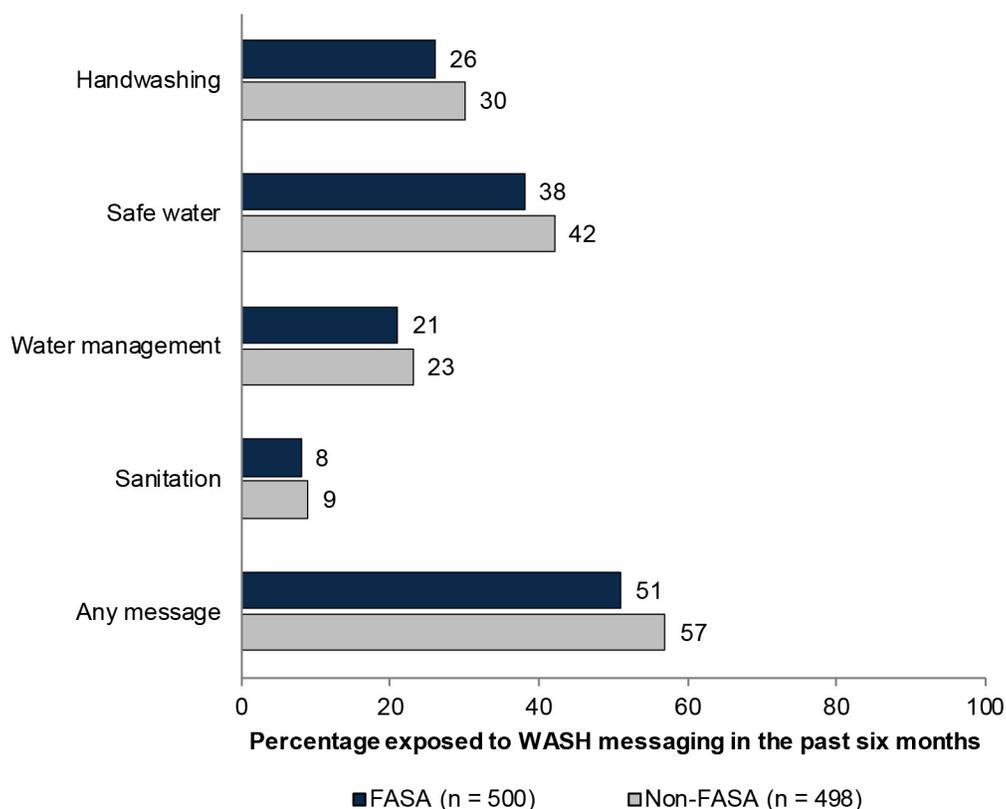


Households in FASA and non-FASA areas were generally equally likely to report satisfaction with their water connections, with more than half of respondents saying they were satisfied or very satisfied with the frequency and duration of supply, their knowledge of availability, and the water's potability (not shown). These results were consistent with the general sentiment from the focus group discussions that piped water is higher quality than other available options, and that access to piped water improves health. As with the network expansion projects, it is likely that not enough time had passed for us to observe noticeable differences in the reported quality of water supply. End-line data collection is planned for 2020, when it is possible that the FASA projects could increase connection rates in areas where networks expanded or increase satisfaction with the water supply in areas where networks were rehabilitated.

D. IEC and sanitation messaging in FASA versus non-FASA areas

The FASA project was expected to improve health outcomes through messaging related to water, sanitation, and hygiene. Though messaging through the project would have ended in 2017—more than six months before the household survey was administered—the 2018 WASH Interim Survey collected data on whether households in FASA and non-FASA areas have been exposed to WASH messaging. More than half of households in FASA areas report hearing some WASH messaging in the year leading up to the survey (52 percent, not shown). In the last six months, after the FASA project ended, nearly the same share of households in FASA areas—51 percent—report hearing WASH messaging (Figure VI.2). Non-FASA households have heard messages at similar rates as FASA households. Together, these findings suggest that messaging has likely been continuing through other efforts (outside of the FASA project).

Focusing on the types of messages heard over the past six months, most of the households that heard messaging remember hearing messages related to safe water. Thirty percent of households report hearing messaging about handwashing, and almost one-quarter report hearing messages about water management. Fewer than 10 percent of households remember hearing messages about sanitation. Households in FASA areas are no more likely than households in non-FASA areas to report hearing any type of WASH message, consistent with the fact that the FASA project (and related messaging) concluded more than six months before the survey.

Figure VI.2. Exposure to WASH messaging (2018)

Source: 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Handwashing includes washing hands and using soap. Safe water includes drinking potable water, storing water safely, and treating water (boil, filter ...). Water management includes managing water consumption and the cost of water, and knowing how to read bills and meters. Sanitation includes use sanitary facilities to defecate, placing children's feces in the sanitary installation, and burying stool. Percentages might not sum to 100 because respondents could select up to three options.

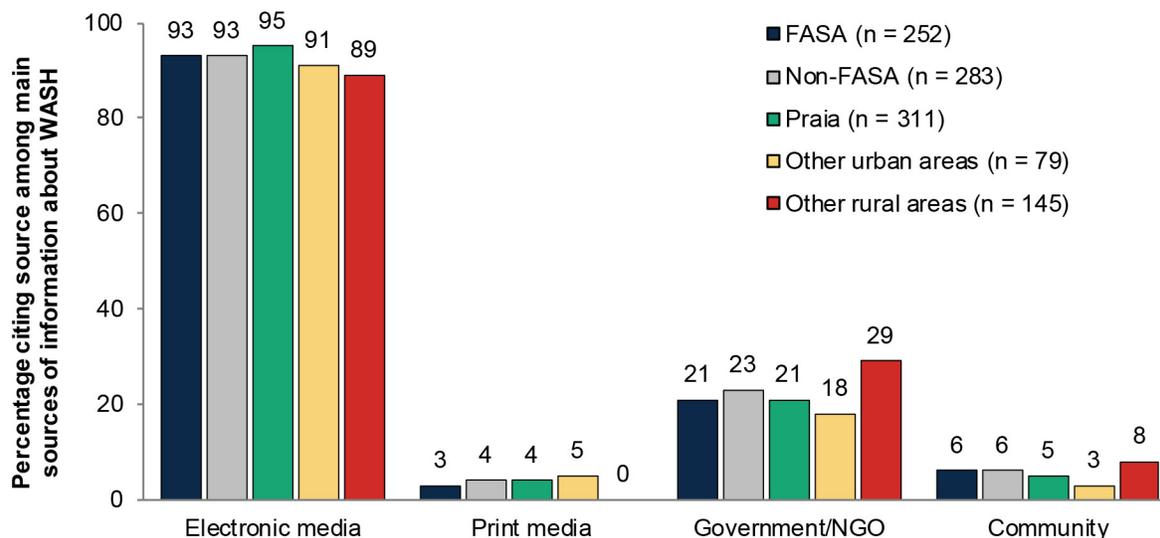
Electronic media, including radio, TV, and social media, are by far the most common source of WASH messaging, with more than 90 percent of respondents reporting one or more of those sources as a source of WASH messaging (Figure VI.3). More than 20 percent of respondents report hearing WASH messages from a government/NGO worker, whereas other sources, such as print media or the community (school and work) are credited less often. Sources of WASH messaging are similar in both FASA areas and non-FASA areas. In general, sources of messaging also do not vary across geographic

“Before the bathroom construction was made, they did a presentation of a theatrical play and did a demonstration of how to use a bathroom, and at the end of construction they did the same thing, addressing the issue of bathroom use and reuse of water.”

–FASA beneficiary, focus group participant

regions, with the exception of print media, which is a less common source in rural areas than urban areas. Across the focus groups, participants are most likely to have heard information related to safe water via the television or radio, though several participants mentioned attending community meetings before and after the construction of the networks.

Figure VI.3. Sources of WASH messaging (2018)



Source: 2018 WASH Interim Survey (Santiago representative sample).

Notes: Estimates are weighted to adjust for differences in sampling probabilities. Electronic media include radio, television, and social media. Print media include newspapers, magazines, books, posters, and brochures. Government/NGO includes sanitary agents, health staff, social assistants, community associates (NGOs), utility workers, and meter readers. Community includes school, work, friends or co-workers, and church or mosque. Percentages might not sum to 100 because respondents could select up to three options.

VII. THE WASH PROJECT'S EFFECTS ON FAS BENEFICIARY HOUSEHOLDS

In this chapter, we describe how water and sanitation conditions have changed for households that received FAS water connection subsidies (some of which also received subsidized septic tanks or sewer connections). We begin by examining the share of households on Santiago that received FAS subsidies, as well as those that were eligible but did not receive FAS-subsidized connections (Section VII.A). We then briefly describe the characteristics of FAS beneficiary households compared to other households on Santiago to understand whether the program served the types of households it intended to target (Section VII.B). We present changes (between 2015 and 2018) in beneficiary households' water sources, including water connections and disconnections, alternative water sources, and experience collecting water (Section VII.C), as well as sanitation conditions (Section VII.D). Finally, we assess changes in water consumption and water and sanitation expenditures (Section VII.E) and changes in health-related behaviors and the prevalence of diarrhea in 2018 (Section VII.F).

Key findings

- **Five percent of Santiago households report receiving FAS benefits to connect to the water network, improved sanitation, or both.** An additional 3 percent report that they met the eligibility criteria but are not receiving benefits; qualitative data suggest this is probably because they could not make the matching contribution or had existing debts to the combined water and electricity utility.
- **FAS beneficiary households have lower expenditures, on average, and are more likely to be living in poverty than other households on Santiago are,** consistent with the program's efforts to focus on poor households.
- **In 2018, over 90 percent of FAS beneficiaries are connected to the piped water network;** no beneficiary households were connected in 2015.
- Although most FAS beneficiaries use the piped network as their primary water source, **about half of the beneficiaries still collect water at least occasionally,** a decrease from 95 percent in 2015.
- **FAS beneficiaries used more water and spent less overall on water** in 2018 than they did in 2015.
- **Access to improved sanitation increased** between 2015 and 2018 among households that received subsidies for both water connections and improved sanitation; this was also true of households that only received subsidies for water connections.
- **The frequency with which households treat their water decreased** between 2015 and 2018. **The share that self-reported proper handwashing behavior and the use of soap increased.**

A. FAS eligibility and participation

Drawing on the 2018 representative sample of Santiago households, we estimated FAS participation and eligibility rates. About 5 percent of households on Santiago report receiving FAS subsidies; an additional 3 percent report being eligible but not receiving subsidies (not shown). Of those households that are eligible but did not receive subsidies, most do not know why they did not. A small number of FAS-eligible households that did not receive subsidies report either that they did not have the money for the household contribution required for the connection or that they had debt with ELECTRA that prevented them from participating. No respondents report not receiving FAS subsidies because they were not interested.

Most households in our 2018 sample of FAS beneficiaries know that they were connected to the water and/or sewer network through the FAS activity, but 2 percent of households report that they do not know if they were connected by FAS. In our sample, 70 percent of households received subsidies for water connections and 9 percent received subsidies for both water and sewer connections; for the remaining households, information on the type of subsidy is not available. Households that received only improved sanitation were not included in our survey sample, as improved sanitation is not closely linked to the project logic.

B. Demographic and socioeconomic characteristics of beneficiaries

To understand how the FAS project benefited different types of households, we can compare the characteristics of FAS beneficiary households to those of a representative sample of Santiago households. Compared to households on Santiago overall, FAS beneficiary households have lower monthly expenditures and are more likely to be in poverty, as expected, based on the program's intent to target poor households (Table VII.1). FAS beneficiary households are also less educated than the population as a whole, with a higher share of household heads having only a basic education and a lower share having higher education. Although FAS beneficiary households appear to be less well off on most measures, they are more likely to own their home (one criterion of FAS was home ownership) than households on Santiago more broadly

Table VII.1. Demographic and socioeconomic characteristics of FAS beneficiary households compared to Santiago households (2018)

Characteristic	Sample size		Mean		Difference	p-value
	Santiago overall	FAS beneficiary households	Santiago overall	FAS beneficiary households		
Demographic characteristics						
Household size	998	361	4.32	4.44	0.12	0.23
Household has children under age 5	994	360	0.12	0.12	-0.00	0.81
Household has children under age 2	994	360	0.31	0.33	0.02	0.19
Female household head ^a	998	361	0.53	0.52	-0.01	0.63
Education of household head ^b	990	356				$\chi^2=0.00^{***}$
Less than basic education			0.27	0.28	0.01	0.69
Basic education			0.40	0.48	0.07	0.00 ^{***}
Secondary education			0.21	0.21	-0.00	0.77
Higher education			0.12	0.04	-0.07	0.00 ^{***}
Household owns its house	996	361	0.82	0.92	0.09	0.00 ^{***}
Geography						
Municipality	998	361				$\chi^2=0.06^*$
Praia			0.58	0.59	0.01	0.87
Santa Catarina			0.15	0.24	0.09	0.04 ^{**}
Other areas			0.26	0.17	-0.10	0.04 ^{**}
Household expenditure and poverty						
Monthly household expenditures per capita (2018 USD) ^{c,d}	998	360	77.29	55.01	-22.28	0.00 ^{***}
Household in poverty ^e	998	360	0.25	0.38	0.13	0.00 ^{***}
Household in extreme poverty ^e	998	360	0.11	0.15	0.04	0.00 ^{***}

Source: 2018 WASH Interim Survey (Santiago representative sample and FAS sample).

Notes: Estimates were weighted to adjust for differences in sampling probabilities. Statistical significance of differences was based on p-values that were adjusted for clustering at the enumeration area level. All comparisons presented in the text were statistically significant at the 0.10 level or better, based on two-tailed t-tests that were weighted to adjust for differences in sampling probabilities.

^aFemale-headed households include only households in which all designated household heads were female. If the household names both female and male heads, then it is not categorized as a female-headed household. If the household does not designate a household head, the household is categorized as not having a female household head.

^bEducation of the household head is the highest education level completed for the household head with the most education (if more than one head is designated) or the household member with the most education (if no heads are designated).

^c 1USD = 92.59CVC, the average exchange rate from oanda.com between April 14 and June 16, 2018, the period of data collection.

^d To account for outliers, values were top-coded at the 99th percentile value.

^e Poverty is defined as having household expenditures per capita lower than 60 percent of the median. Extreme poverty is defined as having household expenditures per capita lower than 40 percent of the median.

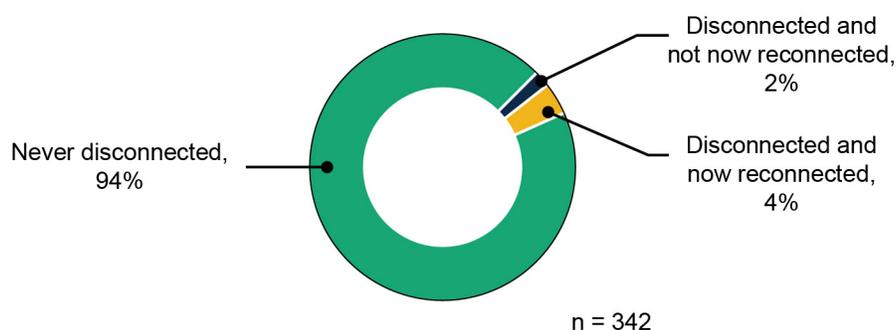
*/**/*** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

We can also compare the demographic and socioeconomic characteristics of intended FAS beneficiary households (surveyed in 2015) to those of actual beneficiaries (surveyed in 2018). Differences between these groups could indicate whether or not the program reached its intended beneficiaries. There are several sizeable differences; most notably, households in the 2018 sample are less likely to be female-headed and less likely to be in poverty (not shown). In the sections that follow, we discuss differences between the 2015 sample and 2018 sample. We expect that these differences largely reflect changes over time due to FAS subsidies, but compositional differences between intended and actual beneficiaries could also contribute to the estimates.

C. Household connections and water sources

To be eligible to receive a FAS-subsidized connection, households must have not been connected to the piped water network; eligible beneficiaries were then expected to receive subsidized connections between 2015 and 2018. As expected, nearly all households in the 2018 FAS beneficiary sample became connected to the piped water network between 2015 and 2018, and most were still connected in 2018. Six percent of FAS beneficiary households had been disconnected from the piped water network at some point since becoming connected, but more than half of those households had been reconnected (Figure VII.1).⁴⁷ Most households that reported being disconnected acknowledged that it was due to nonpayment of the water bill, though a few attributed their disconnection to billing errors or issues (not shown). However, as discussed in Chapter VIII, Section C.3, AdS was not systematically disconnecting customers during this period, and based on billing and payment data provided by AdS, many poor customers (likely including FAS beneficiaries) were at risk of disconnection for non-payment.

Figure VII.1. Share of FAS beneficiary households that have been disconnected from the piped water network (2018)



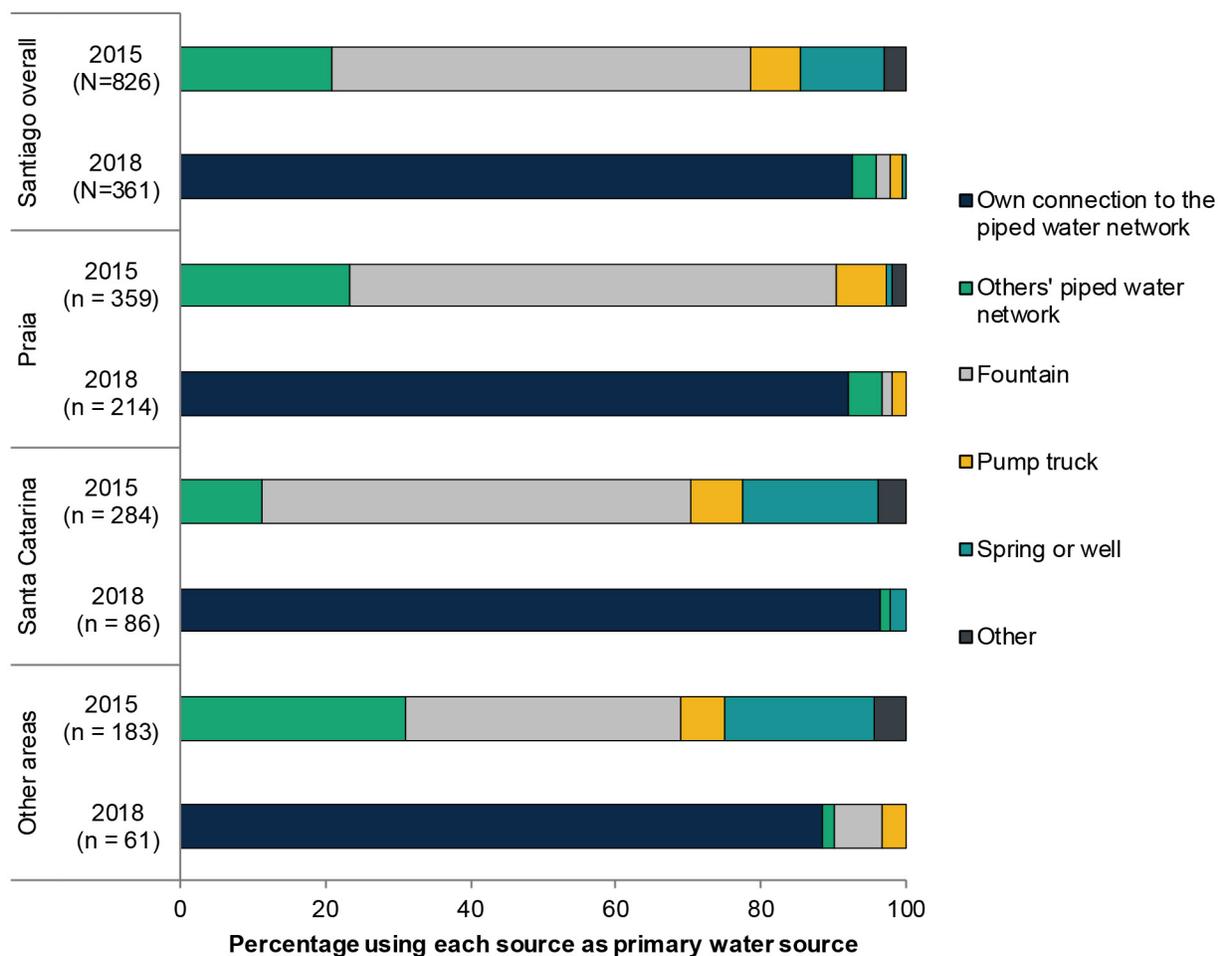
Source: 2018 WASH Interim Survey (FAS sample).

Notes: Sample is restricted to households that have connected to the piped water network and provided consistent information about connections and disconnections. A disconnected household is considered to have reconnected if its primary water source is its own connection to the piped water network.

⁴⁷ We consider a household to be reconnected to the network if they report using their own connection as their primary water source at the time of the 2018 WASH Interim Survey. About 5 percent of households—not included in Figure VII.1—reported that they have not been disconnected but do not rely on the piped water network. Based on the pattern of responses, these most likely represent reporting errors.

In 2015, 58 percent of FAS beneficiary households used public fountains as their primary water source, and a smaller number used another household’s piped network connection, a spring or well, or a pump truck (Figure VII.2). Public fountains were a more common water source for FAS beneficiaries in Praia, and springs and wells were less common there than in other parts of the island. In 2018, 93 percent of FAS beneficiary households report using their own piped network connection as their primary water source; the exceptions are (a) a small percentage that report having been disconnected from the network and not being reconnected and (b) a small percentage that report relying on other sources (but do not report that they have been disconnected).

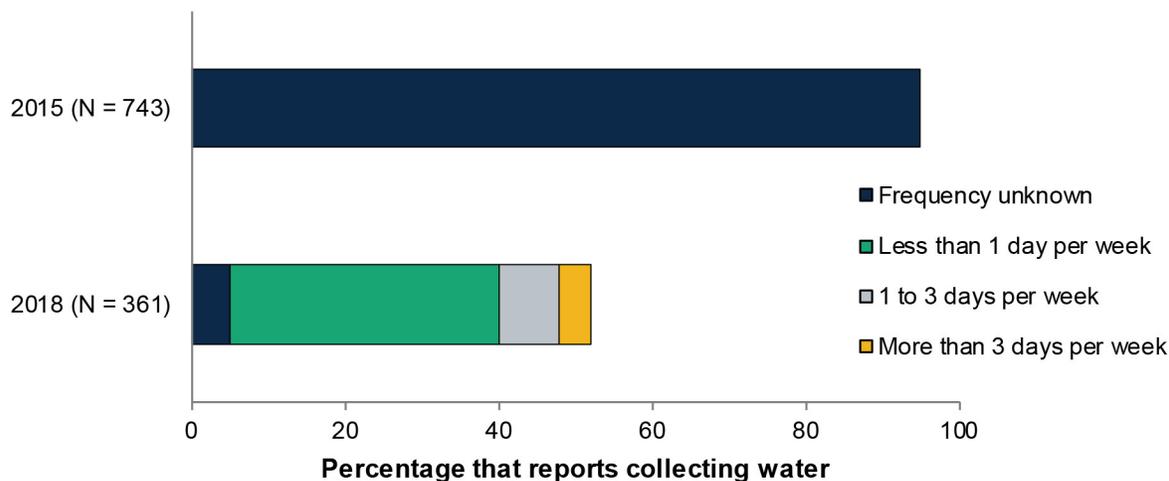
Figure VII.2. FAS beneficiary households’ primary water sources (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

One intended benefit of subsidized water connections was that households would no longer need to spend as much time collecting water. In 2018, half of FAS beneficiary households report collecting water from an alternative source at least occasionally; the share collecting water has declined from 95 percent in 2015 (Figure VII.3). Among households that report collecting water in 2018, two-thirds do so less than one day per week.

Figure VII.3. Share of FAS beneficiary households that collect water, and frequency of collection (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

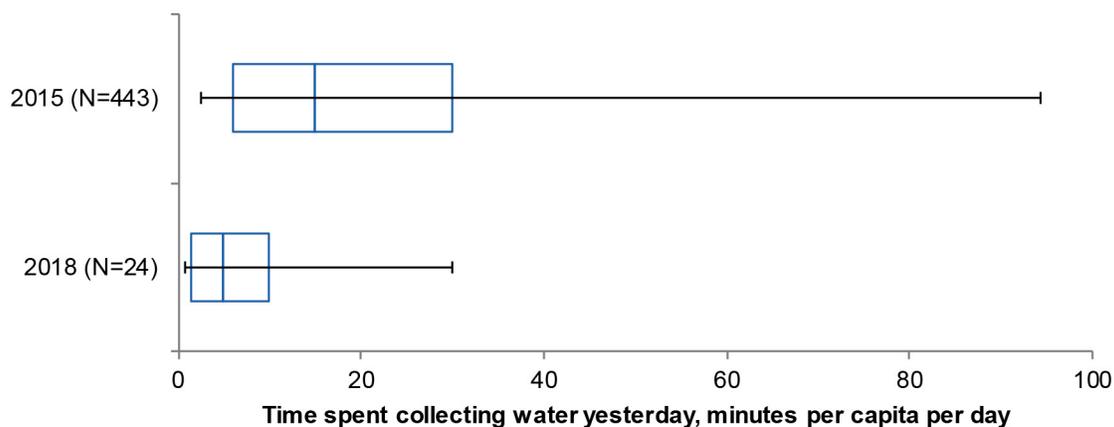
Notes: The 2015 MCA-Cabo Verde FAS Survey asked respondents whether they collected water but did not ask them how frequently they did it. In the 2018 WASH Interim Survey, some households report that they collect water but do not report how frequently they do so.

In 2018, 30 percent of FAS beneficiary households report using water from another household's piped network connection when their primary source is unavailable, whereas approximately 20 percent each use public fountains or pump trucks as an alternative source. Households in Praia are more likely to rely on public fountains and pump trucks as alternative sources than those outside of Praia; households outside of Praia are more likely to rely on streams, springs, and wells as an alternative source.

Among FAS beneficiary households that continue to collect water, the amount of time spent collecting water declined between 2015 and 2018 (Figure VII.4).⁴⁸ More than half of households reported in 2015 that someone in their household collected water the previous day; those households reported a median of 15 minutes per capita spent collecting water. In contrast, in 2018 only 7 percent of households report that someone in their household collected water the previous day (hence the very small sample size in Figure VII.4); the median among those households is five minutes per capita.

⁴⁸ In 2015, respondents were not asked for a comprehensive account of the time spent collecting water; they were asked how long it takes to gather water from their primary source, but not how frequently they collected it or any information about collecting water from a non-primary source. The most comparable data between 2015 and 2018 is the time spent the previous day on water collection, which was included in a household member roster in both years. However, this measure does not capture all of the households that collect water, as many do not collect water every day.

Figure VII.4. Time spent collecting water yesterday, among FAS beneficiary households that collected water (2015 and 2018)



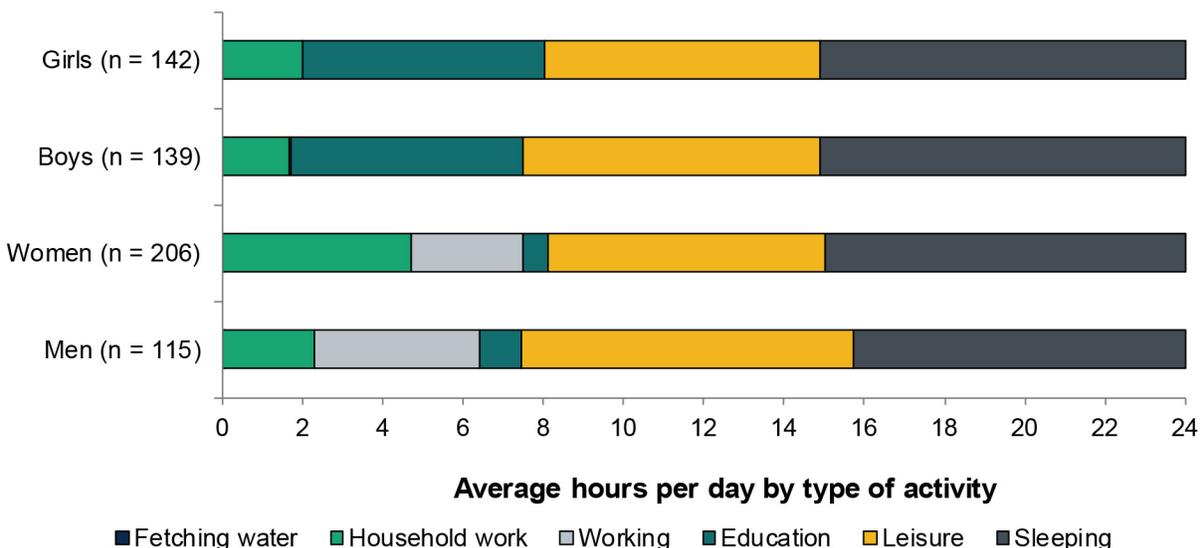
Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

Notes: Medians and percentiles are not top-coded. Blue box indicates the 25th percentile value (left), median (middle), and 75th percentile value (right). The bars (“whiskers”) indicate the 5th and 95th percentile values.

One of the ways that the FAS project was expected to lead to poverty reductions was through a shift from time spent collecting water to time spent on productive uses, such as attending school or working. The 2015 FAS Survey did not collect complete time use data, so we can only examine current time use to understand how FAS beneficiary households are using their time in 2018 (Figure VII.5).⁴⁹ For all types of household members, the amount of time spent collecting water is very small compared to the time spent on other activities (and therefore not visible in the figure). The time spent across activities varies somewhat for different types of household members. Girls spend 21 percent more time than boys on housework and women spend about twice as much time on housework as men. Men, meanwhile, spend more time on both income-generating activities and education than women. No statistically significant differences are observed either between girls and boys or between women and men in the amount of time spent collecting water.

⁴⁹ In 2015, respondents were asked about the amount of time household members spent on various household activities, but they did not ask about time spent attending school or working. In 2018, the survey included sleep and leisure and required that reported time sum to 24 hours.

Figure VII.5. Time spent on various activities yesterday, FAS beneficiary households (2018)



Source: 2018 WASH Interim Survey (FAS sample). The 2015 FAS Baseline Survey data on time use were incomplete and could not be included in the analysis.

Notes: Averages are calculated at the household level for households that have each type of household member; households that do not have that type of household member are not included in the averages. Time use data was collected for household members age 7 through age 18 and for the respondent. Girls and boys are defined as those under age 18.

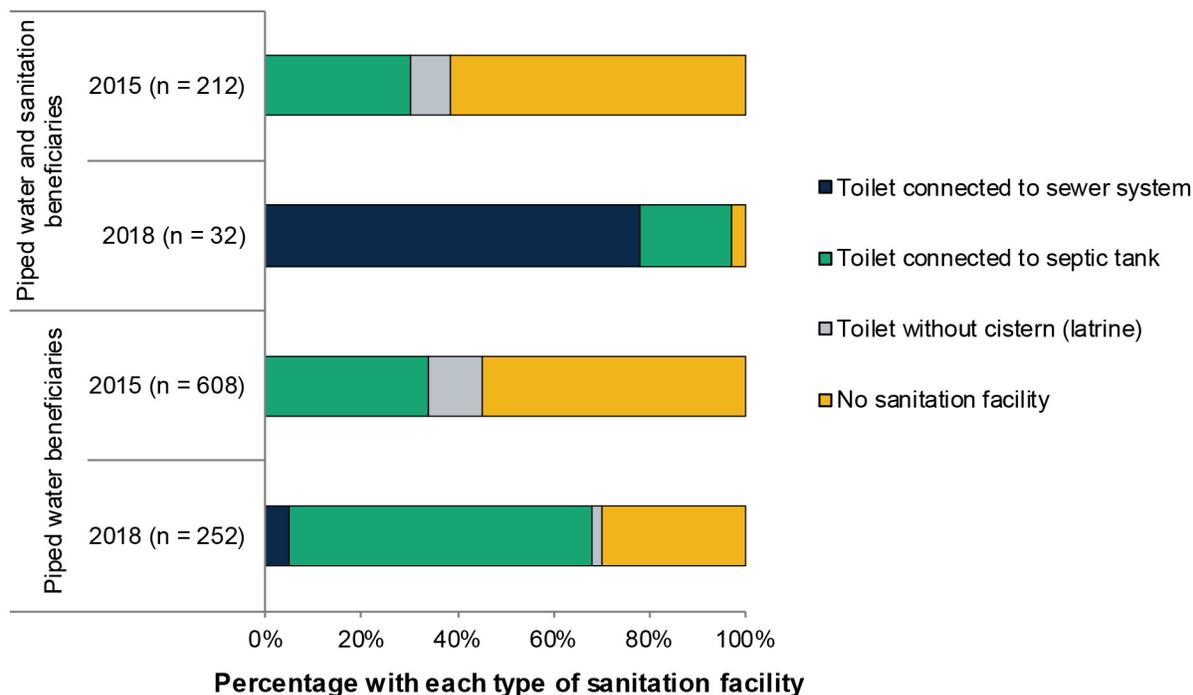
By reducing time spent collecting water, the FAS project could have increased school enrollment rates. However, in 2015, school enrollment rates were already high, with more than 90 percent of children ages 6–14 enrolled in school, and enrollment rates were comparable between boys and girls, so there was little room for improvement.

D. Sanitation facilities

As some of the FAS subsidies were provided to households for sanitation improvements, we would expect to see an increase in the share of households using improved sanitation facilities—either a connection to the sewer network or a connection to a septic tank. Access to improved sanitation facilities increased between 2015 and 2018 for households that received both FAS sanitation subsidies and water subsidies, as well as for those that received only water subsidies. In 2015, none of the households identified as intended beneficiaries of both water and sanitation subsidies had toilets connected to the sewer network and 61 percent reported not having any sanitation facility (Figure VII.6). In 2018, 78 percent of FAS households that received both types of subsidies are connected to the sewer network and only one household in our sample reports having no sanitation facility.

Among FAS beneficiary households that received only water subsidies, there were also increases in access to improved sanitation facilities between 2015 and 2018. The percentage using a toilet connected to a septic tank doubled and the percentage using a latrine or no facility decreased. Five percent of beneficiaries of water subsidies (without sanitation subsidies) connected to the sewer network.

Figure VII.6. Sanitation facility type, FAS beneficiary households (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

Note: In 2018, only a subset of sample households indicated the type of FAS benefit received; this analysis focuses on 2018 households that self-identify as water beneficiaries or water and sanitation beneficiaries.

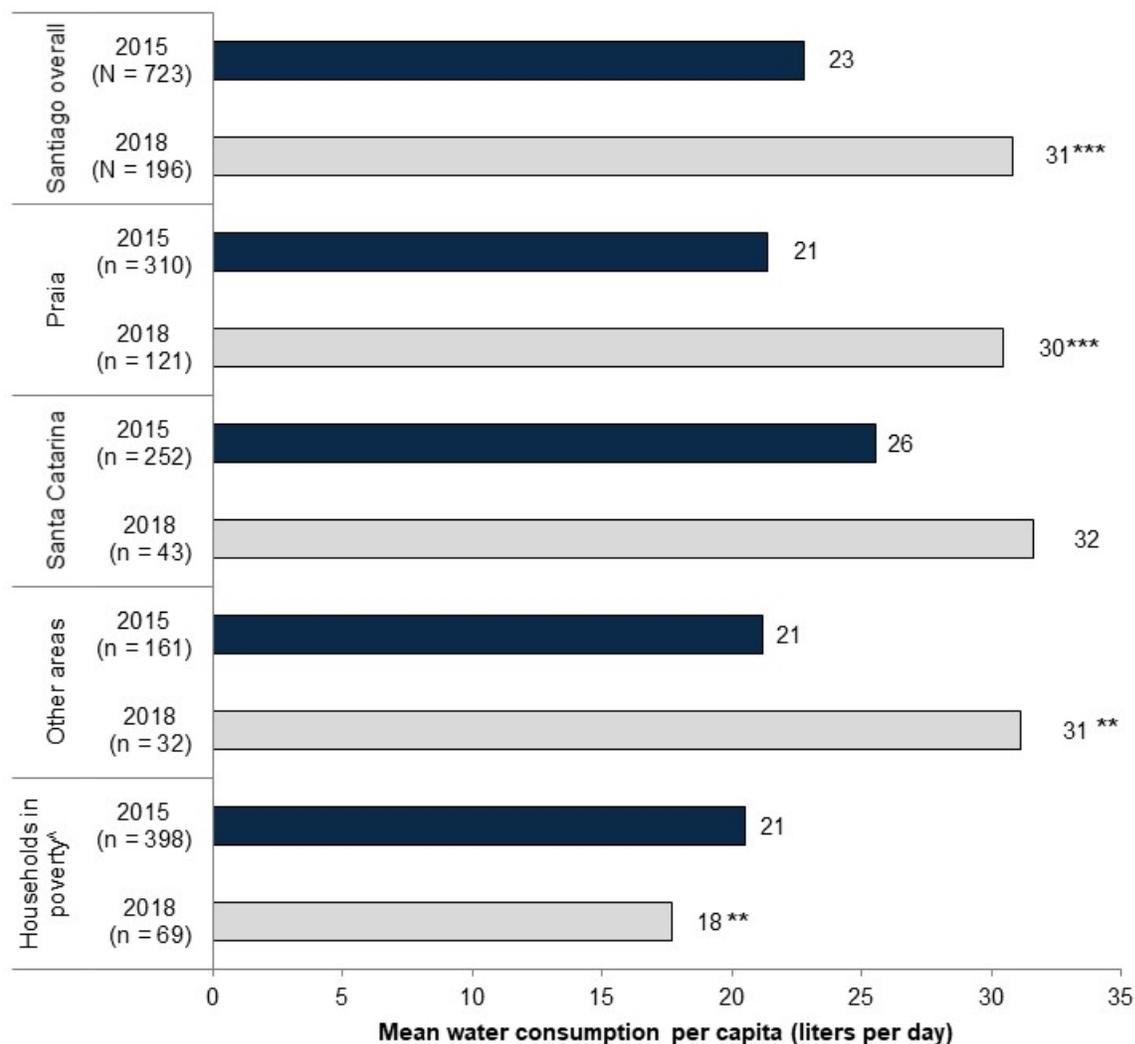
E. Water consumption and water and sanitation expenditures

The FAS project was expected to increase water consumption by increasing access to piped water among beneficiary households. In 2015, none of the intended FAS beneficiary households were connected to the piped water network; we can measure consumption in 2015 using household reports of daily water use. In 2018, more than 90 percent of FAS beneficiary households use their own piped water network connection as their primary water source; consequently, we can measure consumption using AdS billing data (reweighted to account for missing data) for most households. For households that rely on other sources, we use self-reported consumption.

Consistent with expectations, household water consumption increased among FAS beneficiary households, from 23 liters per capita per day in 2015 to 31 liters per capita per day in 2018, on average (Figure VII.7). These levels are broadly consistent with levels on Santiago overall (Chapter V), though consumption levels are lower among FAS beneficiaries—as we would have

expected, given that they are less well off, on average. Consumption levels in both years are similar across geographic areas and poverty status. Water consumption was lower among poor households in 2015 than among poor households in 2018. As the share of poor households was different in the 2015 and 2018 samples, the observed difference in consumption may reflect compositional differences between these groups.

Figure VII.7. Water consumption, liters per capita per day (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey, 2018 WASH Interim Survey (FAS sample), and 2018 AdS billing data.

Notes: 2015 estimates are based on survey self-reported water use. 2018 estimates for households that rely on their own piped network connection are based on billing data, whereas estimates for households that rely on other sources are based on survey self-reported water use. Estimates for 2018 are weighted to adjust for differences in availability of AdS billing data among households that use their own piped network connection. To account for outliers, values were top-coded at the 99th percentile by year.

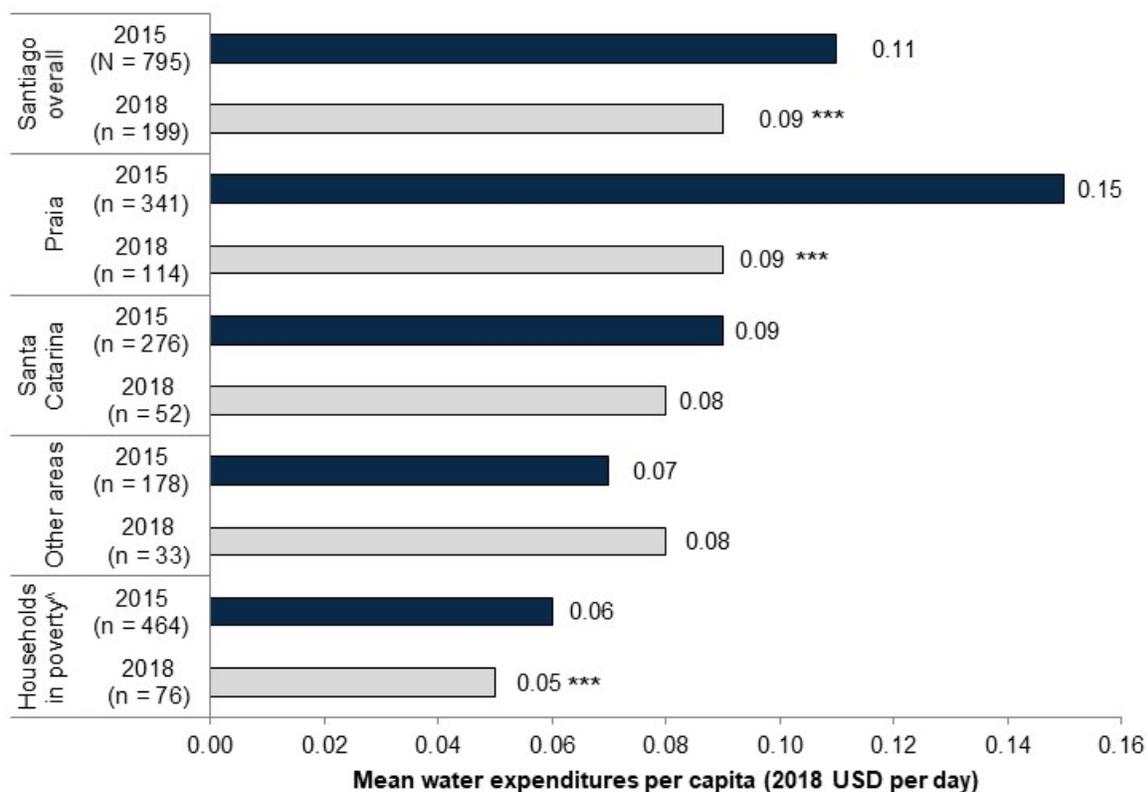
[^]Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

*/**/** Significant difference from zero at the .10/.05/.01 level, two-tailed test.

Because FAS beneficiaries are using new water sources—most are reliant on their own piped water network connections—we would expect them to experience changes not only in water consumption, but also in the price of water. (As shown in Chapter V, the price per liter varies across water sources, with households using their own piped water network connection often, but not always, facing lower prices.) To understand the combined impact on FAS beneficiary households, we estimated changes in water expenditures between 2015 and 2018.

Overall, household water expenditures among FAS beneficiaries fell between 2015 and 2018, from USD0.11 per capita per day to USD0.09 per capita per day (2018 USD) (Figure VII.8). Much of this decline is driven by a large decline in expenditures in Praia; in Santa Catarina and other areas, expenditures were relatively stable between 2015 and 2018. Some of the difference across areas may reflect the fact that the price for water changed differentially across municipalities. Water expenditures were lower among poor households in 2018 than among poor households in 2015.

Figure VII.8. Water expenditures, per capita per day (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey and 2018 AdS billing data.

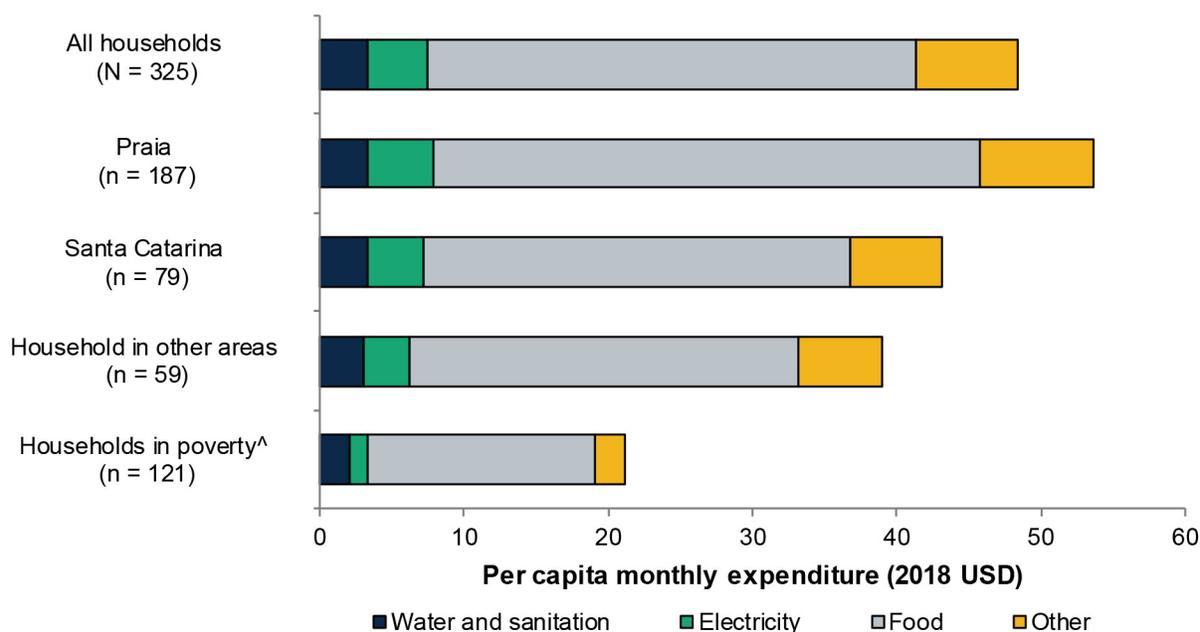
Note: To account for outliers, values were top-coded at the 99th percentile by year. In 2018, USD1 = CVE92.59, the average exchange rate from oanda.com between April 14 and June 16, 2018, the period of data collection. In 2015, USD1 = CVE93.06, accounting for -0.005 percent inflation between 2015 and 2018.

^aPoverty is defined as having household expenditures per capita lower than 60 percent of the median.

*/**/** Significant difference from zero at the .10/.05/.01 level, two-tailed test.

In the 2018 survey, households report spending just over three dollars per person per month on water and sanitation, equivalent to 7 percent of their monthly expenditures on the categories included in the survey (Figure VII.9). Poor households spend less than nonpoor households on water and sanitation and overall, but water and sanitation account for a higher share of total expenditures for poor households than for nonpoor households. Households in Praia spend more overall than households in other regions, but expenditures on water and sanitation are not higher in Praia. In all groups, food makes up about two-thirds of all expenditures.

Figure VII.9. Expenditures on water and sanitation and other household expenses among FAS beneficiary households, monthly per capita (2018)



Source: 2018 WASH Interim Survey (FAS sample).

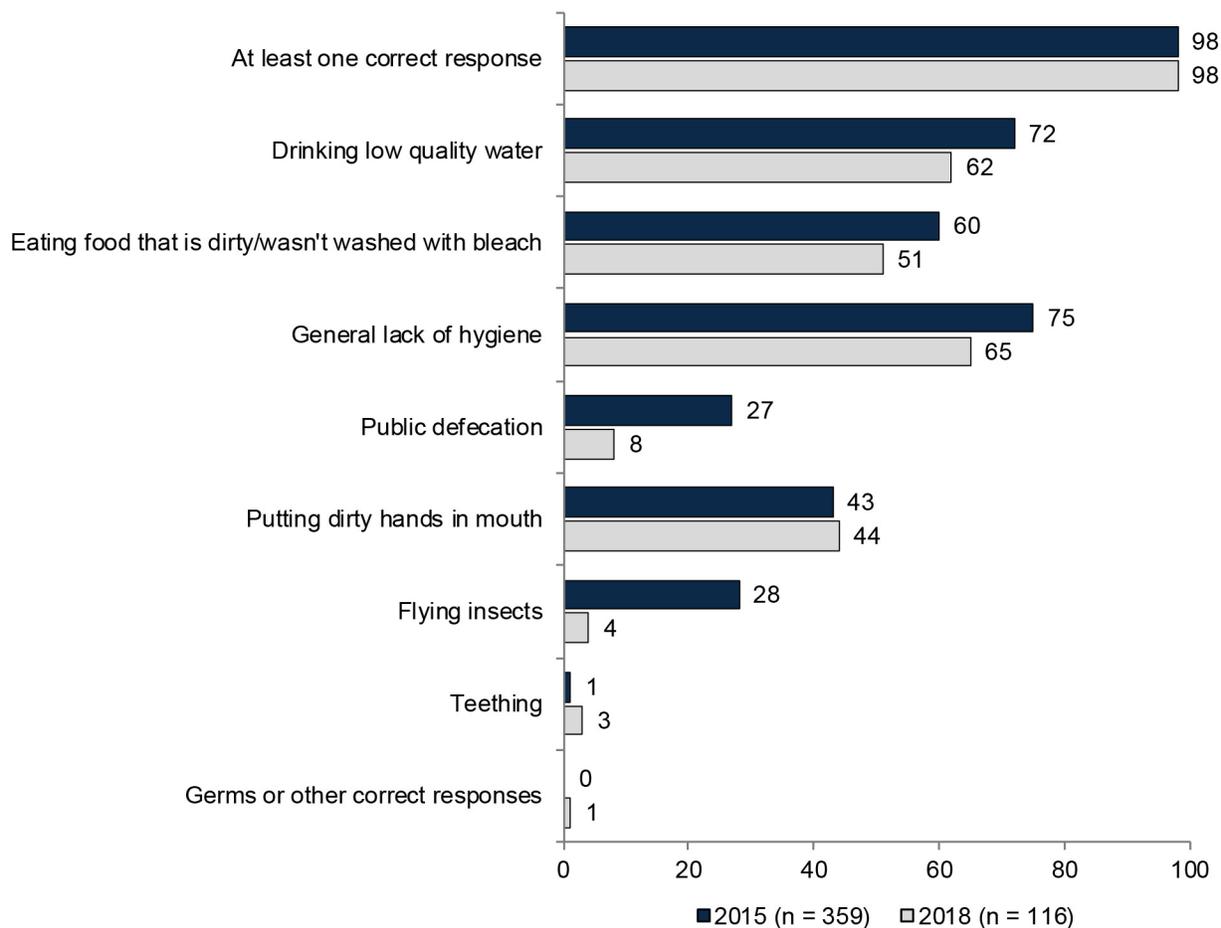
Notes: In 2018, USD1 = CVE92.59, the average exchange rate from oanda.com between April 14, 2018, and June 16, 2018, the period of data collection. To account for outliers, values were top-coded at the 99th percentile value.

[^]Poverty is defined as having household expenditures per capita lower than 60 percent of the median.

F. WASH behaviors and health

Nearly all FAS beneficiary households could correctly name at least one cause of diarrhea in children in both 2015 and 2018 (Figure VII.10). In both years, dirty water, dirty food, and poor hygiene were each given as responses by a majority of respondents (households were able to give more than one response), whereas approximately 40 percent named dirty hands as a cause of diarrhea in both years. Both defecating in the open and flying insects were named as a cause of diarrhea in 2015—each given by more than one-fourth of respondents—whereas in 2018, both of those responses are uncommon.

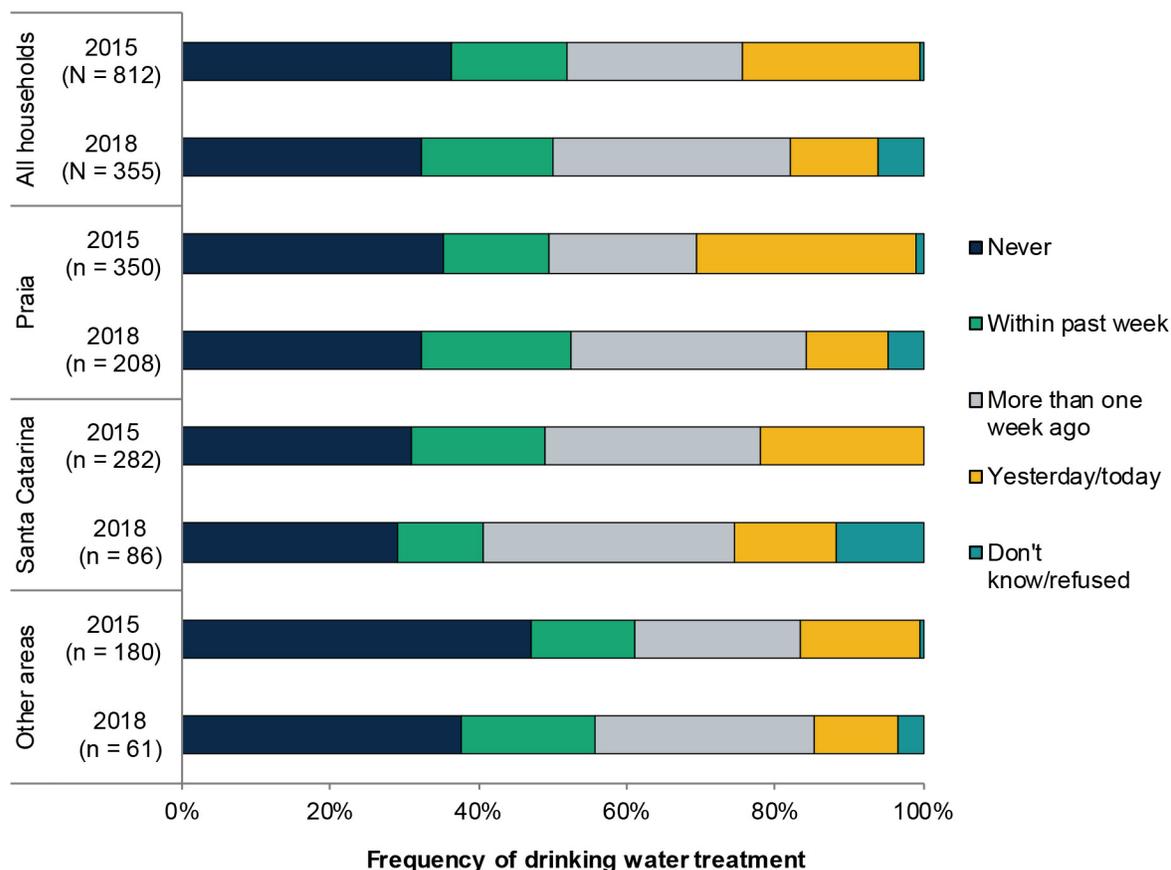
Figure VII.10. Reported causes of diarrhea in children, FAS beneficiary households (2015 and 2018)



Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

Notes: Sample is restricted to households with children under age 5. Percentages may not sum to 100 because respondents could select multiple response options and some responses are not presented here.

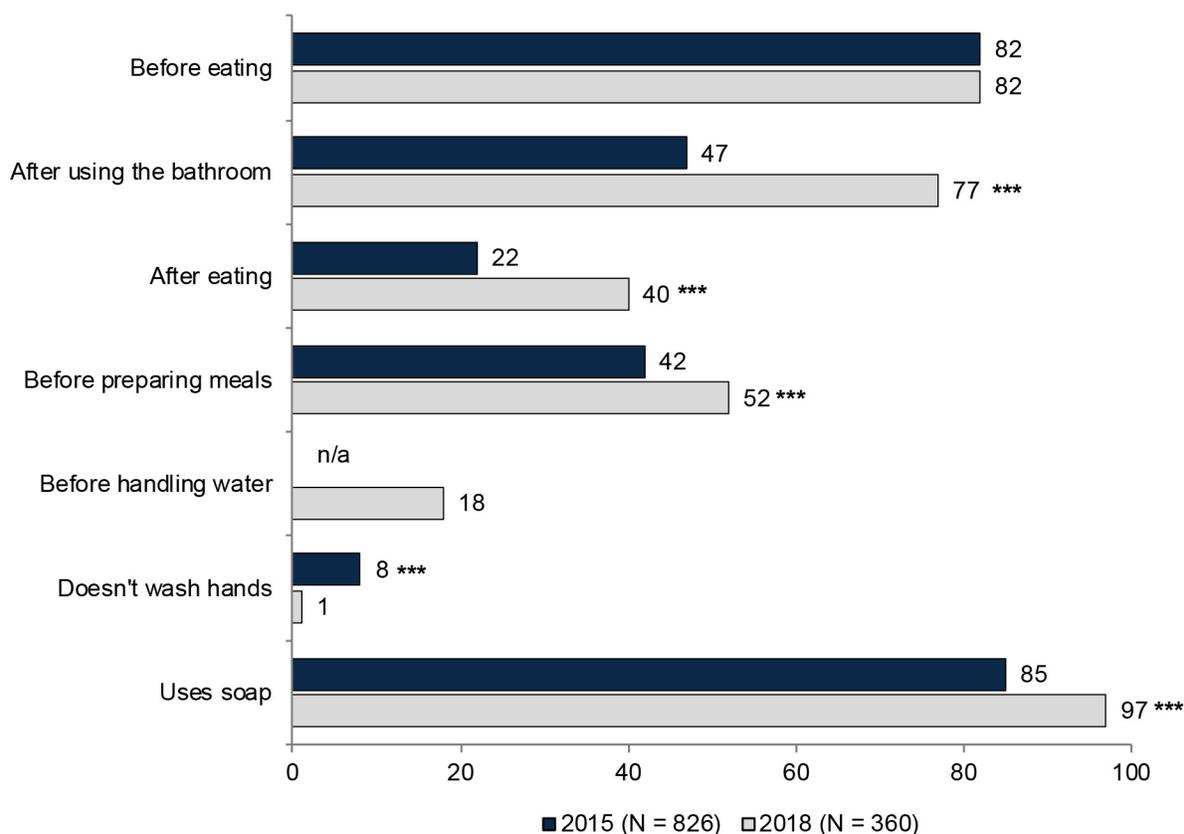
Among FAS beneficiaries, the frequency with which households treat their drinking water generally decreased between 2015 and 2018 (Figure VII.11), consistent with the switch from collecting and storing water to reliance on piped water as their primary source. The share of households that treated their water in the past day fell. Meanwhile, the share of households that treat their water but did it more than one week ago increased. This shift in water treatment behavior was more pronounced in Praia than in other areas.

Figure VII.11. Changes in water treatment habits, FAS beneficiary households (2015 and 2018)

Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

Note: Households indicated that last time they treated drinking water.

Self-reported handwashing behavior increased among FAS beneficiaries between 2015 and 2018 (Figure VII.12). However, respondents in the representative sample also report similar rates of handwashing in 2018, so we cannot attribute the improvement in self-reported behaviors to the FAS program and related WASH messaging targeted at beneficiaries. In 2018, just over 1 percent of households report that they do not generally wash their hands, compared with 8 percent of households in 2015. In both years, more than 80 percent of households reported washing their hands before eating, but handwashing increased significantly after using the bathroom, after eating, and before preparing meals. The use of soap was already high in 2015, with 85 percent of households that reported washing their hands reporting that they did so with soap. Nearly all households report using soap in 2018, a statistically significant increase from 2015.

Figure VII.12. Handwashing habits, FAS beneficiary households (2015 and 2018)

Source: 2015 MCA-Cabo Verde FAS Survey and 2018 WASH Interim Survey (FAS sample).

Notes: Responses reflect when household members generally have a habit of washing their hands. Percentages might not sum to 100 because respondents could have selected multiple response options. In 2015, “before handling water” was not a provided response option.

*/**/** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

Among FAS beneficiary households, the reported four-week prevalence of diarrhea among children under age 5 is 22 percent in 2018 (not shown).⁵⁰ In households that report a case of diarrhea in the past four weeks, fewer than half report missing work to care for a sick child; among households where members had to miss work, most report only missing a few days (not shown).

⁵⁰ Data on the prevalence of diarrhea from the 2015 MCA-Cabo Verde FAS Survey are not comparable to data in the 2018 WASH Interim Survey. In 2015, respondents were asked if they had had any health problems related to water or food, and if not, they were not asked about health problems (including diarrhea). Therefore, households that do not identify diarrhea as a water- or food-related health problem did not report cases of diarrhea. Reported cases of diarrhea were few in 2015, but 2015 data likely do not include all cases.

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VIII. AdS PERFORMANCE

This chapter examines AdS’s performance over the first two years of its existence by drawing on the utility’s administrative data, the 2018 interim household survey data, primary qualitative data, and ultrasonic meter data. We begin by summarizing AdS’s operational and financial status (Section VIII.A). We then look at customer⁵¹ perceptions and knowledge of AdS and its bills (Section VIII.B). Next, we examine AdS’s billing practices and the actual and self-reported receipt and payment of bills (Section VIII.C). We then assess whether AdS’s water tariff structure is progressive, regressive, or neutral (Section VIII.D). Finally, we examine the accuracy of AdS’s meters, according to the ultrasonic meter data we collected (Section VIII.E).

Key findings

- **AdS has shown mixed performance on a number of indicators.** From 2017 to 2018, the utility added new customers and supplied more water; but the operating cost deficit increased substantially as did non-revenue water, likely due in part to the incorporation of Praia into the data part-way through 2017. AdS made notable improvements in the bill collection rate and staff productivity was stable.
- **Almost half of the water consumption that AdS bills for is subsidized.** The small share of domestic consumption in the unsubsidized price blocks and by other types of consumers makes it difficult for AdS to achieve cost recovery.
- **Customer opinions of AdS are mixed.** AdS customers in Praia have more favorable opinions of the new utility relative to ELECTRA; AdS customers outside of Praia generally have a higher opinion of their SAAS than of AdS.
- **In general, AdS customers do not understand their bills.** The majority of customers in the representative sample and FAS beneficiaries who report receiving a bill from AdS do not know the price of water, what an estimated bill is, or how sanitation charges are calculated.
- **AdS bills most customers in a timely fashion.** However, on average, 13 percent of customers do not get a bill in any given month and 9 percent receive estimated bills.
- **Roughly one-third of AdS customers are at risk of being disconnected for unpaid bills.** Eighteen percent owed more than two-thirds of their 2018 bills. FAS beneficiaries paid almost as much as non-poor customers. Poor customers who did not participate in FAS were further behind on their payments.
- **AdS’s increasing block tariff schedule is regressive.** Non-poor customers consume 84 percent of subsidized water.
- **The majority of AdS meters tested against an ultrasonic meter are fairly accurate.** Roughly one-sixth of the meters we tested against an ultrasonic meter were under registering by more than 10 percent, contributing to non-revenue water. A similar share was over registering by more than 10 percent—potentially because of factors such as meter age or air in the pipes, an issue AdS is already working to resolve.

⁵¹ In this chapter, “customers” refers to households with their own piped network connection.

A. Summary of AdS's operational and financial status

An important measure of AdS's performance is its financial status and progress toward cost recovery, which requires that total revenues be greater than or equal to total expenses. In this section, we use AdS's operational data and primary qualitative data to examine the progress that AdS made toward cost recovery during its first two years of operation.

1. Number of piped network connections

By the end of 2018, AdS had 54,184 active water connections, an increase of almost 2,000 active connections from 2017 (Table VIII.1). Domestic connections account for 94 percent of the total active connections in 2018 and according to the post-compact indicator tracking table, by the end of the compact in 2017, AdS was reported to provide network service to 61 percent of the population of Santiago (not shown). Commercial and services connections increased by 6 percent, whereas other (state, tourism, and industry) types of active connections increased by 2 percent. However, in 2018 AdS also had 5,094 inactive connections compared to 4,133 inactive connections in 2017. Consistent with the household survey data, AdS records indicate that roughly one-third of the utility's water customers also have sewer service. According to the post-compact indicator tracking table, by the end of the compact in 2017, 10 percent of the population of Santiago was connected to sewers managed by AdS (not shown).

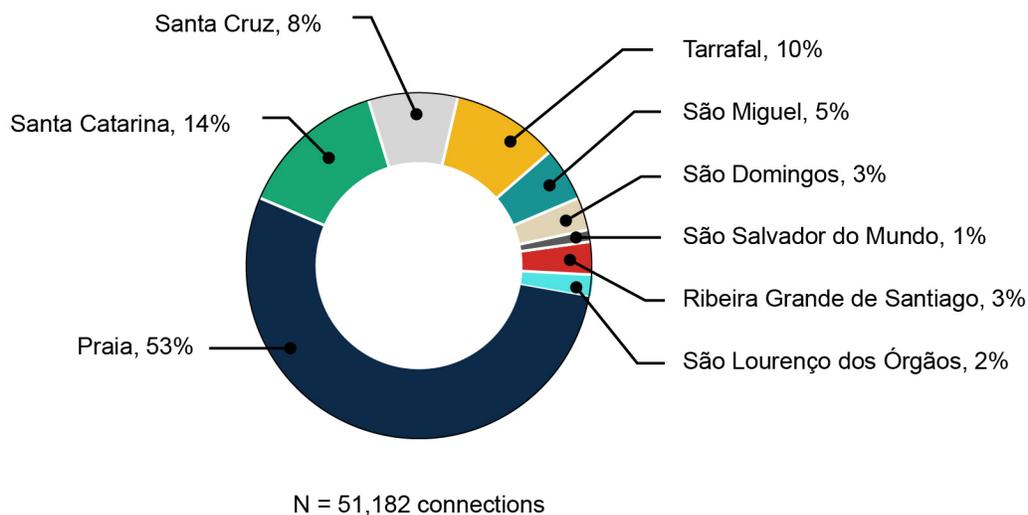
Table VIII.1. AdS's piped network connections in 2017 and 2018

Indicator	2017	2018	Change from 2017 to 2018
Total number of active connections	52,185	54,184	1,999
Number of active domestic connections	49,321	51,182	1,861
Number of active commercial and services connections	1,782	1,891	109
Number of active other (state, tourism, and industry) types of connections	1,082	1,111	29
Total number of inactive water connections	4,133	5,094	961
Total number of sewer connections	19,413	21,828	2,415

Source: 2017 and 2018 AdS operational data.

Of AdS's 51,182 domestic water connections in 2018, 53 percent are located in Praia, which is consistent with the share of the total population in Praia (Figure VIII.1). Santa Catarina, Santa Cruz, and Taraffal have the next-highest numbers of water connections, accounting for 14 percent, 10 percent, and 8 percent of connections, respectively. Together, the other five municipalities account for 15 percent of water connections.

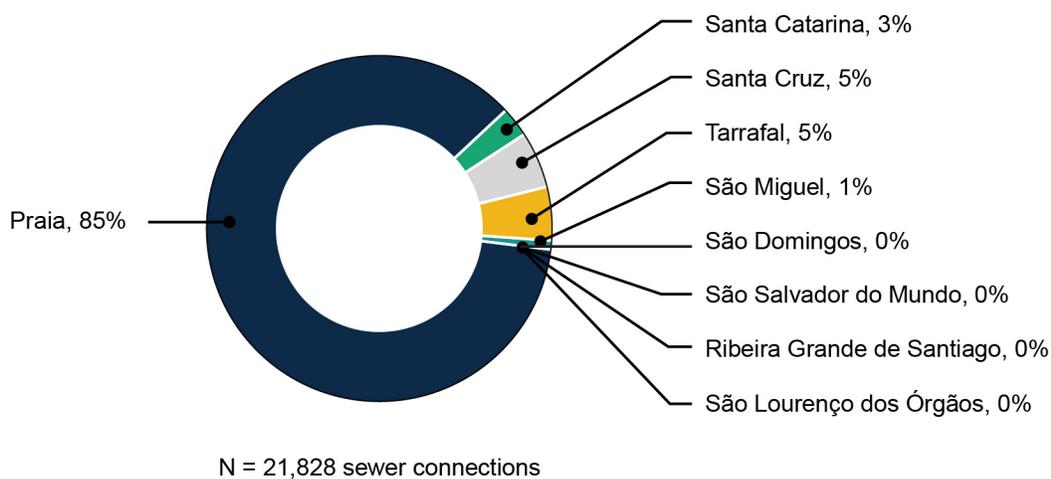
Figure VIII.1. Share of AdS’s 2018 piped network domestic connections by municipality



Source: 2018 AdS operational data.

Eighty five percent of AdS’s 21,828 sewer connections in 2018 are located in Praia (Figure VIII.2). Tarrafal and Santa Cruz are the only other municipalities with a non-trivial share of AdS’s sewer customer base (each comprise 5 percent of AdS’s sewer connections).

Figure VIII.2. Share of AdS’s 2018 sewer connections by municipality



Source: 2018 AdS operational data.

2. Volume of water billed

From 2017 to 2018, AdS increased billed water consumption by 10 percent, with slightly over 3.0 million m³ of water billed. In 2018, AdS billed 2.3 million m³ of water for domestic consumption, a decrease of 5 percent from 2017 (Table VIII.2). Domestic water consumption represented over three-quarters of total billed consumption in 2018. Although accounting for less than one-quarter of billed consumption in 2018, the volume of water that AdS billed its other types of customers more than doubled.

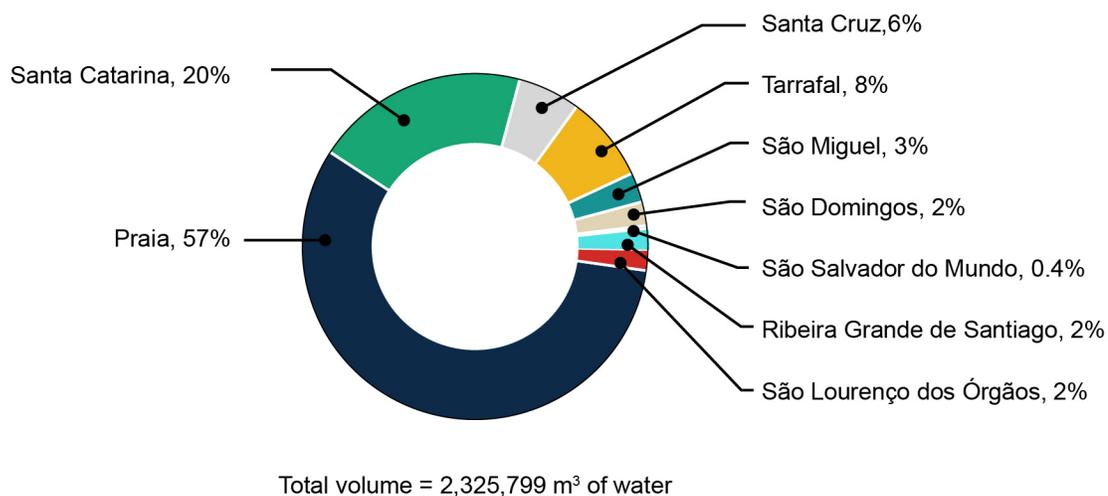
Table VIII.2. AdS's volume of water billed in 2017 and 2018 (m³)

Indicator	2017 ^a	2018	Change from 2017 to 2018
Volume billed for domestic consumption	2,450,403	2,325,799	-124,604
Volume billed for commercial consumption	107,743	245,383	137,641
Volume billed for other (public, NGOs schools, tourism, industry) types of consumption	168,083	430,922	262,839
Total volume of water billed	2,726,229	3,002,105	275,876

Source: 2017 and 2018 AdS operational data.

^a AdS took responsibility for service provision in Praia in July 2017 so annual data reflect the sudden growth of the company's responsibilities halfway through the year.

The volume of water billed in each municipality compares fairly well with expectations given the share of customers in each municipality, although customers in Santa Catarina appear to consume slightly more than customers in other municipalities. Over half of the volume of water billed by AdS in 2018 is for water consumption by customers located in Praia (Figure VIII.3). Santa Catarina follows with the second-highest share, accounting for 20 percent of billed consumption. Cumulatively, the remaining six municipalities represent less than one-quarter of billed consumption.

Figure VIII.3. Share of AdS's total volume of water billed in 2018 by municipality

Source: 2017 and 2018 AdS operational data.

One determinant of how much water customers can consume is the availability of water in the network. On average across the municipalities, AdS provided 9 hours of service per day which did not change during 2018, but did improve compared to the 8 hour average reported for 2017. However, this average value masks substantial variation across municipalities with the hours of service per day ranging from 19 hours in Ribeira Grande de Santiago to half an hour in São Salvador do Mundo. Throughout 2018, the average number of hours stayed the same in all municipalities except Tarrafal, where AdS increased the average hours of service per day from 6 to 8 hours by the end of the year.

3. Key financial indicators

AdS data from 2017 must be interpreted with caution, since Praia was incorporated into AdS's service area half way through the year, doubling the fledgling utility's number of customers and vastly complicating operations and billing. AdS's operating cost coverage⁵² was generally stable at 73 percent in 2017 and 74 percent in 2018. More precise measurement in 2018 might partly explain why the operating cost coverage was below the compact baseline of 110 percent. However, the 2018 operating cost deficit⁵³ is 51 percent higher than the 2017 deficit (Table VIII.3).

⁵² Operating cost coverage is defined here as total operational revenues over total annual operating costs. It is expressed as a percentage.

⁵³ Operational cost deficit is defined as total annual operating costs minus total annual operational revenue.

Non-revenue water,⁵⁴ the bill collection rate,⁵⁵ and staff productivity all contribute to the utility's financial health.⁵⁶ As of 2018, AdS's non-revenue water is 61 percent, which is higher than the 46 percent reported in 2017 and the 39 percent reported at baseline. The increase between 2017 and 2018 is likely due to the incorporation of Praia into the data part-way through 2017 (since it is widely believed that non-revenue water is a bigger problem in Praia than other parts of the island), whereas the increase relative to the compact baseline is likely due at least in part to more accurate measurement, particularly since the baseline was an aggregation of the non-revenue water reported by ELECTRA and the SAAS. At the same time, AdS improved its bill collection rate to 64 percent compared to only 44 percent in 2017 when AdS was faced with extensive billing challenges related to the handover of customers in Praia. The bill collection rate is slightly lower than the 68 percent reported at baseline, but there are concerns with data quality prior to the creation of AdS. As of the end of 2018, AdS had 235 employees and 35 percent of them were female (not shown). Staff productivity, reported as the number of AdS staff per 1,000 potable connections, is 4.2 in 2018, a slight increase compared to 2017 but far lower than the compact baseline of 15.

Table VIII.3. Key financial and operational indicators for AdS

Indicator	ITT baseline	ITT as of compact end date (Nov 30 2017)	2017 AdS operational data ^a	2018 AdS operational data
Operating cost coverage	111%	45%	73%	74%
Value of implicit subsidy (USD)	\$11,797,509	\$8,705,504	NA	NA
Operational cost deficit ^b	NA	NA	\$2,354,339	\$3,552,487
Nonrevenue water	39%	79%	46%	61%
Bill collection rate	68%	41%	44%	64%
AdS staff per 1,000 potable water connections	15	3.9	3.7	4.2

Source: Post-compact indicator tracking table (ITT) and 2017 and 2018 AdS operational data.

Notes: We were unable to confirm how indicator numbers from the post-compact ITT were calculated, so we focused on comparing indicators based on 2017 and 2018 AdS operational data.

^a AdS took responsibility for service provision in Praia in July 2017 so annual data reflect the sudden growth of the company's responsibilities halfway through the year.

^b Because data were not available to calculate the implicit subsidy, we report the operational cost deficit in place of the implicit subsidy for 2017 and 2018 AdS operational data.

NA = not available.

⁵⁴ AdS calculates non-revenue water as the difference between the annual volume of water produced and the annual volume of water billed. It is expressed as a percentage.

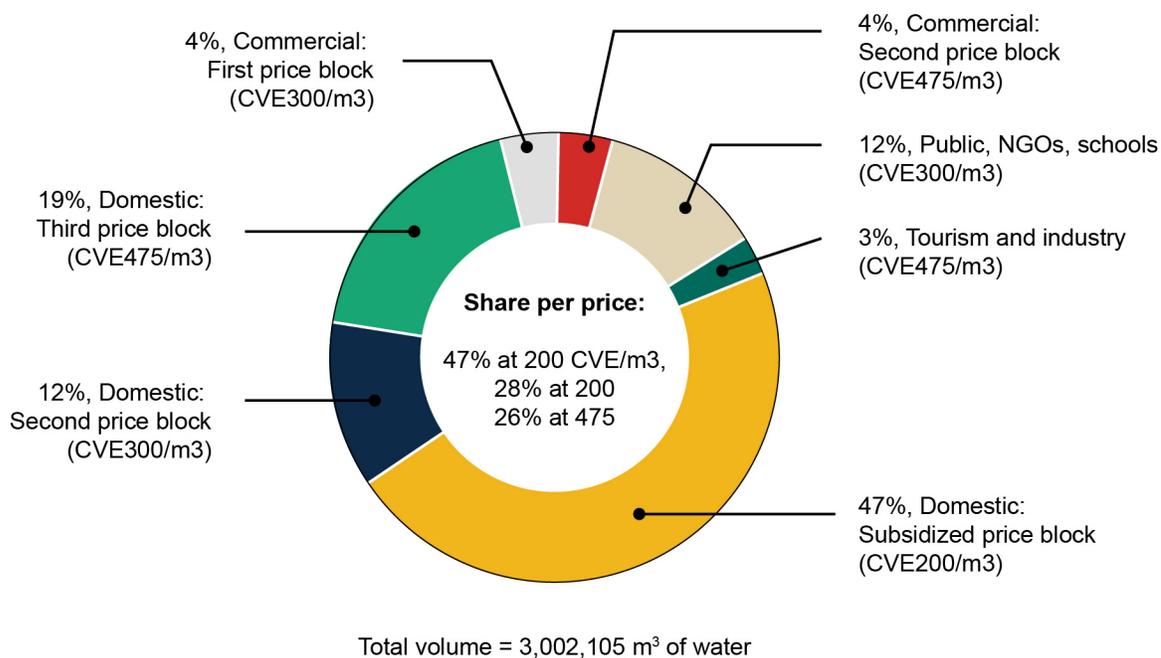
⁵⁵ The bill collection rate is defined here as the total annual value of billed water paid by customers over the total annual value of billed water. It is expressed as a percentage.

⁵⁶ The tariff structure is another major determinant of a utility's financial health, but AdS does not control the tariff structure so we discuss it in the next section.

4. Cost recovery through the current water tariff structure schedule

After its establishment in 2016, AdS worked with ARE to set up a unified, increasing block tariff structure that would make at least a minimal quantity of water affordable to everyone while still allowing AdS to recover costs. The unified, increasing block tariff structure has been in effect since July 2017. (See Chapter IV.2 for details on how it was phased in.) It includes the following three price blocks for monthly (30 days) domestic consumption: (1) CVE200/m³ for the first 5 m³ consumed, CVE300/m³ for the next 6 to 10 m³ consumed, and CVE475/m³ for any water consumed above 10 m³. The first price block is subsidized because it is only about CVE19 above the price that AdS purchases water from ELECTRA in Praia, whereas the price per cubic meter at the second and third blocks is not subsidized. In 2018, 47 percent of water consumption billed by AdS was in the subsidized block (Figure VIII.4). The small share of domestic consumption in unsubsidized price blocks and by other types of customers makes it difficult for AdS to recover the revenue lost from subsidized water consumption. Moreover, new domestic customers are not providing AdS with additional revenue that would help it achieve cost-recovery. Over 80 percent of the consumption billed to domestic customers connected to the network after 2014 fell under the subsidized price block (not shown).

Figure VIII.4. Share of AdS’s total volume of water billed in 2018 by customer type and price block



Source: 2017 and 2018 AdS operational data.

AdS's operational data indicate that the current water tariff structure does not allow the utility to recover its costs. However, ATAS staff interviewed as part of the primary data collection are cautiously optimistic.

Cost recovery is linked to a number of factors: the cost of obtaining water from ELECTRA, which AdS believes is too high; the share of non-revenue water; the ability of customers to pay their bills and the consistency with which they do so; the operational costs that AdS faces in producing and distributing water, including energy for wells and pumps, transportation, maintenance, and repair costs; and the ability to respond to customer complaints. The perception among stakeholders and households alike is that water is expensive. AdS needs to become more efficient to reduce its operating costs while consistently providing water and quality service to its customers to ensure cost recovery in the future.



“We made the business plan taking into account the price. So if all the assumptions are realized, the company is viable to the goal of three years—four years at most. I think it is true in many countries, even in countries that are more developed than here, when we create companies like this and there is a backlog to catch up, there is necessarily a period when we are in deficit. But it is made up after six or seven years. We’re positive after three years [we should see AdS begin to recover costs]. However, what is really needed is for AdS to make a major effort to improve its results.”

–ATAS staff



B. Customer perceptions and knowledge of AdS and the water tariff schedule

AdS is expected to provide better services to its customers through corporatization. One of the six characteristics of well-performing public water utilities is customer orientation to promote satisfaction and ultimately the payment of bills (Baietti et al. 2006). This section explores how familiar Santiago households are with AdS, customer perceptions of AdS compared to their previous water supplier, AdS's responsiveness to customer complaints, and customer familiarity with their bills.

1. Familiarity with AdS as the water utility

Because AdS has only been in existence for two years, Santiago households, especially those not connected to the piped network, might not be very familiar with AdS. The 2018 survey asked respondents to identify the company that supplies piped water to their neighborhood. Approximately 90 percent of beneficiaries who received subsidized connections to water and sanitation utilities through the FAS and households from the representative sample that reported using the piped network as their primary source identified AdS as their water supplier (Figure VIII.5). In contrast, only half of non-piped households identified AdS as their water supplier. AdS is not necessary the water supplier of non-piped households since some of these households may rely on water sources

such as community wells, springs, and or private distributors. Most of the remaining half indicated that they did not know the name of their neighborhood’s water supplier.

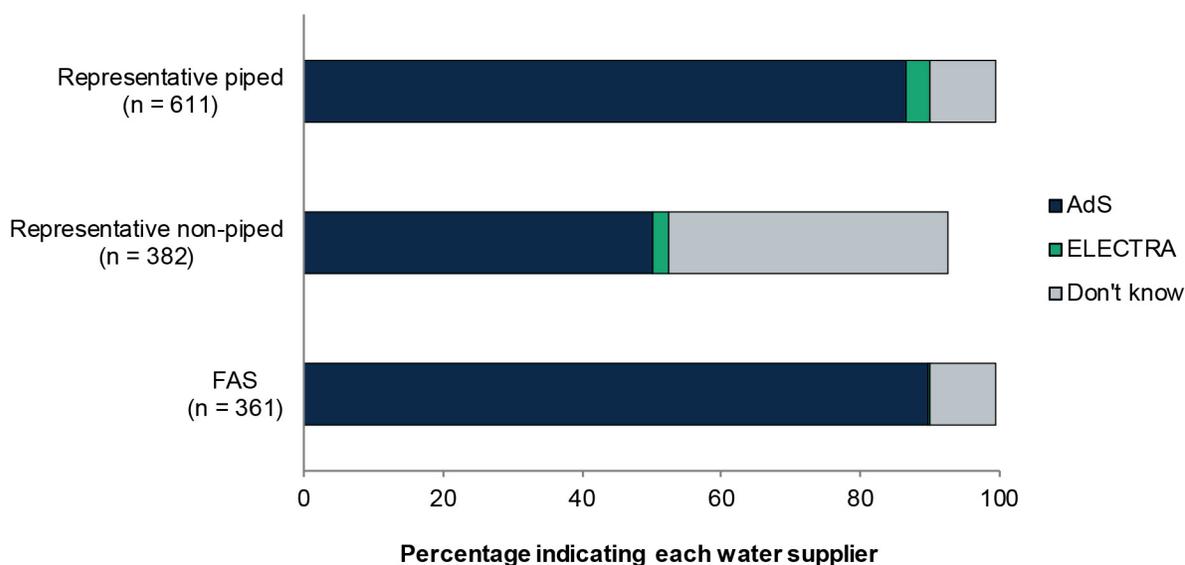


“I think it has legs to walk despite some problems that, of course, are in the public domain. These problems, some complaints, are associated with the fact that AdS is one of the few, if not the only, companies that started basically without any state installation subsidy. This weighed a lot at the start. But all the studies of which I have knowledge of show that it is possible—the sustainability, the viability of the company.”

– Municipal Camara, Santiago Island



Figure VIII.5. Company identified by households as their neighborhood’s water supplier (2018)



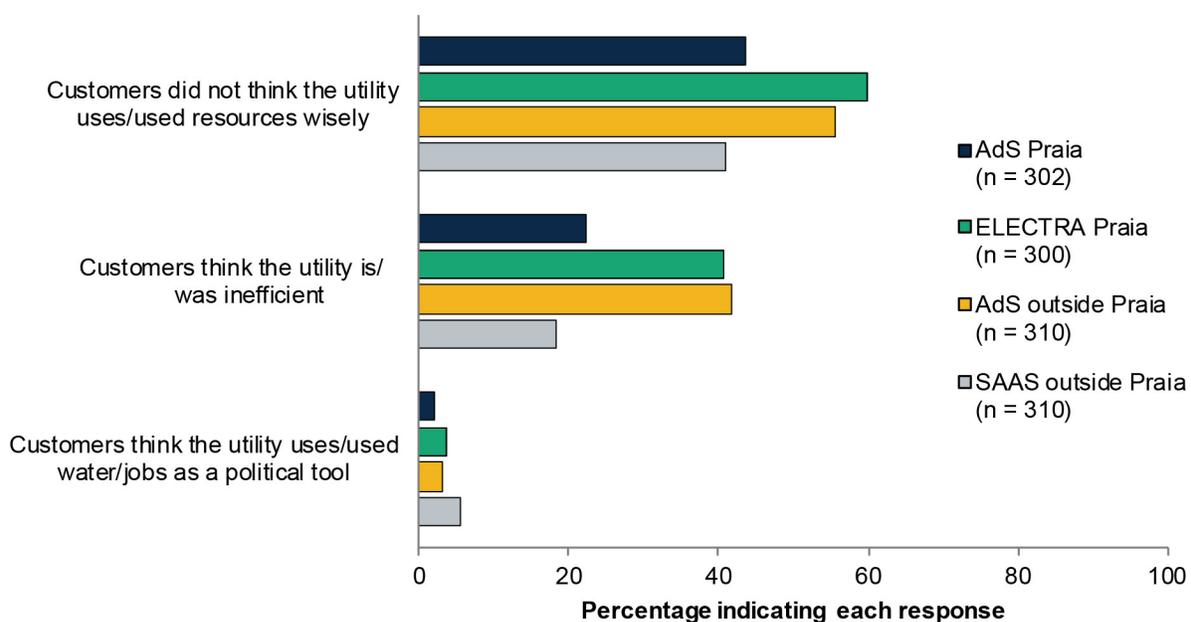
Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For households in the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages may not sum to 100 because some respondents indicated that there was no water supplier or gave another response, and those responses are not presented here.

2. Perception of AdS compared to previous utility

As a corporatized MMU, AdS has its own transparent financial accounts separate from other government operations and is able to make operational decisions independent of the government. Under this structure, AdS is expected to operate more transparently and efficiently than ELECTRA in Praia and the SAAS that had served Santiago municipalities outside of Praia. The 2018 survey asked customers about their perceptions of AdS and their previous utility (either ELECTRA or SAAS, depending upon customer location). AdS customers in Praia have more favorable opinions of the new utility relative to ELECTRA, while AdS customers outside of Praia generally have a higher opinion of their SAAS than AdS. Specifically, although slightly more than 40 percent of customers do not think that AdS used resources wisely, this is lower than the roughly 60 percent who do not think ELECTRA used resources wisely. Similarly, the share of AdS customers in Praia who think it is an inefficient utility is much lower compared to the roughly 40 percent who think ELECTRA was inefficient (Figure VIII.6). Outside Praia, almost 60 percent of customers do not think that AdS uses resources wisely, but only 20 percent had the same opinion about their SAAS. In addition, the share of customers who think AdS is inefficient (just over 40 percent) is almost double the share that had the same opinion of their SAAS. Only a small share of customers inside and outside Praia think that AdS or their former water suppliers uses or has used water or jobs as a political tool.

Figure VIII.6. Negative customer perceptions of AdS compared to ELECTRA and SAAS (2018)



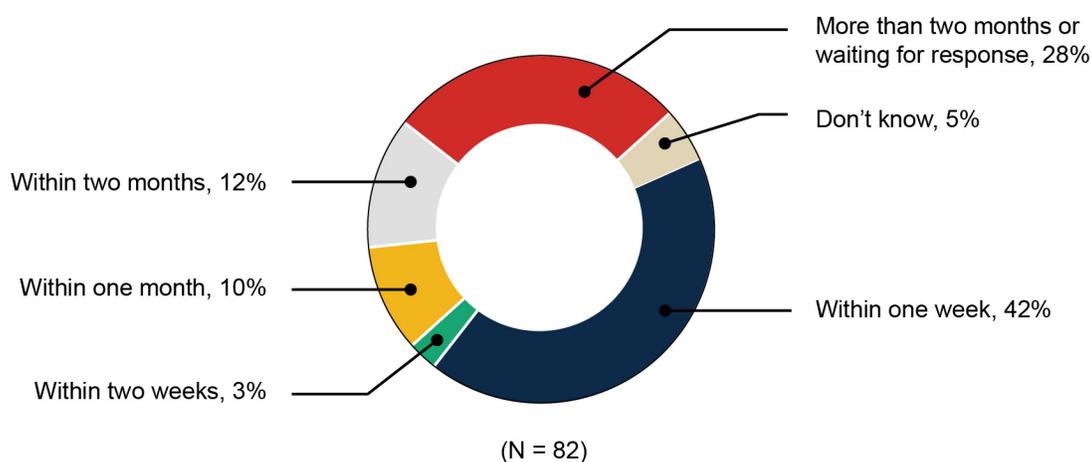
Source: 2018 WASH Interim Survey (representative sample).

Notes: Estimates were weighted to adjust for differences in sampling probabilities. The percentage giving each response is based on customers that used their own piped network connection as their primary source. Percentages may not sum to 100 because respondents could select multiple response options to the survey question and because “don’t know”, “no opinion”, and other infrequent responses are not presented here.

3. AdS responsiveness to complaints and issues

The 2018 household survey asked respondents whether they had ever filed a complaint with AdS and, if they had filed one, how long it took for them to receive a response from AdS. Only 14 percent of respondents say they have ever filed a complaint with AdS. Forty two percent of 2018 survey respondents who have ever filed a complaint with AdS say that AdS had responded to their complaint within one week, but almost equally many said it took at least two months before AdS responded to their complaint (Figure VIII.7). These findings are broadly consistent with the fact that only 42 percent of AdS customers were satisfied with the speed with which AdS responded to their complaints (Figure V.5).

Figure VIII.7. Time frame of AdS response to complaints and issues reported by customers (2018)



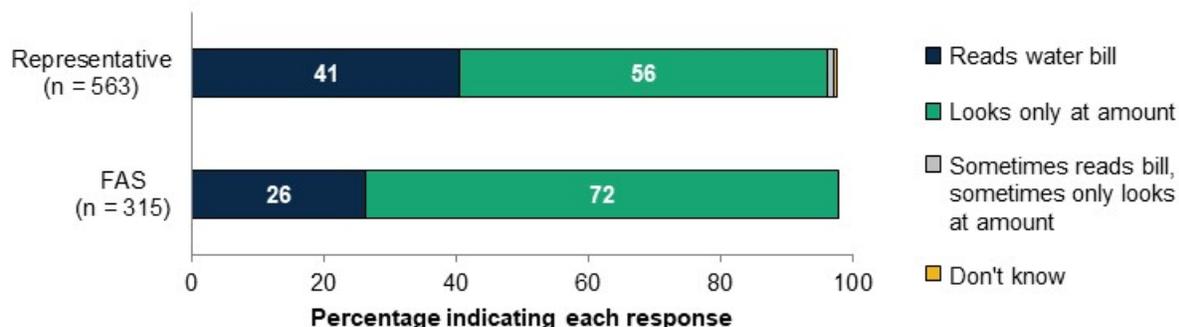
Source: 2018 WASH Interim Survey (representative sample).

Notes: Estimates were weighted to adjust for differences in sampling probabilities. Percentages are based on responses from customers who have filed a complaint with AdS, and they may not sum to 100 because infrequently reported responses are not presented here.

4. Customer knowledge of bill components

Customer attention to the bill. In order to understand the extent to which AdS's customers try to understand their bills, the 2018 household survey asked respondents whether they or someone else in their household spent time reading their water bill or if they only looked at the amount that they have to pay. Fewer than half of respondents from the representative sample and roughly one-quarter of respondents among the FAS beneficiary sample report that they or someone else in their household reads their water bill (Figure VIII.8). Most of the remaining respondents from both samples say they only look at the bill amount.

Figure VIII.8. Share of customers who read their bill versus only look at the amount (2018)

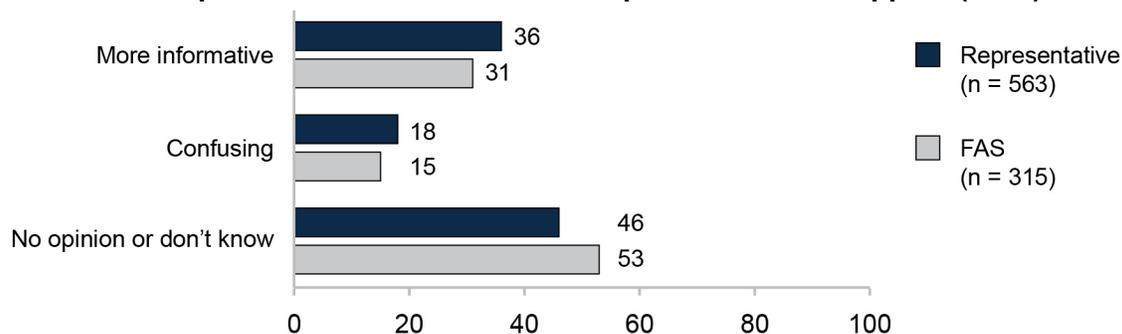


Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers that reported receiving a bill from AdS may not sum to 100 because some infrequently reported responses are not presented here.

Customer perceptions of their bill. The 2018 household survey asked respondents how they would compare the information on the bill that they get from AdS to the bill that they used to get from their previous water supplier. Compared to the bill from their previous water supplier, 36 percent of respondents from the representative sample and 31 percent from the FAS beneficiary sample report that AdS’s bill is more informative (Figure VIII.9). However, 18 percent of representative customers and 15 percent of FAS beneficiaries say that AdS’s bill is more confusing. Although opinions are similar across both samples, FAS beneficiaries were connected to the piped network in 2015, so they only had about a year of service with ELECTRA or a SAAS before AdS became their new water supplier. Roughly half of respondents from both samples either had no opinion or did not know. Based on the opinions provided by customers, it appears that AdS’s bills are at least slightly better than the bills issued by previous water suppliers.

Figure VIII.9. Comparison of AdS bill to bill from previous water supplier (2018)

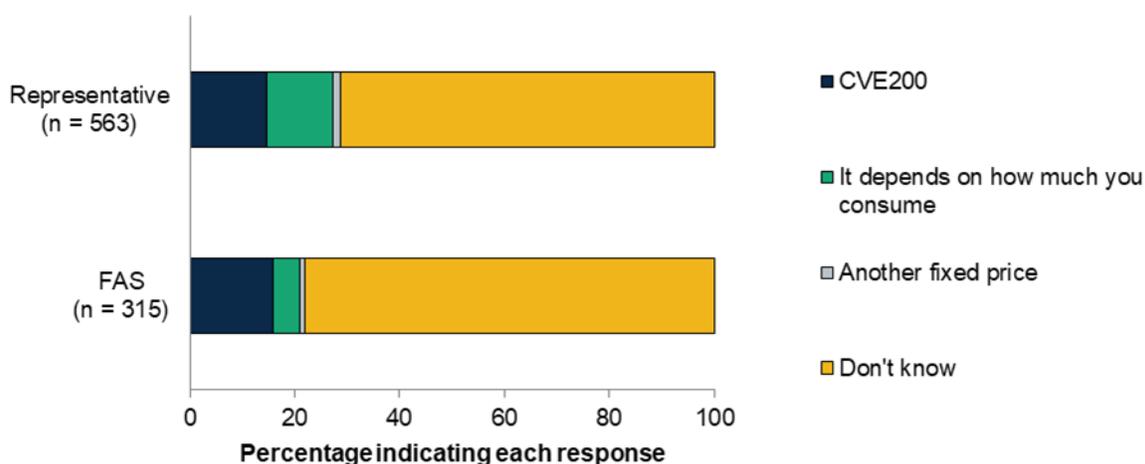


Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers who reported receiving a bill from AdS may not sum to 100 because respondents could select multiple response options for this survey question and because the “other opinion” response option is not presented here. Because FAS beneficiaries were connected to the piped network in 2015, they only had about a year of service with ELECTRA or a SAAS before AdS became their new water supplier.

Customer knowledge of water charges. The WASH project’s IEC campaigns included components focused on educating customers on their bills and the new water tariff structure. Although it is not essential for customers to understand their bills in order to pay them, given AdS’s current block pricing structure, it is important for customers to be aware of the price per cubic meter of water because it could affect how much they consume. However, over 70 percent of respondents from both the representative and FAS beneficiary samples report that they do not know the price per cubic meter of water (Figure VIII.10). Only 13 percent of respondents from the representative sample and 5 percent from the FAS beneficiary sample indicate that the price per cubic meter depends on how much you consume. About 15 percent of respondents from both samples indicated that the price was CVE200/m³, which was the price under the subsidized block.

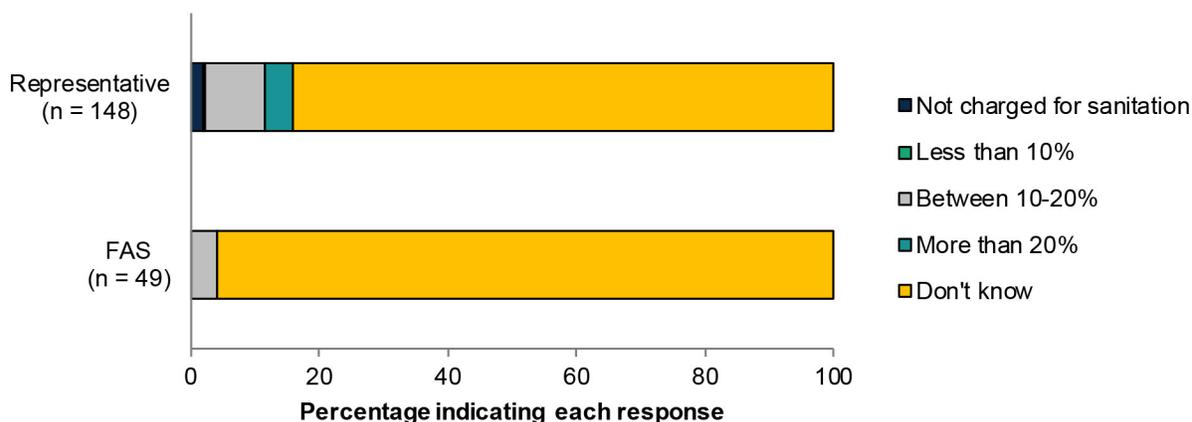
Figure VIII.10. Customer knowledge of the price per cubic meter of water (2018)



Source: 2018 WASH Interim Survey (representative and FAS samples).

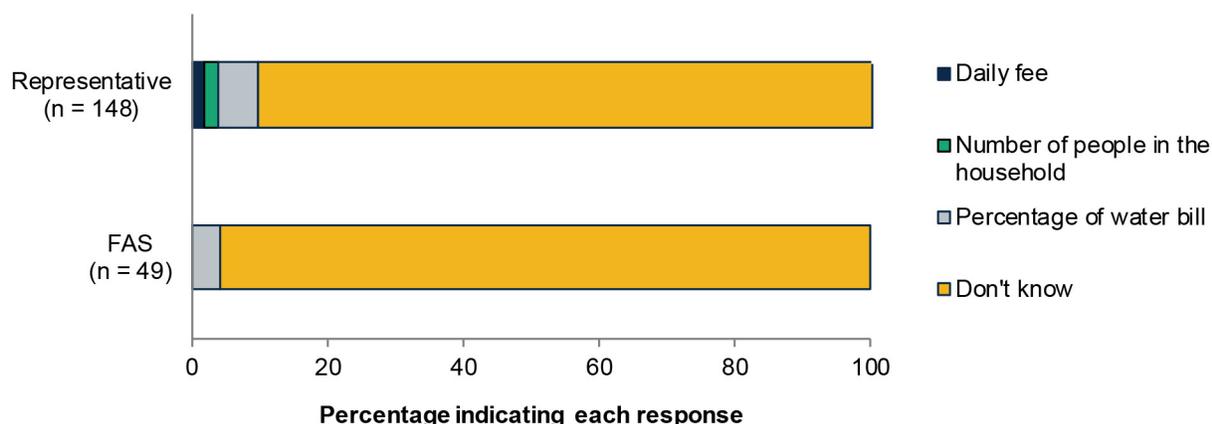
Note: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers who reported receiving a bill from AdS may not sum to 100 because some infrequently reported responses are not presented here.

Customer knowledge of sanitation charges. AdS calculates the sanitation charges for its domestic customers as 20 percent of their water bill. The 2018 household survey asked respondents with a sewer connection how they thought sanitation charges were calculated. Ninety percent of respondents from the representative sample and 96 percent from the FAS beneficiary samples report that they do not know how the sanitation charges on their AdS bill are calculated (Figure VIII.11). Only 6 percent of representative customers and 4 percent of FAS beneficiaries know that sanitation charges are calculated as a percentage of their water bill. Similarly, when asked approximately how much of their total bill from AdS is for sanitation charges, 84 percent of customers from the representative sample and 96 percent of FAS beneficiaries say they do not know (Figure VIII.12).

Figure VIII.11. Customer knowledge of share of AdS bill that is for sanitation (2018)

Source: 2018 WASH Interim Survey (representative and FAS samples).

Note: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers with a sewer connection who reported receiving a bill from AdS may not sum to 100 because some infrequently reported responses are not presented here.

Figure VIII.12. Customer knowledge of how sanitation charges are calculated (2018)

Source: 2018 WASH Interim Survey (representative and FAS households).

Notes: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages are for customers with a sewer connection who reported receiving a bill from AdS.

C. Billing

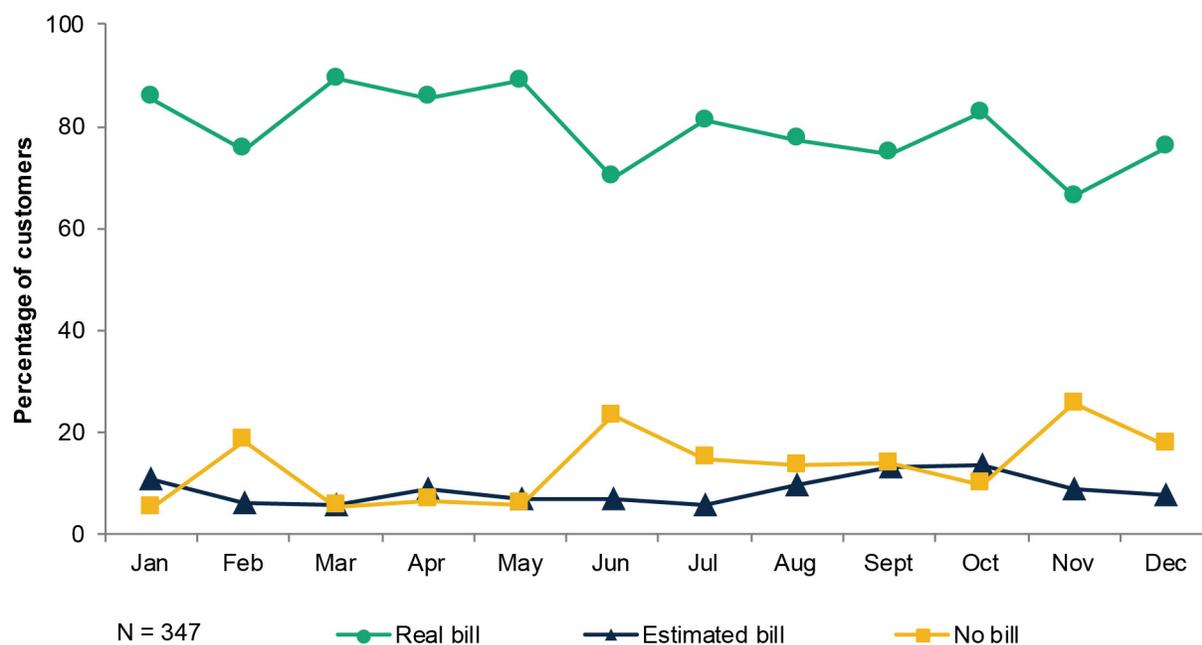
An effective billing system is a critical component of a water utility's cost recovery strategy. AdS inherited its customer database from Santiago's previous water suppliers, and since it began operations, it has worked to verify the existence of customers appearing in the database to move forward with issuing bills to those who are still active customers. In this section, we first describe AdS's billing practices, then discuss customers' self-reported receipt of bills and their knowledge of estimated bills. We then look at AdS billing and payment data and customer self-reports for

payment patterns. It is important to examine the bill-paying practices of AdS customers because low bill collection rates impede the cost recovery of water utilities.

1. AdS's billing practices

Types of bills issued. AdS issues two different types of bills for water consumption: real and estimated bills. Real bills are based on actual water consumption as recorded by a customer's meters. When AdS is not able to issue a bill based on a customer's meter reading, it issues an estimated bill based on the customer's average consumption history so the customer can at least start paying for some of the household's likely water consumption for the month. The estimated bill is an actual bill that the customer must pay, like any other regular bill issued by AdS. In 2018, the share of customers receiving an estimated bill ranged from 6 percent in July to 14 percent in October (Figure VIII.13). In our consumption analysis we exclude 8 customers that did not receive any real bills in 2018, 59 customers with zero consumption for half or more of their bills, and 3 customers with duplicate meter reading dates for most of their real bills. Additionally, we exclude real bills showing negative or zero consumption.

Figure VIII.13. Types of bills issued by AdS in 2018 by month

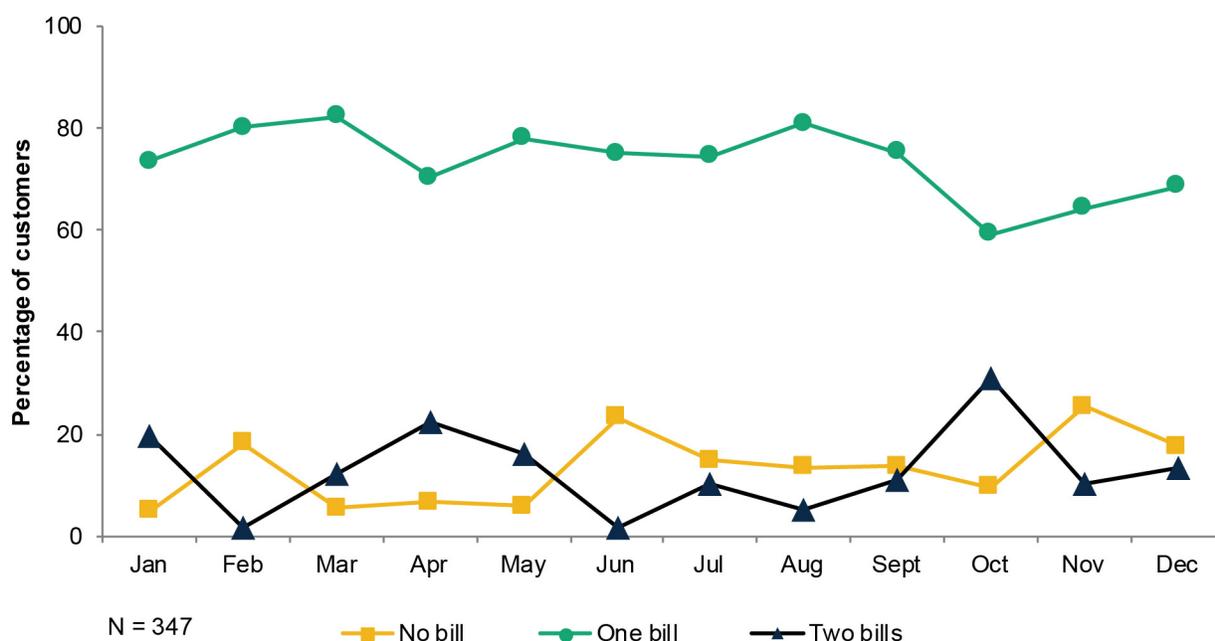


Source: 2018 AdS billing data (representative sample).

Notes: Estimates were weighted to be representative of all households that use their own piped network connection on Santiago. Estimates are based on 347 customers from the representative sample that we could match to AdS billing data. Percentages for some months may add up to more than 100 since some customers received both real and estimated bills in the same month.

Number of bills per month. It is best practice for utilities to bill their customers once per month to encourage regular bill-paying behavior. Across most months in 2018, at least 70 percent of AdS's customers received one bill per month. However, in several months, more than 10 percent of the customers received two bills, and more than 10 percent of the customers did not receive a bill at all (Figure VIII.14). November and June 2018 had the highest share of customers that did not receive a bill. Customers with more than one bill per month received one bill for their current month and one for a previous month. According to AdS, this happens for a variety of reasons, including delays on its part in issuing bills, unusual meter readings that need to be confirmed before a bill can be issued, and meter readings that are not validated during the billing process. In 2017, AdS was particularly delayed in issuing bills, so the 2018 billing data include some bills for 2017 water consumption. To make multiple bills in a month less burdensome for customers, AdS gives them the opportunity to pay their bills off in installments.

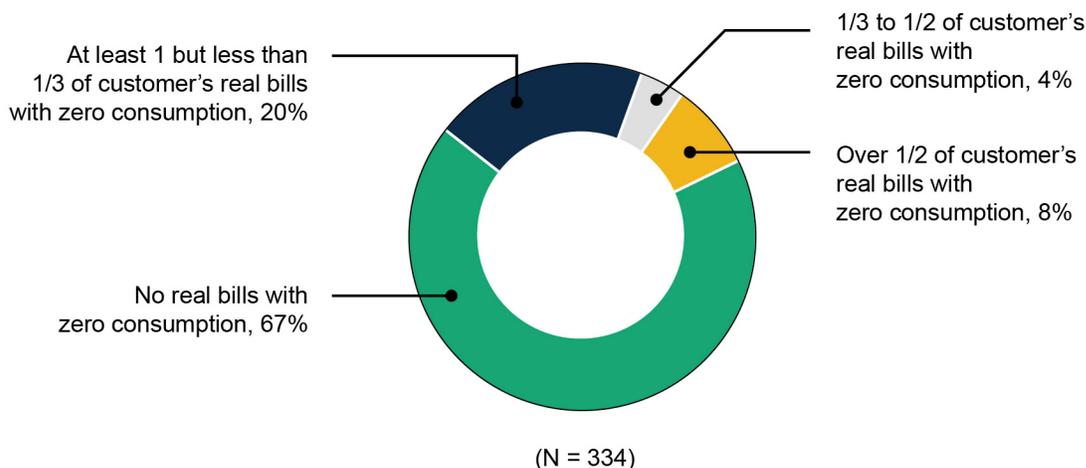
Figure VIII.14. Number of AdS bills received by customers in 2018, by month



Source: 2018 AdS billing data (representative sample).

Notes: Estimates are weighted to be representative of all households that use their own piped network connection on Santiago. Estimates are based on 347 customers from the representative sample that we could match to AdS's billing data. A small number of customers received three or more bills in a given month; the month for which that was most common was January, in which 2 percent of customers had three or more bills (not shown in figure).

Proportion of real bills with zero consumption. In 2018, one-third of customers had at least one real bill with zero consumption, and 8 percent had zero consumption for more than half of their real bills (Figure VIII.15). Although customers could have had a few days or weeks of low consumption due to reasons such as suspended water service in their neighborhood, seasonal consumption, and malfunctioning meters. (Section VIII.E has details on meter accuracy.).

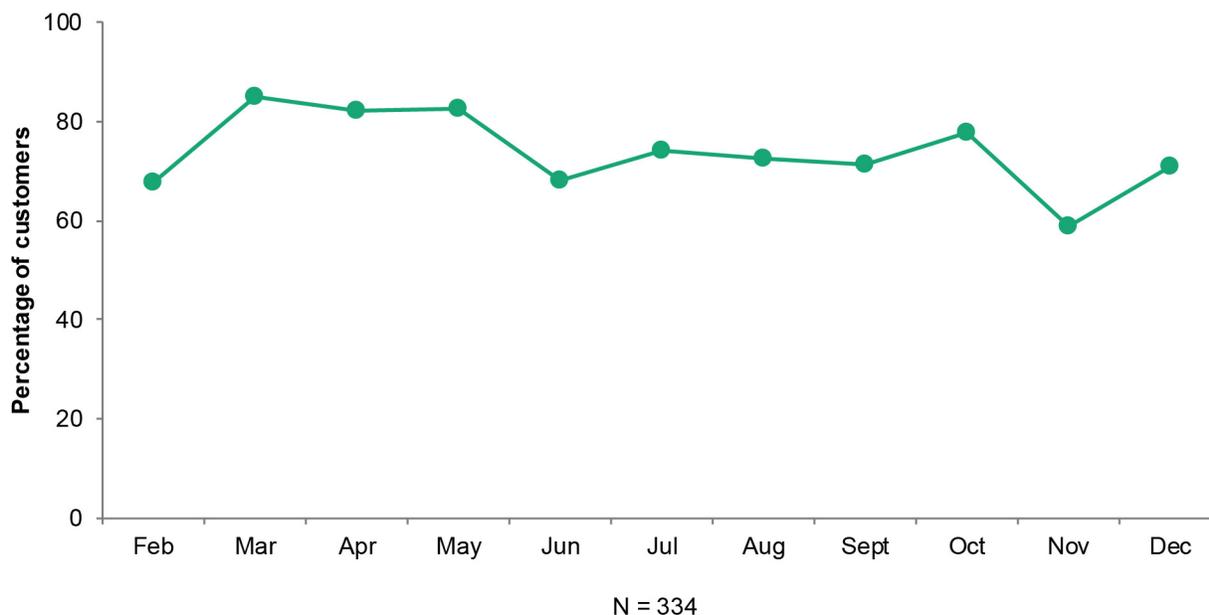
Figure VIII.15. Percentage of real AdS bills showing zero consumption (2018)

Source: 2018 AdS billing data (representative sample).

Notes: Estimates were weighted to be representative of all households that use their own piped network connection on Santiago. Estimates are based on 337 customers from the representative sample that we could match to AdS's billing data and that had real bills. We excluded the month of January because we used the previous meter reading date to estimate the days between meter readings, and we did not have the meter reading date of bills issued in December 2017.

Number of water consumption days covered by real and estimated bills. To make it easier for customers to pay their water bills each month, each real or estimated bill issued by AdS should only cover about 25 to 35 days of consumption. In 2018, the real and estimated bills issued by AdS to its customers covered an average of 30.6 days of consumption (not shown). About one-quarter of bills covered less than 30 days, close to three-quarters covered between 30 and 35 days, and the remaining bills covered up to 47 days. The bills issued in Praia and outside of Praia were similar in terms of the number of days covered, and the number of days covered by bills was similar for both poor and non-poor customers.

Meter reading frequency. Although AdS tries to send meter readers to customers' dwellings about every 25 to 35 days so it can issue them a real bill, it is not always able to send readers to all dwellings within this time frame. Also, because some meters are located inside dwellings, if customers are not at home at the time of the meter reader's visit, their meter reading is usually not recorded until the following month. In 2018, the share of customers with 35 days or less between meter readings ranged from 59 percent in November to 83 percent in May, and in most months, at least 70 percent of customers had a meter reading taken within 35 days of the previous reading (Figure VIII.16).

Figure VIII.16. Share of customers with 35 days or fewer between meter readings in 2018

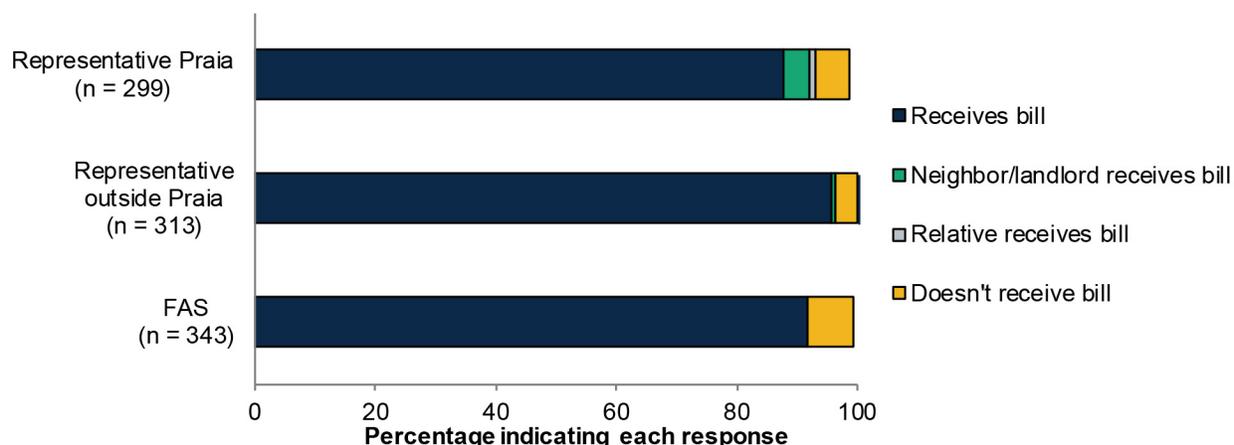
Source: 2018 AdS billing data (representative sample).

Notes: Estimates were weighted to be representative of all households that use their own piped network connection on Santiago. Estimates are based on 337 customers from the representative sample that we could match to AdS's billing data and that had real bills. We exclude the month of January because we used the previous meter reading date to estimate the days between meter readings, and we did not have the meter reading date of bills issued in December 2017.

2. Customers self-reports on AdS bill receipt, and customers' knowledge of estimated bills

Customers receiving a bill from AdS (self-reported). According to 2018 survey data, AdS is already billing more than 90 percent of its customers, either directly or through a neighbor, landlord, or relative. However, 6 percent of Praia customers from the 2018 representative sample report that they have not received a bill, even though AdS has been operating in Praia since July 2017 (Figure VIII.17). Only 4 percent of customers outside Praia report that they have not receive a bill from AdS, and 8 percent of FAS beneficiaries also report that they have not received a bill.

Figure VIII.17. Customers reporting receipt of a bill from AdS (2018)

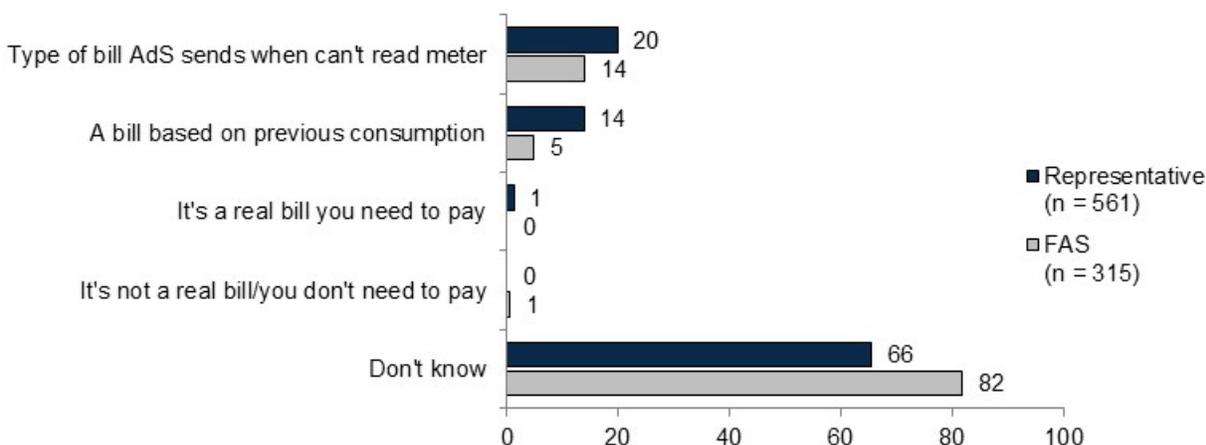


Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers in the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities.

Customers’ knowledge of estimated bills. The 2018 survey included questions about estimated bills. Sixty-six percent of customers in the representative sample and 82 percent of FAS beneficiaries do not know what an estimated bill is (Figure VIII.18). Only 20 percent of customers in the representative sample and 14 percent of FAS beneficiaries correctly say that an estimated bill is a type of bill that AdS sends when it is unable to read their meter, and only 14 percent of representative households and 5 percent of FAS beneficiaries correctly report that estimated bills are based on previous consumption.

Figure VIII.18. Customers’ understanding of estimated bills (2018)



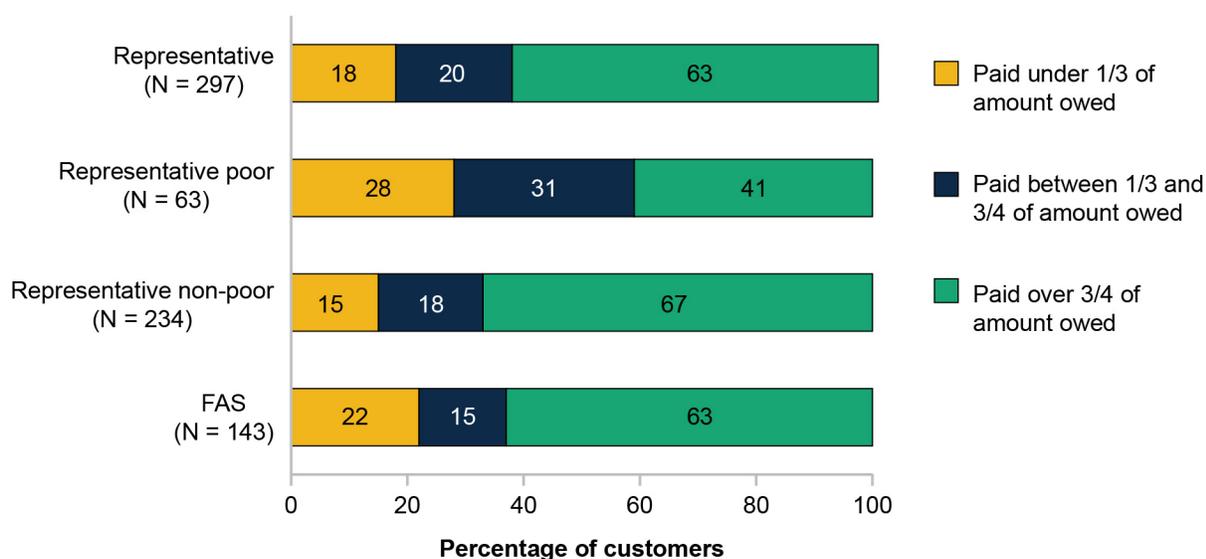
Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers in the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers that report receiving a bill from AdS may not sum to 100 because respondents could select multiple response options, and some responses that are rarely reported are not presented here.

3. Bill payment

Customer debt (AdS data). Based on AdS’s billing and payments data, 41 percent of poor customers and 63 percent of non-poor customers from the representative sample had paid off over three-fourths of the total value of their 2018 bills by the end of October 2018 (Figure VIII.19). Sixty three of FAS customers had paid over three-quarters of the amount they owed, 15 percent had paid between one-third and three-quarters of what they owed, and 22 percent had paid less than one-third of what they owed. AdS only began systematically suspending the water supply of domestic customers in early 2019, so customers with 2018 debt could be at risk of having their connections suspended in 2019.

Figure VIII.19. AdS payment rates, proportion of January to September 2018 bills paid by end of October 2018

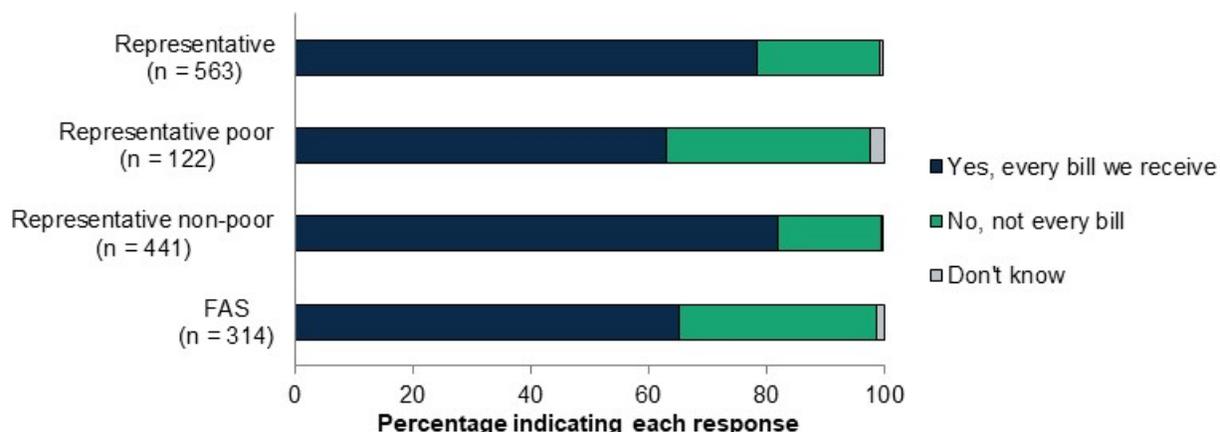


Source: 2018 AdS billing data and 2018 WASH Interim Survey (representative and FAS sample).

Notes: Estimates for the representative sample are weighted to be representative of all households that use their own piped network connection on Santiago. Estimates for the FAS sample are weighted to be representative of FAS beneficiaries surveyed in 2018. Estimates are based on 440 customers that we could match to AdS’s billing and payments data. Out of the 545 customers matched with AdS billing data, 105 did not have AdS payments data.

Regularity of payment (self-reported). First, in the 2018 interim household survey, households were asked if they generally pay their AdS bill. Almost 80 percent of customers from the representative sample (Figure VIII.20) say they do so. However, only 63 percent of poor customers from the representative sample and 65 percent of FAS beneficiaries report paying every bill they receive.

Figure VIII.20. AdS customer payment patterns, frequency (2018)

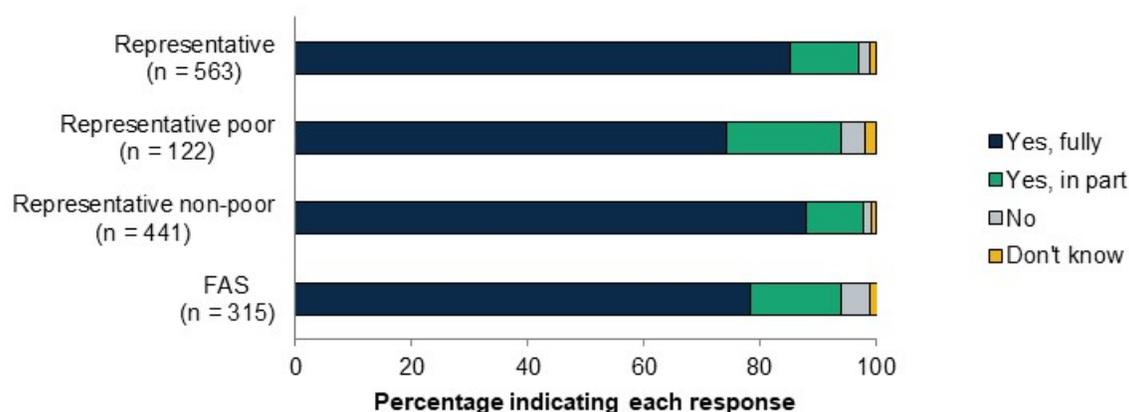


Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers in the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers who report receiving a bill from AdS may not sum to 100 because some infrequently reported responses are not presented here. We classified customers as poor if their household expenditures per capita were lower than 60 percent of the median.

Payment in full (self-reported). The 2018 interim household survey included questions to customers about whether they usually pay their AdS bill in full or in part. Eighty-five percent of customers in the representative sample report that they usually pay their bill in full. (Figure VIII.21). The percentage of customers paying their bill in full is lower for poor customers, with 74 percent in the representative sample and 78 percent in the FAS sample reporting that they usually pay their bill in full. Most of the remaining households in each sample say they usually pay their bill in part.

Figure VIII.21. AdS customer payment patterns, full or partial payment (2018)

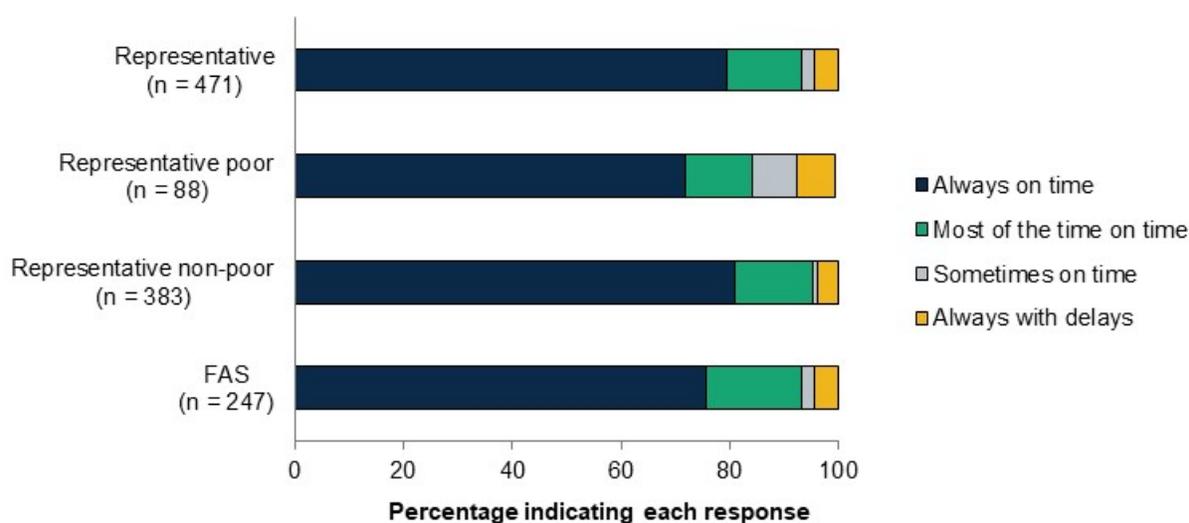


Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers who report receiving a bill from AdS. We classified customers as poor if their household expenditures per capita were lower than 60 percent of the median.

Timeliness of payment (self-reported). The 2018 interim household survey also asked customers that reported paying their bill in full whether they usually pay their bill on time. For the representative sample, 79 percent of customers reported always paying their bill on time, while 14 percent indicated most of the time, and the remaining households reported paying it on time sometimes or always with delays (Figure VIII.22). While 81 percent of non-poor customers from the representative sample reported always paying their bill on time, only 72 percent of poor customers always pay on time and 7 percent always pay with delays. Over three quarters of FAS beneficiaries also reported always paying their bill on time, while 17 percent said most of the time, and only 7 percent reported paying it on time sometimes or always with delays.

Figure VIII.22. AdS customer payment patterns, timeliness among customers who usually pay bill in full (2018)



Source: 2018 WASH Interim Survey (representative and FAS samples).

Notes: For customers from the Santiago representative sample, estimates were weighted to adjust for differences in sampling probabilities. Percentages for customers who report receiving a bill from AdS and usually paying it in full. We classified customers as poor if their household expenditures per capita were lower than 60 percent of the median.

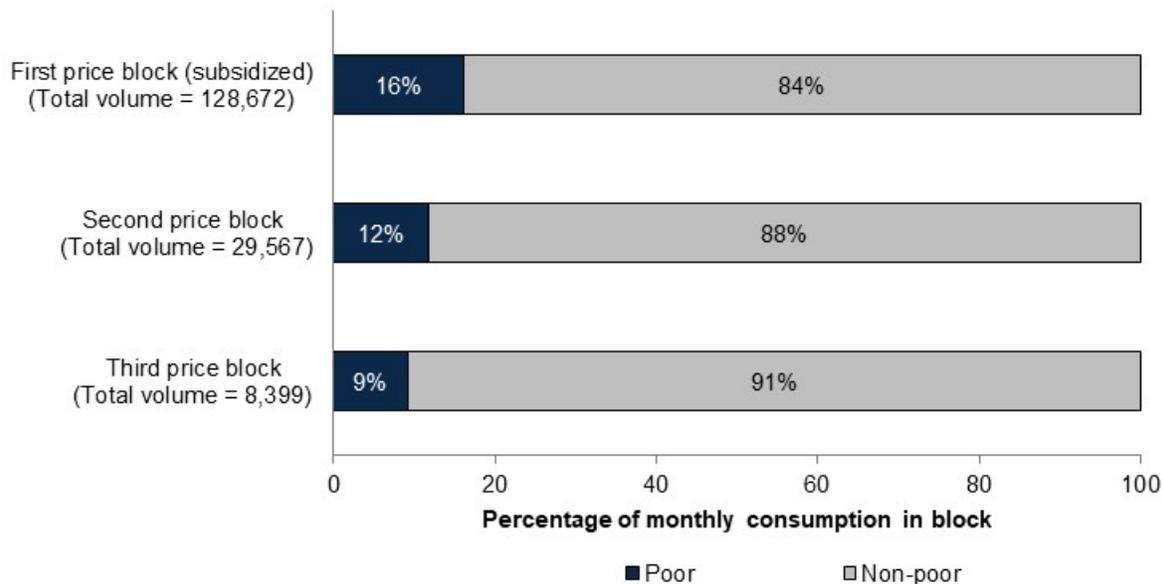
D. Progressive, regressive, or neutral tariff

If AdS had a way to identify poor households across Santiago, it would subsidize the first five cubic meters of water for them only, but it has no way to do this, so it subsidizes the first five cubic meters of water for all domestic customers and all water collected at the kiosks it operates. By offering the subsidized price to everyone, AdS is missing out on revenue from better-off customers that could help cover its operational costs. Given this, the share of water consumption under the subsidized pricing block that is going to poor versus non-poor customers is of critical importance for AdS's financial sustainability and the equity goals of the WASH project, particularly as the current tariff structure is under review. If the share of water consumption going to poor customers under the subsidized block is higher than the share going to non-poor customers, then the tariff schedule is progressive (advantaging the poor). However, if non-poor customers are a higher share of the subsidized consumption, then the tariff is regressive

(advantaging the rich). If poor and non-poor customers have an equal share of subsidized consumption, the tariff is neutral.

To help AdS determine whether the current structure schedule is progressive, regressive, or neutral, we focus on the 2018 representative sample for which we have 2018 AdS billing data and compare water consumption amounts in the three different price blocks by poverty status. In the subsidized price block, the share of monthly water consumption by poor customers is 16 percent, and it is 84 percent for non-poor customers (Figure VIII.23). Unsurprisingly, non-poor households also have the highest share of consumption in the unsubsidized second and third price blocks, accounting for 88 percent and 91 percent of consumption, respectively. Because most of the consumption in the subsidized price block is from non-poor households, the current block tariff structure appears more regressive than progressive.⁵⁷

Figure VIII.23. Share of domestic water consumption consumed by poor vs. non-poor households in each pricing block (2018)



Source: 2018 AdS billing data and 2018 WASH Interim Survey.

Notes: Estimates are weighted to be representative of all households that use their own piped network connection on Santiago. Estimates are based on the consumption of 302 customers in the representative sample that we could match to AdS billing data. We classified customers as poor if their per capita household expenditures were lower than 60 percent of the median.

⁵⁷ Although AdS charges the same subsidized rate at kiosks as for piped customers, it would not have to do this. The majority of kiosk water is likely consumed by poor households (although we do not have data to confirm this assumption), so AdS could maintain a progressive subsidy on kiosks even if it raised the price of the first block of piped water to make the tariff for piped water less regressive.

E. Meter accuracy from ultrasonic meter data

The reduction of non-revenue water is a key objective of AdS's board of directors and as part of its strategy to reduce non-revenue water AdS is working to address the issue of meter inaccuracy. AdS considers meter inaccuracy a big issue because roughly 70 percent of the meters on Santiago are more than 7 years old and 41 percent are more than 10 years old. Meters should usually be replaced after 10 to 12 years since as they get older they are less accurate. If AdS had the resources, it would replace the 12,000 meters in Praia that are more than 10 years old, but without the necessary resources, it is prioritizing the replacement of meters that are not working at all and, with funding from donors, is piloting the replacement of old meters in select neighborhoods.

The presence of air in the water supply is another issue that affects the accuracy of meter readings. The water supply system inherited by AdS is not fully equipped with air release valves to remove air, so in times of intermittent supply, pipes are filled with air, and when water is pumped through the system again, both water and air flow through it. As a result, each time households resume use of the piped network after water is supplied again through the system, their meters read both the flow of water and the flow of some of the air in the system. Although the amount of air flow recorded by household meters is marginal, meters could slightly over-register water consumption. In partnerships with donors, AdS is currently working on several projects to replace old meters and improve the network, but these improvements take time and resources, so the presence of air in the network is a problem that will likely only be resolved in the medium term.

Before presenting our findings on meter accuracy, we assess how demographically and socioeconomically comparable the convenience sample of Praia households (part of the group of households with ultrasonic meters) is with Praia households in the 2018 representative sample that used their own piped network connection as their primary source. The point is to determine how applicable the findings in the ultrasonic meter survey data are likely to be to the meters installed in households across Praia.

The two samples are similar in terms of household size and the presence of young children in the household. Both samples averaged about four household members, and close to one-fourth of the households had children under age 5 (Table VIII.4). However, there are statistically significant differences (at the 5 percent level) between the two samples on several demographic and socioeconomic dimensions. In particular, the ultrasonic meter sample has a larger share of homeowners and a smaller share of household heads with high levels of education. Additionally, monthly expenditures per capita are on average lower for households with ultrasonic meters. Hence, the findings on meter accuracy are not generalizable to the population of piped network customers and water meters in Praia.

Table VIII.4. Comparison of demographic and socioeconomic characteristics of Praia ultrasonic meter sample and a representative sample of Praia households using piped water (2018)

Characteristic	Sample size		Mean		Difference	p-value
	Ultra-sonic	Praia piped	Ultra-sonic	Praia piped		
Demographic characteristics						
Household size	214	302	4.17	3.94	0.23	0.23
Household has children under 2	212	301	0.06	0.08	-0.01	0.38
Household has children under 5	212	301	0.23	0.25	-0.02	0.47
Female household head ^a	214	302	0.45	0.52	-0.07	0.07*
Education of household head ^b	213	296				$\chi^2=15.76^{***}$
Less than basic education			0.18	0.20	-0.02	0.42
Basic education			0.54	0.34	0.20	0.00***
Secondary education			0.16	0.26	-0.10	0.00***
Higher education			0.12	0.21	-0.08	0.04**
Household owns its house	213	302	0.89	0.76	0.13	0.00***
Household spending and poverty						
Monthly household expenditures per capita (2018 USD) ^{c,d}	104	302	87.40	122.88	-35.48	0.03**
Household in poverty ^e	104	302	0.15	0.11	0.04	0.11
Household in extreme poverty ^e	104	302	0.08	0.06	0.01	0.46

Source: 2018-2019 Ultrasonic Meter Installation Survey and 2018 WASH Interim Survey (Santiago representative sample)

Notes: The Praia representative sample is restricted to households using their own piped network connection as their primary water source. Estimates for the Praia representative sample are weighted to adjust for differences in sampling probabilities. Statistical significance of differences is based on *p*-values that are adjusted for clustering at the enumeration area level. All comparisons presented in the text are statistically significant at the 0.10 level or better, based on two-tailed *t*-tests that were weighted to adjust for differences in sampling probabilities.

^a Female-headed households include only households in which all designated household heads were female; if the household named both female and male heads, it was not categorized as a female-headed household. If the household did not designate a household head, the household is categorized as not having a female household head.

^b Education of the household head is the highest education level completed for the household head with the most education (if more than one head was designated) or the household member with the most education (if no heads were designated).

^c In 2018, USD1 = CVE92.59, the average exchange rate from oanda.com between April 14, 2018, and June 16, 2018, the period of data collection.

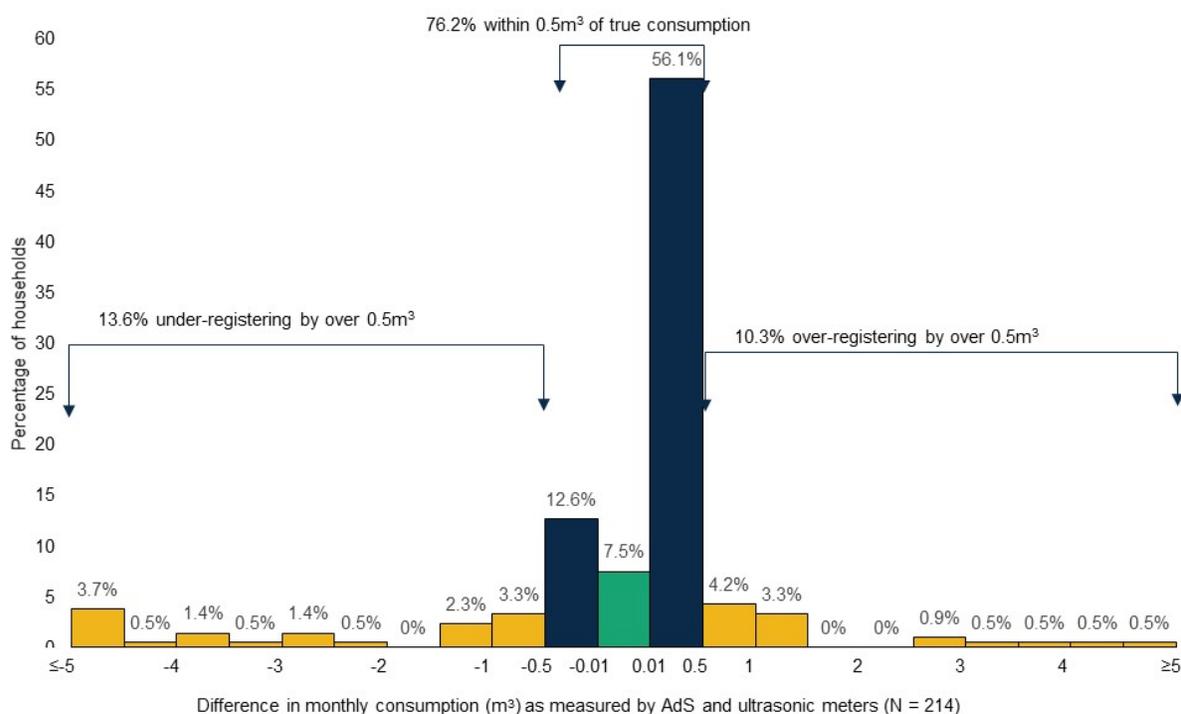
^d To account for outliers, values were top-coded at the 99th percentile value within year.

^e Poverty is defined as having household expenditures per capita lower than 60% of the median; extreme poverty is defined as having household expenditures per capita lower than 40% of the median.

*/**/*** Significantly different from zero at the .10/.05/.01 level, two-tailed test.

Meter inaccuracy: m³. We estimated the difference in water consumption as measured by the two types of meters by subtracting consumption recorded by ultrasonic meters from consumption recorded by AdS meters (both in m³). Positive values indicate the monthly consumption amount over-registered by AdS meters, and negative values indicate the amount under-registered. Figure VIII.24 shows the distribution of the difference in monthly consumption between AdS and ultrasonic meters. Eight percent of the AdS meters are quite accurate (within 0.01 m³ as shown in the green bar), and the majority (76 percent) are relatively accurate (within the equivalent of 0.5 m³ of consumption as registered by the ultrasonic meter over a 30-day period). The remaining AdS meters we tested are over-registering or under-registering by the equivalent of more than 0.5 m³ per month.

Figure VIII.24. Difference in monthly consumption as measured by AdS and ultrasonic meters



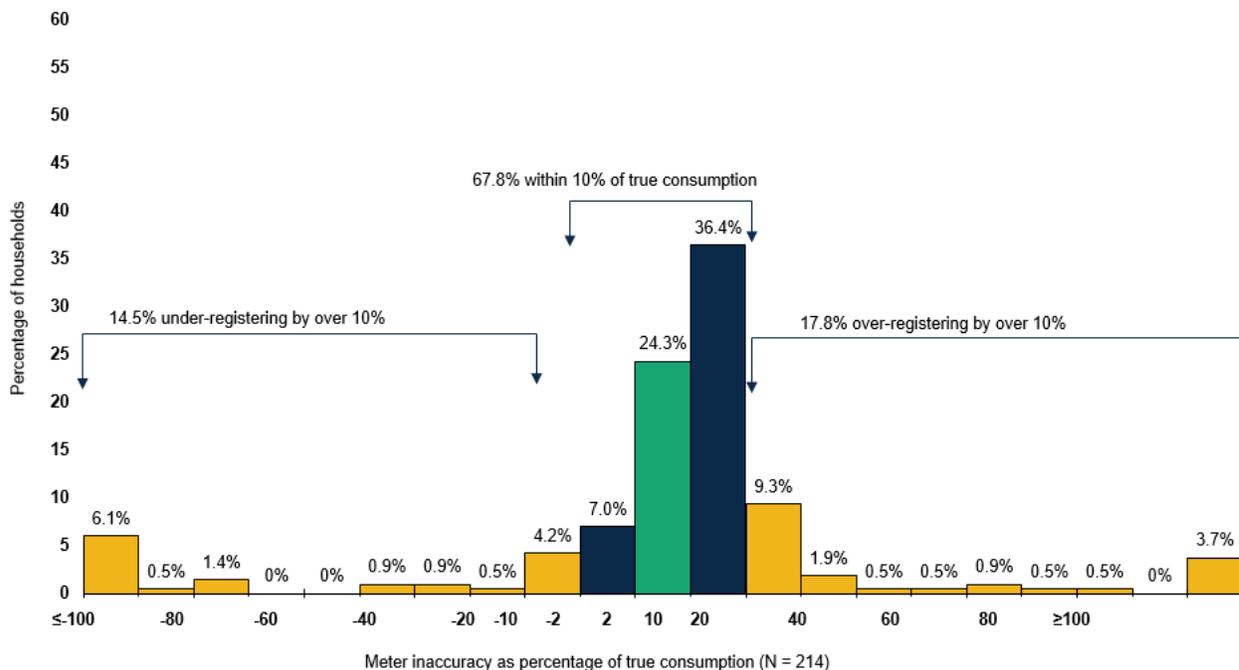
Source: 2018-2019 ultrasonic meter surveys

Notes: Monthly consumption difference of 5 m³ includes eight outliers with AdS meters under-registering by more than 5 m³ and one outlier with the AdS meter over-registering by more than 5 m³.

Meter inaccuracy relative to volume. An alternative way to define meter inaccuracy is relative to the total amount of water provided to the customer. We define AdS meter inaccuracy as the difference between the AdS and ultrasonic meters as a share of monthly ultrasonic meter consumption, with the percentage positive if a meter is over-registering and negative if it is under-registering. As shown in Figure VIII.25, 24 percent of the AdS meters we tested are within 2 percent of the true consumption (see green bar) as measured by the ultrasonic meter, and a

majority (68 percent) are within 10 percent. However, almost a third of the AdS meters we tested—32 percent—are over- or under-registering by more than 10 percent.

Figure VIII.25. Meter inaccuracy as a percentage of true consumption



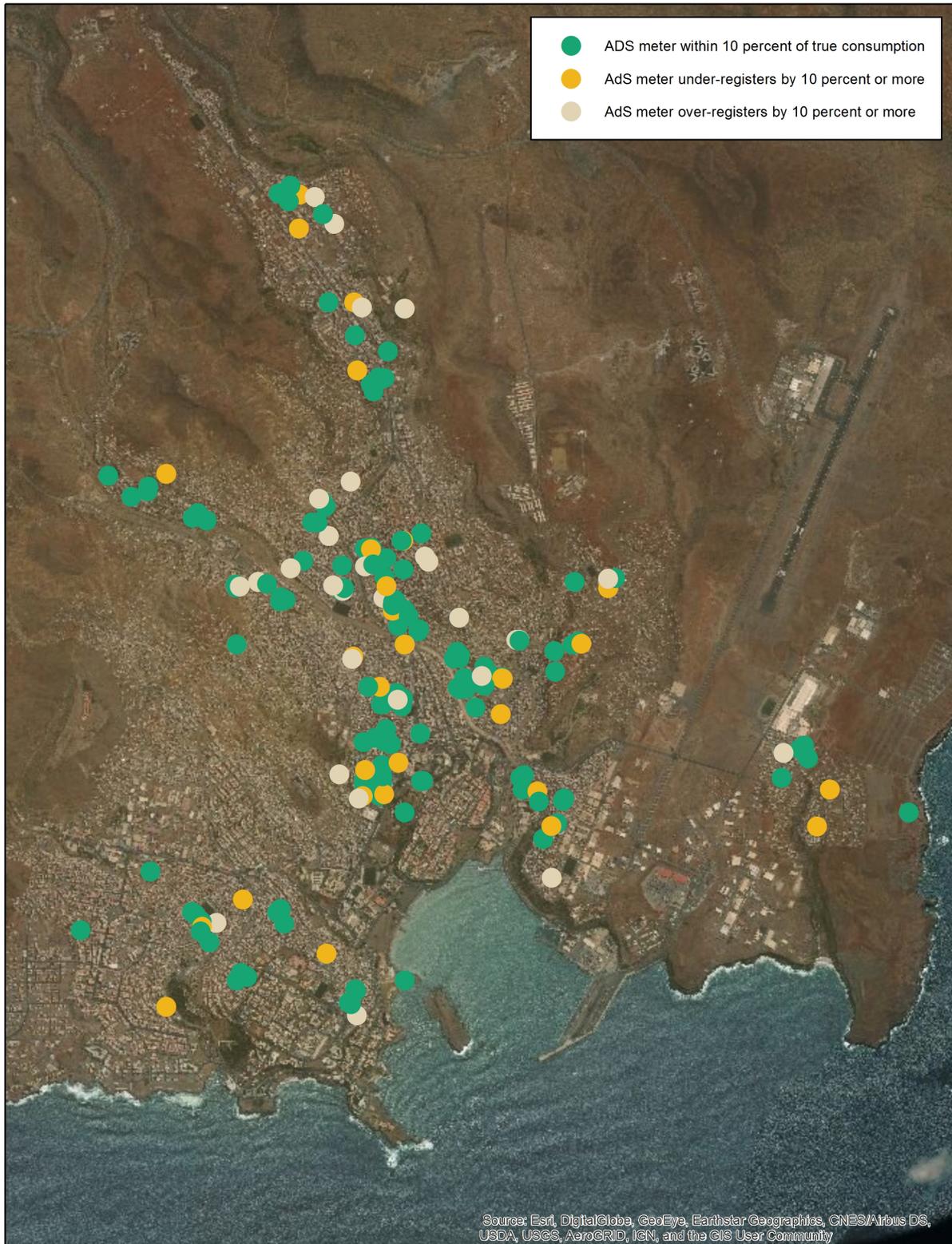
Source: 2018-2019 ultrasonic meter surveys.

Notes: Inaccuracy percentage of 100 includes seven outliers with AdS meters over-registering by more than 100 percent.

Figure VIII.26 is a map with the approximate⁵⁸ location of the 214 households. Households whose AdS meters are within 10 percent of true consumption are in green, those with AdS meters over-registering by 10 percent or more are in beige, and those with AdS meters under-registering by 10 percent or more are in yellow. Meters with different levels of accuracy are distributed across neighborhoods, and inaccurate meters do not appear to be concentrated in specific areas.

⁵⁸ For confidentiality reasons we cannot reveal the exact location of the households.

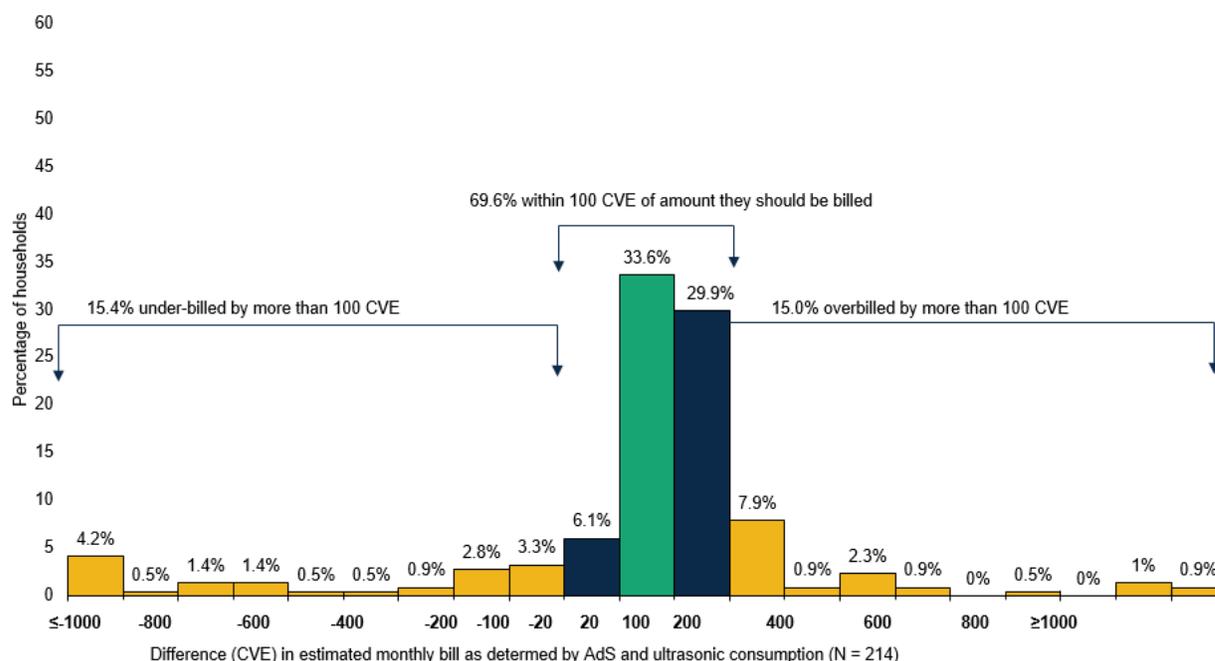
Figure VIII.26. Approximate location of households with ultrasonic meters installed



Source: 2018 to 2019 ultrasonic meter surveys.

Billed value of meter inaccuracies. Because of AdS’s increasing block water tariff, the monetary value of meter inaccuracies in terms of the additional cost charged to customers (for over-registration) and the value of revenue AdS is deprived of (for under-registration) cannot be easily inferred from meter inaccuracies measured in m³ or percentages. We estimate the difference in monthly water consumption costs by subtracting the hypothetical value of the bill for the volume of water registered by the ultrasonic meter from the hypothetical value of the bill for the volume of water registered by the AdS meter for each household.⁵⁹ Positive values indicate the amount that households are being overcharged, and negative values indicate the amount that they are being undercharged. As shown in Figure VIII.27, 34 percent of households we were able to install an ultrasonic meter in are billed within CVE20 (see green bar) of what they should be, based on their true consumption as measured by the ultrasonic meter, and a solid majority (70 percent) are within CVE100. However, our analysis suggests that 15 percent of the households we were able to install an ultrasonic meter in are charged more than CVE100 per month over what they should be, and some are charged several hundred CVE in excess of what their bill should actually be.

Figure VIII.27. Difference in estimated monthly bill as determined by AdS and ultrasonic meters



Source: 2018-2019 ultrasonic meter surveys

Notes: Difference of CVE1000 includes two outliers with bills more than than CVE1000 too high.
Difference of CVE – 1000 includes nine outliers with bills that were at least 1000 CVE too low.

⁵⁹ We use the existing unified water tariff structure to calculate water consumption costs. The tariff structure includes the following three price blocks for monthly (30 days) domestic consumption: 200 Cabo Verdean Escudos per cubic meter (CVE/m³) for the first 5m³ consumed, 300 CVE/m³ for the next 6 to 10m³ consumed, and 475 CVE/m³ for any water consumed above 10m³.

In sum, although the majority of the AdS meters we tested are within 0.5m³ or 10 percent of true monthly consumption as measured by the ultrasonic meter, about one-third of the tested meters are over- or under-registering by more than 10 percent. As shown in Figure VIII.25, inaccurate meters do not appear to be concentrated in particular areas. Furthermore, in terms of the billed value of these inaccuracies, 15 percent of households in our sample are paying at least CVE100 more per month than they should. On the other hand, AdS is also losing a similar amount in revenue per month for 15 percent of households.

As part of our analysis, we also tried using information on household water use, neighborhood infrastructure quality, and water availability in the neighborhood (as reported by survey respondents) to predict meter inaccuracy.⁶⁰ We determined that none of these were good predictors of meter inaccuracy (not shown). Based on AdS's assessments of the conditions of meters, and given the intermittent supply system on Santiago, the best explanation for meter under- and over-registration appears to be the age of the meters and the over-registration caused by the presence of air in the water supply system (because water flow is intermittent). As noted, AdS is actively addressing these issues, which it inherited when it took over as Santiago's water supplier in 2016, and although it does not have the resources to immediately resolve them, it is making gradual progress.

⁶⁰ Because we only had data on meter age for 86 households and meter brand for 104 households, we could not use these characteristics to reliably predict meter inaccuracy.

IX. CASE STUDIES

The FASA was an integral component of the WASH project, offering the first opportunity to exercise the new institutional roles for prioritization of WASH investments and apply the new policies developed under the NIRR, and serving as a powerful incentive for municipalities to consider corporatizing their SAAS. Although it is beyond the scope of this evaluation to undertake an in-depth analysis of each project, we use three case studies on Santiago, Sal, and São Vicente to document the diversity of the portfolio funded under the FASA, and explore the rationale, implementation, challenges, and results attained through the fund. Our case studies also offer the opportunity to provide MCC with a set of lessons learned.

Key findings

- The extensive infrastructure works completed as part of the Praia-São Domingos Connector benefited more than 30,000 residents of São Domingos and Praia, and helped improve services at the Santiago airport.
- The FASA and the FAS missed out on the potential for synergy because FASA network expansions happened after FAS connections in most neighborhoods.
- National regulators have not fully developed and implemented policies that the local utilities need to enable them to maximize the potential of the new infrastructure.

We selected three FASA projects to profile in the case studies:

- A. Interconnection of Praia and São Domingos (Santiago, Tranche 2, \$4.2 million).** The main objective of the project was to supply piped water to the municipality of São Domingos and to neighborhoods in the northern part of Praia, including a spur to connect the airport with the piped water network. We selected this project because it was the single largest FASA investment in dollar value, and it provides network water to a municipality that previously relied on tanker trucks to deliver water ever since the borehole that used to supply the SAAS went dry.
- B. São Vicente water and sewer network expansion and upgrades (São Vicente, Tranches 1 and 2, \$1.4 million in total).** The objective of this project was to have the distribution network bring piped water to the High Zones of the peripheral districts of the city of Mindelo. We selected this case study because it was predicted to benefit the largest number of individuals. The project also was one of the few that also received FAS interventions in the community, and it had the potential to demonstrate combined effects from both expansion and line infrastructure improvements.
- C. Sal waste-water treatment plant and sewer network expansion (Sal, Tranche 1, \$1.4 million).** The main objective of the project was to rehabilitate an existing waste-water treatment plant (WWTP) so it could provide treated waste-water for the agricultural and tourism sectors, but the project also included expanding the sewer network in Santa Maria, an investment that directly benefits local residents and indirectly benefits the tourism sector because poorly

managed waste in the neighborhoods adjacent to the hotels is a risk for the industry. We selected this project because it is one of only two sanitation projects funded by the FASA, and its importance for the tourism sector gave it the potential for large economic returns.

We used a mixed-methods approach, combining a document review with primary qualitative data. Our primary qualitative data consist of interviews with those involved with implementation as well as focus groups with beneficiaries. These three projects represent different types of investments that were awarded by the FASA, including a water network expansion and a rehabilitation of sanitation infrastructure rehabilitation. The projects were funded through both FASA tranches and took place on three different islands.

A. Interconnection of Praia and São Domingos

1. Introduction and context

Located on the island of Santiago, São Domingos is a municipality of roughly 17,000 residents that borders the capital city of Praia (Câmara Municipal de São Domingos 2019). More than 80 percent of the municipality's population live in rural areas, and most are subsistence farmers. Previously reliant on boreholes in Ribeirão Chiqueiro, a village within the municipality, São Domingos was forced to turn to tanker trucks for water when the boreholes dried up in 2015 after a drought. This expediency came at a high cost to the municipality, which then began to look for external help to resolve the problem. It was in this context that MCA-CV awarded a \$4.2 million FASA grant for the interconnection of the Praia and São Domingos water supply systems—the largest FASA project in dollar terms (Figure IX.1). The project's main objective was to supply piped water from a desalination facility in Praia to the municipality of São Domingos and neighborhoods in the northern peri-urban neighborhoods of Praia. By moving desalinated water from the coast (Praia) to households in São Domingos, the municipality hoped to improve the livelihoods of its people—including by developing the area's tourism industry—and encourage the gradual extension of water and sanitation services across the island. The project also eventually included the extension of the

São Domingos was supplied from boreholes in Ribeirão Chiqueiro ... and, incredible as it may seem, these boreholes were exhausted. And this cost a lot to the municipality, and there was a month that the municipality was practically without water.

–Municipal Council member, São Domingos

Figure IX.1. Engineering designs for the São Domingos Connector



Photo by Mathematica

infrastructure to the Santiago International Airport, which had not been connected to the piped water network before (NORVIA CV and CENOR CE 2017).

On November 2, 2015, MCA-CV signed a contract for the project with *MOTAENGIL-África* (MOTAENGIL) as part of the second tranche of MCA-CV funding, and construction began on February 26, 2016. MOTAENGIL hired *MORABI*, a local NGO, to work on social and gender inclusion as part of the contract. Its innovative strategies for engaging the local population in the IEC campaign helped educate them on water use, storage, and bill payment. To inspect and monitor implementation of the project, MCA-CV contracted with the engineering firms *NORVIA CV* and *CENOR CE*. Despite a number of challenges, including two contract extensions, MOTAENGIL delivered these infrastructure works to AdS in October 2017 (NORVIA CV and CENOR CE 2017; MOTAENGIL 2018).

2. What worked well?

The extensive infrastructure works completed as part of the Praia-São Domingos Connector benefited more than 30,000 residents of São Domingos and Praia. The interconnection of Praia and São Domingos was a large undertaking, requiring more than 30 kilometers of piping, two new pumping stations, and two new water reservoirs (Figures IX.2 and IX.3). The new infrastructure can accommodate a supply of 60 liters of water per person per day for 75 percent of the population of São Domingos and several neighborhoods in Praia (NORVIA CV and CENOR CE 2017). However, the effects of the project are limited by the actual amount of water in the network. NORVIA CV and CENOR CE noted in their final report that “the project’s impact on the life of targeted populations ... will depend on the quantity of water that is made available to the Ponta de Água reservoir” (2017). Although the

Figure IX.2. Pumping stations in the Municipality of São Domingos



Figure IX.3. Construction of one of the two new water reservoirs servicing São Domingos and Praia



Photos by Mathematica

project has not yet yielded any new tourism investments in São Domingos, the municipal council of Praia has already credited the increased water supply from the project as an important enabler in the construction of a casino and hotel on the Santa Maria islet off the coast of Praia.

MOTAENGIL maintained a strong working relationship with its monitoring organizations, and remained committed to completing the works through contract extensions, thus ensuring the high level of quality of the infrastructure.

The Praia-São Domingos Connector helped improve services at the airport by reducing the cost of water.

Before the FASA project, the Santiago airport relied on expensive water delivered by tanker trucks. Thanks to the Praia-São Domingos Connector, the airport now has a piped network via a spur from the main line that carries water from Praia to São Domingos. According to the current director of Santiago Airport, the project as originally designed did not include the spur, which was added to the design after the previous director saw that the construction would come close to the airport and contacted MCA-CV engineers to see if it would be possible to create a spur from the main network to the airport. The change to the works was approved and has led to a series of perceived benefits, including lowering the cost of water; improving the quality and consistency of water for tourists using the airport; and allowing the airport to easily store more water to ensure a consistent supply. The lower cost of water allows the airport to use those savings to invest in other improvements.

“Having water available 24 hours per day in the network contributes to increasing our [volume of water stored] since we have reserve structures; that is, reservoirs with large water storage capacity—and in terms of costs, it has reduced our costs.”

–Staff at the Santiago Airport

MORABI actively engaged with young men on topics related to the project. Throughout many of the other informational campaigns associated with the WASH project in Cabo Verde, implementers struggled to engage male participants, many of whom considered the subject matter relatively unimportant. MORABI faced the same challenge during its informational campaigns and awareness-raising activities on such topics as water conservation, water use, household budgeting, and bill paying. Recognizing that “the majority of participants in informational and educational sessions were women,” the implementer created a series of

“It was also true that ... the young men present [in the exchange programs] displayed that they understood that good water management with a foundation of household budgeting leads to consistent water availability and bill payment.”

–MORABI

“exchange programs,” in which young men from different neighborhoods got together for a day of group discussions, shared meals, and sports (NORVIA CV and CENOR CE 2017). These exchange programs gave MORABI the chance to spread awareness to a demographic typically not involved in discussions about WASH, and witness genuine and encouraging conversations (MORABI 2017). In doing this, MORABI increased young men’s understanding of water management best practices. This unique approach to reaching a historically

disengaged demographic serves as a successful example that can be used by other local NGOs engaged in IEC efforts.

3. What were challenges?

MOTAENGIL’s insufficient implementation of technical evaluation led to delays in completing the project and decreased its impact on the population. NORVIA CV and CENOR CE noted in their final report that MOTAENGIL had not properly evaluated the feasibility of various aspects of the project’s technical approach. In some cases, this lack of information and understanding caused delays in the implementation process. For example, when MOTAENGIL began construction, it was forced to shift plans for one of the two constructed reservoirs after discovering that underground infrastructure and electrical wiring already existed throughout the original intended location. This problem, which required the contractor to find workarounds, could have been prevented if MOTAENGIL had conducted a more extensive feasibility study of the region (NORVIA CV and CENOR CE 2017). The workarounds and delays in the implementation process also meant that some intended beneficiaries were not served by the project because topography prevented their being reached. Although the people who were not reached represented a small percentage of all the potential beneficiaries, the issue came up a number of times in focus group discussions. Focus group participants noted that as a result of changes to the implementation plan, timeline, and the ability to consistently pump water from Praia to São Domingos, access to water ranges widely from neighborhood to neighborhood. Some residents have access to water almost every day, whereas others must wait to stock up once a month; still others have no access to piped water at all.



“In the community of Praia Baixo, we have piped water, but sometimes we go days without water.”

“There is piped water in Ribeirão Chiquinho. Everyone has it and there are no major worries or water problems at the moment.”

“In Caiada, the water supply is deficient. Water comes from month to month.”

“In Portal, we also sometimes go months without water.”

–Focus group participants



Delays in construction meant the timeline for the complementary work carried out by the social and gender team did not align with the construction timeline, and awareness activities ended too early as a result. The delays in construction caused by the problems noted above led to two contract extensions (to January and April 2017, respectively). However, the contract extensions did not extend to MORABI. The result was that MORABI completed the social and gender inclusion work early in the contract, so as construction continued, many beneficiaries were not fully aware of the work taking place and did not receive information on them. In focus group discussions with beneficiaries, the majority of participants could not

remember receiving information relevant to the FASA project in their community.⁶¹ If the informational campaigns and awareness activities related to the interconnection of Praia and São Domingos had been extended to align with the timeline of infrastructure works (or even past the completion of the works), the population would have received additional training and education on topics such as water usage, access, hygiene, and bill paying, which would have contributed to the longer-term sustainability of the infrastructural investments through more careful storage and maintenance practices (NORVIA CV and CENOR CE 2017).

4. Lessons learned

1. **Implementers of large-scale infrastructural WASH projects can benefit from conducting thorough feasibility studies, including a review of existing underground infrastructure, when relevant.** Many of the project's delays were the result of an insufficient study of MOTAENGIL's technical strategy. Its resulting gaps in knowledge led both to changes in the implementation plan and slower progress in completing the works. By ensuring that implementers of large-scale works have a full understanding of the terrain they will be working with, agencies like MCC can help to minimize project setbacks.
2. **Creative and innovative communication strategies are critical for engaging beneficiaries on topics they otherwise might avoid, and campaigns sometimes must adapt to different audiences.** MORABI's decision to implement exchange programs proved to be a successful strategy for engaging young men on water and sanitation topics, among others. Actors working in international development, such as MCC, could help to promote awareness and ownership among male beneficiaries by highlighting past examples of best practices to other implementers.

B. São Vicente water and sewer network expansion and upgrades

1. Introduction and context

São Vicente was one of seven islands selected by MCA-CV for IGF's water and sanitation enhancements. It has about 82,600 inhabitants, making up 15.4 percent of the population of Cabo Verde. Approximately 70,468 (85 percent of the population) live in the urban and peri-urban areas of Mindelo, making it the most populous urban area of the island. The people rely on subsistence agriculture, fishing, and tourism for their livelihood (Sapo Noticias 2019; Britannica).

An extensive needs assessment revealed that although about 70 percent of the population had access to water, it was provided mainly through municipally run public fountains. Households that had access to piped water had only a limited amount because they tended to have inefficient storage practices, and the quality of service they received was poor. The quality of the water itself was also poor because of the rust and dirt in water pipes.

⁶¹ Nearly all focus group participants reported remembering national media campaigns that focused on water conservation and use. Although beneficial and relevant, these campaigns did not take place as a part of this specific FASA project.

This case study examines the implementation of the IGF activities on the island of São Vicente.⁶² From 2012–2017, MCA-CV invested \$1.4 million in two projects in São Vicente to expand access to water and improve sanitation across neighborhoods in the peri-urban areas of Mindelo. Initially, the intersection of the FASA and the FAS was expected to benefit a significant number of people in neighborhoods on the outskirts of Mindelo. By investigating this subset of neighborhoods and the benefits they received, we can understand the combined effects of joining expansion and line infrastructure improvements with household water and sewer network connections.

On São Vicente, the local NGO *Amigos Da Natureza* (AdN) built FAS-sponsored home water and sewer connections between October 2014 and July 2015. These included constructing and configuring necessary water and sanitation plumbing inside the homes themselves so the connections were functional. AdN was able to connect 757 households on São Vicente: 478 to only the water network, 32 to only the sewer network, and 247 to both water and sewer networks (Engenhaira Inês Alvarinhas 2016). The expansion of the FASA water and sewer networks was implemented by the company *Empreitel Figueiredo* from February to December 2015 and March 2016 to October 2017 for water and sewer, respectively (Empreitel 2017). Although MCA-CV experienced a number of delays and challenges (discussed below), the team was able to successfully complete the two FASA contracts on São Vicente, totaling \$1.4 million. The FASA water works benefitted 37,875 residents in the peri-urban areas of Mindelo and the sanitation works reached 41,232 residents, mostly made up of repeat beneficiaries from the water project (MCC Completion Report 2018).



“Rarely or almost never are any of the connected families cut off from the water. So I believe ... because it is an asset that people feel at home, inside their home, people will have the commitment, and because they have been involved, say in the project itself, and have made the project their own project, they will do everything they can to continue to benefit from it. “

–AdN staff



⁶² Although our intention (as described earlier in this chapter) was to primarily focus on FASA projects in the case studies, the information on FAS activities that we gained in the focus group discussions proved to be more robust, in part due to the closer relationships between households and implementers of FAS household connections. We also found that in areas where FASA and FAS activities overlapped, focus group participants were not familiar enough with the differences between the two programs to distinguish between them; rather, they just talked in general terms about subsidized connections to the network, which could have been either from the FASA or the FAS. Consequently, the FAS factors heavily in this case study.

2. What worked well?

Flexible approaches are critical to successful implementation, particularly when working with poor households. FAS implementer AdN demonstrated the importance of being flexible in its approach to working with local populations while facilitating and subsidizing home water and sanitation connections for families in São Vicente with low incomes. AdN's flexibility was evident in how it selected and supported beneficiary households. Leveraging "co-participation" with the local government, the NGO began by using existing records from the São Vicente Municipal Council to identify potentially eligible households. It followed up on this activity by going door to door to continue identifying families, as well as allowing households to complete their own application for FAS assistance. These identification processes took place on a rolling basis, helping to streamline FAS implementation and reach more beneficiaries than otherwise would have been possible. In the process, AdN worked with a set of donor- and government-established technical and social criteria:

households were expected to be within 15–20 meters of the network and demonstrate need through some combination of socioeconomic indicators of poverty, such as income, number of family members, education attained, and the home's type of building materials. However, in practice, AdN adopted a flexible approach. The NGO connected homes even if they were farther than 15–20 meters from the network or only fulfilled certain established indicators of poverty while not necessarily meeting all of them. It is important to note that this might have allowed better-off families to receive a reduced-price connection that they should not have received. However, it does appear that there was a certain level of class homogeneity within FAS beneficiary neighborhoods, with one focus group participant noting that "everyone has the same right, same need."



"The first selection [of households for FAS connections] was from the records that existed in the Municipal Council. But since this number was not enough, we had to resort to more surveys on the ground, and in these surveys on the ground, we needed not only a technician from the Amigos da Natureza Association, but also a social technician from the municipal council [who helped identify eligible households]. Let us say, there was this, co-participation between these two institutions during the surveys."

–AdN staff



Local implementers had the foresight and willingness to negotiate with the local utility to further reduce the cost of connections for poor households. In combination with the discounts, the local implementer also allowed households to make in-kind payments. The FASA contractor and FAS implementer both looked for ways to reduce the cost of household connections to enable more families to benefit from piped water and sewerage. In its initial contract, AdN budgeted for families to contribute 20 percent of the price paid to ELECTRA NORTE for connections, both to stretch its budget and to generate a sense of ownership of the works among beneficiaries. Early on in its implementation process, however, AdN recognized that this level of contribution from households needed to drop for the connections to be accessible to poor families on São Vicente. AdN worked closely with ELECTRA NORTE to negotiate a 95 percent reduction in the overall price paid to the utility for household connecting to the piped water network for the first time (Type 1 connections)—including the amount paid by AdN—and a 96 to 98 percent reduction in fees paid for households connecting to both the water and sewer networks for the first time (Type 2 connections), although these amounts varied depending on a household’s distance from the network.⁶³ The agreement was successful because the local NGO offered to supply all the associated materials and physical labor needed for digging ditches and installing the necessary piping. An AdN staff member noted that these inputs were often provided directly by beneficiaries, who largely had more access to labor and raw materials than to financial resources. ELECTRA NORTE’s decision to allow an outside group such as AdN to take on these responsibilities was not entirely out of the ordinary, as the utility typically would have contracted out the connection labor to a separate firm anyway. The remaining fees paid to ELECTRA NORTE, 1,200 escudos for Type 1 connections and 1,600 escudos for Type 2 connections, were for its inspection of the AdN-facilitated connections.

As an added bonus to beneficiaries, AdN secured funding from the Municipal Council to offer a 50 percent subsidy of the financial cost of connection inspections. Consequently, the monetary price of most home connections ended up totaling less than 1,000 escudos. For households that were unable to afford this, the NGO worked out payment plans. An AdN staff reported that

Figure IX.4. A poor neighborhood on São Vicente that was connected through the FASA and the FAS



Photo by Mathematica

⁶³ One AdN staff reported that Type 1 connections from ELECTRA NORTE typically cost 25,000 escudos, and Type 2 connections from ELECTRA NORTE typically cost between 40,000 and 65,000 escudos. Electra NORTE typically charged extra for households farther than 15 meters from the network. AdN negotiated the price for Type 1 and Type 2 connections down to 1,200 and 1,600 escudos, respectively.

savings from their negotiations with ELECTRA NORTE and in-kind payment from households were repurposed for connecting homes farther than 15 meters away from networks, as well as configuring water and sanitation systems within homes.

Similarly, Empreitel Figueiredo facilitated subsidized home connections to the segments of the piped networks that were newly constructed with FASA funding by negotiating a 50 percent discount with ELECTRA NORTE. This discount was for future connections in poor households in several neighborhoods on São Vicente, and were to take place once the contractor completed its main FASA infrastructural works. This negotiation was conducted by Empreitel Figueiredo's social and gender consultants as a part of the connection financing plan for poor households. The social and gender consultants completed this work with the benefit of technical assistance from several partnering groups such as AdN and the municipal council of São Vicente, and also worked on informational and educational campaigns.

Figure IX.5. FASA works in São Vicente



Photo by Mathematica

The FASA contractor and FAS implementer both developed a strong rapport with beneficiary communities. AdN's deep understanding of local communities helped the team reach and develop relationships with the beneficiaries it was focusing on in São Vicente. Established in 1977, the local NGO has worked on environmental issues such as reforestation and local farming with many of the communities benefitted through the MCC WASH project (Amigos da Natureza 2014; Newton 2019). Its experience working with local communities allowed the team to create targeted informational and educational campaigns and community meetings on topics such as water conservation and hygiene practices; these resonated with beneficiaries of the FAS interventions. The dialogue AdN created with these communities, along with the labor that households personally contributed to connecting their homes, developed into a strong sense of shared responsibility between neighborhoods and AdN. These relationships proved critical for the NGO in neighborhoods such as Chã de Vital, where church-run volunteer youth programs actively sought out AdN to offer their assistance with manual labor. Results from the focus groups and interviews with key informants revealed that the sense of ownership on the part of beneficiaries will help keep households from missing payments on utility bills, consequentially strengthening the financial sustainability of the WASH project and its effects.

For Empreitel Figueiredo, one of its greatest success was engaging community leaders. The implementer established a committee of 12 local leaders, representing eight community organizations, who then assisted Empreitel with activities such as developing home connection financing strategies and neighborhood meetings. Members of this committee offered their own homes as meeting locations and helped galvanize turnout for neighborhood meetings from local communities. Beneficiaries reported high levels of satisfaction when asked about their relationship with and impressions of the project implementers, though they did not always distinguish clearly between Empreitel Figueiredo and AdN.

“They said what they were going to do. We prepared everything and they arrived, they installed it, everything went very fast.”

“As you asked, we had no problems, it was very fast. We thank you, and we are happy and thankful.”

“So it was a great benefit for everyone, and we thank the association that came to help us. It was very good for us, and we are very thankful.”

–Focus group participant

3. What were the main challenges?

Requirements and mishaps related to design, procurement, and reporting led to a series of delays for FASA implementation. MCA-CV and the government of Cabo Verde used a “design-bid-build” approach during the first tranche of FASA projects. Under this type of approach, MCA-CV contracts with a single responsible entity that designs the project and then bids the construction services out to a third party, which remains responsible for the implementation of the project. In Cabo Verde, many municipal governments submitted projects with relatively weak designs. MCA-CV had to support these governments to strengthen their design, and then bid out and procure the contraction component, which took more time. As a result, the first tranche of projects fell behind the originally planned schedule. For the second tranche of projects, MCA-CV used a “design and build” approach. In this approach, the design and construction services are contracted together, which accelerated the process. Although the local construction implementers still faced challenges, such as importing the materials they needed (time was required to ship and clear customs), the overall designs for the project were stronger, and the firms were able to begin the build phase more quickly.

Meanwhile, the social and gender consultants working for Empreitel Figueiredo encountered delays of their own. Early on, this stemmed from an apparent lack of communication with team members leading the infrastructural works. As described by *Ripórtico Engenharia*, the organization hired to monitor implementation, the social and gender work was “not integrated ... which caused an initial impasse and even delay” for the consultants (Ripórtico 2016). Ripórtico Engenharia also revealed in its final report that Empreitel Figueiredo’s decision to segment and sequence its work into distinct periods of (1) conducting a demographic survey to understand the condition and needs of the local population, (2) designing implementation, and (3) conducting implementation ultimately backfired. In particular, Ripórtico Engenharia noted that the implementer spent too much time finalizing deliverables from Periods 1 and 2—such as documents outlining the team’s methodology, documents on the project’s theoretical framework,

and analytic reports on the results from the demographic survey—before moving on to actual implementation. These issues were also noted by Empreitel Figueiredo in its own final social and gender report, which highlighted the burden of the voluminous required documentation. As a result, the team rushed through Period 3 to conduct informational campaigns, begin developing a connection finance strategy, and establish a local committee. This rush may have led to what Ripórtico Engenharia identifies as a “weak technical capacity” within the committee, an important group charged with completing and implementing the connection finance strategy post-compact.

Additionally, Empreitel Figueiredo was unfamiliar with the terrain in the areas where it implemented projects on São Vicente. As a result, it often had to reach out to the Roads Institute⁶⁴ when tearing up roads (in some cases) to install the infrastructure. Empreitel Figueiredo also had to work closely with Electra NORTE to determine where the electrical cables ran through the ground. These additional steps and negotiations took extra time that was not planned for in the schedule and led to implementation delays. Moreover, staff in the Roads Institute took longer than expected to respond to MCA-CV and implementer requests for information and approvals, and it often took multiple requests to get a response. Staff at Electra NORTE were also unresponsive at times, leading to delays in identifying the cables.

The FASA and the FAS missed out on the potential for synergy, thus missing out on efficiency gains. On São Vicente, MCA-CV did not proactively coordinate sequencing between the FASA and the FAS; this led to redundancies that reduced the efficiency of resource use and to a number of missed opportunities for the two programs to work together. Ultimately, the limited overlap in contract dates resulted in limited overlap in implementation (Table IX.1), and the amount of beneficiaries connected through the FAS before their neighborhood received FASA infrastructure extensions was roughly five times greater than the amount of beneficiaries whose FAS connections were preceded by the new FASA infrastructure. Although there was conflicting information on where the two projects overlapped, the most consistently reported situation across key informants and documents was that there were only three neighborhoods on São Vicente where network extensions through the FASA were followed by complementary home connections from the FAS⁶⁵, which took place as a result of AdN reaching out to Empreitel Figueiredo to coordinate implementation (Ines Alvarinhas 2015; Replenish Africa Initiative 2015).

⁶⁴ At the time of the project, the Roads Institute, created in 2003, managed and maintained the infrastructure investments related to roads in Cabo Verde (Instituto de Estradas 2017). As of 2019, the government plans to substitute the Roads Institute with a newly created enterprise, Roads of Cabo Verde (Expresso das Ilhas 2019).

⁶⁵ Information provided by MCA-CV, interviews with implementers, monthly FAS monitoring reports, and the RAIN Cabo Verde close-out on the FAS report offer conflicting information on the number of neighborhoods and beneficiaries that were benefited by the FASA and then the FAS.

Table IX.1. Households connected to water and sewer networks on São Vicente through the FASA and the FAS

Beneficiary type	Number of households connected through the FAS	Number of households connected with own resources post-FASA by end of compact	Number of households expected to be connected through FASA-negotiated discount with ELECTRA NORTE after the end of the compact
Households in three neighborhoods that most sources agreed were benefitted by the FASA before the FAS	103	7	16
Households in neighborhoods that some sources believe were benefitted by the FASA before the FAS	20	5	27
Households in neighborhoods that sources agreed either (1) were benefitted by the FAS before the FASA or (2) were only benefitted by one of the two funds	634	5	81
Total	757	17	124

In all the other communities served by both projects, FAS connections were made before the FASA expanded the existing network, thus limiting the number of households technically eligible for connections. Had MCA-CV organized the FASA works to take place before the start of FAS, many more homes would have been closer to a network and therefore eligible for connections to the piped water and/or sewer networks. Unfortunately, even within neighborhoods where the FASA and the FAS were correctly sequenced, there were lost synergies. For example, in Chã de Vital, Empreitel Figueiredo dug up the roads, put in the network infrastructure, and then repaved the roads and cobblestones. Shortly thereafter, AdN had to dig up the roads again to connect households to the water network. AdN's digging and repaving process could have been prevented had there been better communication between stakeholders, which would have led to savings in resources for MCA-CV.

4. Lessons learned

- 1. Building in flexibility to infrastructure and project designs is beneficial when working on multipronged infrastructure projects.** In particular, AdN's use of different household identification strategies stood out as a notable example of successful flexible implementation.
- 2. Sequencing different activities within projects can often change the results.** On São Vicente, strict sequencing on the Empreitel Figueiredo social and gender team led to delays.

Promoting flexibility in the sequencing of activities in neighborhoods that received network extensions might have saved resources and allowed the project to reach more beneficiaries.

3. **Engaging and hiring local NGOs that understand the local context can be a catalyst for behavior change.** In São Vicente, knowledge of local circumstances, communities, and culture were critical to helping both the FAS and FASA implementers reach their targets. It allowed them to use community leaders as catalysts for information and education efforts, and garner in-kind support for both FAS and FASA works development.
4. **Engaging high-level stakeholders early and often facilitates better communication, and helps alleviate resistance from those stakeholders who stand to lose from local investments.** Early on, consider indirect stakeholders who might need to be involved in infrastructure projects (for example, the Roads Institute or local utilities), and give special attention to actors who stand to lose from institutional shifts or changes. Building in strategies to deal with cooperation incentives and disincentives, such as political economy analysis early on in the project, could help to avoid barriers to implementation and maximize project benefits.
5. **It is important to engage the community and use in-kind payments as a form of generating project ownership in poor neighborhoods.** As AdN recognized in its implementation process, requiring monetary contributions from households can raise barriers when those households don't have much money, regardless of how inexpensive the contributions may be. Allowing households to personally contribute through labor and/or other in-kind payment helps to both maintain a lower project budget and generate local ownership over works. When combined with successful community relations built on informational campaigns and engaging local leaders, these efforts improve the prospects for sustainability of a project investment.

C. Sal waste-water treatment plant and sewer network expansion

1. Introduction and context

The island of Sal, home to more than 30,000 residents, is a major tourist destination. Tourists spent a total of over 2 million bed nights in Sal's 29 hotels in 2016, which was equal to more than half of Cabo Verde's overnight stays that year (INE 2016; Ministry of Tourism 2018). In 2017, tourism on Sal contributed significantly to a growth of more than 11 percent in the nation's tourism industry (CVTI 2017). The coastal city of Santa Maria is a major part of this industry because of its CABOCAM zone, which features destination hotels and a white sandy beach that is five miles long (Figure IX.6). Tourism in Santa Maria has replaced salt and fishing as the main industry of Sal (tourCV 2017).

Figure IX.6. Santa Maria Beach



Photo by Mathematica

Tourism requires appropriate infrastructure, including water and sanitation systems. Before the WASH project, most Santa Maria residents relied on septic tanks, which occasionally spilled and contaminated the water table and the beach (Municipal Council of Sal 2018). In addition to posing health risks for local residents (and generally being an unpleasant hassle for them to deal with), these spills also negatively impacted the local economy. As a municipal council member in Sal noted, “our potential profits from tourism were also contaminated as a result of this spillover.”

In 2015, the Municipal Council of Sal joined with *Águas de Ponta Preta* (APP), a local private water, sanitation, and electricity utility that primarily serves large-scale tourist businesses, to submit a proposal for Tranche 2 FASA funding. The Municipal Council and APP were awarded roughly USD\$1.8M to create a “public and integrated sanitation service” by rehabilitating a non-functional municipal plant (WWTP) in Santa Maria;⁶⁶ connecting it to an existing functional WWTP of APP⁶⁷ using a series of pumping stations and piping; and rehabilitating and expanding the piped sewer network of Santa Maria. MCA-CV believed these works would (1) improve public health measures and reduce health-related expenses, (2) eliminate septic tanks that pollute the environment, and (3) generate more interest and investment in the local tourism industry (Sociedade de Construções 2016).

“I think that the main outcome of the project was solving the problem of sanitation in Santa Maria. Because the septic tanks [were mainly used] before this project, and as we know, the water level in Santa Maria is very high, it is approximately 60, 80 centimeters from the surface of the ground, which is to say, the great objective is to [stop] contamination of the main resource, which is the beach of Santa Maria.”

–Sociedade de Construções staff

Figure IX.7 Rehabilitated WWTP

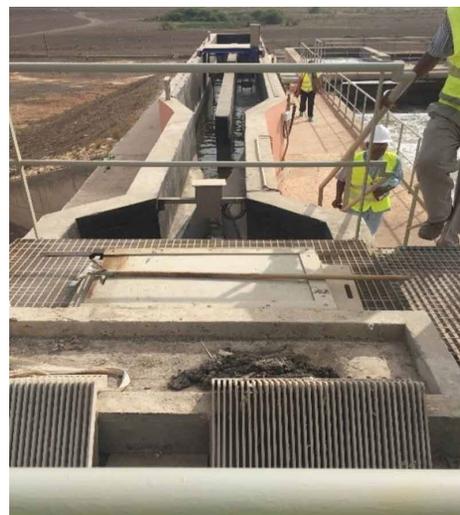


Photo by Mathematica

⁶⁶ In 2001, the islands of Sal and Boa Vista received a \$10 million loan from the Kuwait Fund to address their needs for potable water and sanitation, leading to the construction of a WWTP in Santa Maria (Kuwait Fund 2015). After the plant was critically damaged, seawater began to leak into the system. One interviewed member of the municipal council of Sal noted that, as a result of the damage, the plant remained nonoperational until the FASA project.

⁶⁷ Interviewed APP staff reported that the utility already operated a private WWTP on Sal before the FASA project. Using this plant and a set of private piped networks, APP provided two hotels and three condominiums with a sewer service and sold them treated waste-water.

MCA-CV contracted the engineering firm *Sociedade de Construções* to implement the FASA project on Sal. The construction work was complemented by the activities of Sociedade de Construções' in-house social and gender team, whose mandate included conducting a demographic survey to understand the condition and needs of the local population; developing a home connection financing plan for families to connect to the network; and leading IEC on topics such as water use, hygiene, and household budgeting. MCA-CV hired *Riportico Engenharia* to monitor and evaluate the FASA works, including the social and gender activities.

The FASA project on Sal is unique: (1) It was one of just two FASA projects to focus on sanitation; (2) It has the greatest potential to generate large economic returns by directly helping residents and indirectly improving the tourism sector and stimulating the local economy; and (3) It took an innovative approach to making recycled waste-water an economic commodity that could promote agricultural ventures in one of the most arid parts of Cabo Verde. The project also shows how national WASH regulators, utilities such as APP, and other stakeholders can come together to create and implement new policies that integrate emerging technology on waste-water treatment.

2. What worked well?

The Municipal Council of Sal wisely targeted sanitation as a key area for investment, making important progress toward Blue Flag status. Building on 11 years of collaboration on Sal's sanitation needs, the Municipal Council and APP focused on addressing this sector in their FASA proposal. In making this decision, they differentiated from most other recipients of FASA projects, who focused on water.

Aside from their intention to create a cleaner, more visually appealing city by switching its residents from septic tanks to piped sewerage, the Municipal Council and APP also designed this FASA project with Blue Flag status in mind.⁶⁸ As of 2019, no countries in West Africa have attained Blue Flag status for any of their beaches or marinas, and Sal hopes that Santa Maria

“With environmental problems on the beach, there is no Blue Flag. So this project made an essential contribution; without something similar, we wouldn't have the audacity to think about Blue Flag.”

-Sal Municipal Council member

Beach will be the first in the region, drawing more tourists and bolstering the sector (Foundation for Environmental Education 2019). As a result of the infrastructure investments made through the FASA project, the municipal council of Sal believes this status will be achieved by 2021 or 2022. With that said, Santa Maria will have to meet many other criteria to achieve Blue Flag status. For example, it must create a beach management committee, reach full compliance with the organization's water quality sampling and

⁶⁸ The Blue Flag program, implemented by the Foundation for Environmental Education (FEE), showcases beaches and marinas that meet “stringent environmental, educational, safety-related and access-related criteria.” The program is run out of Denmark, and has influenced (mostly European) tourists in their destination decisions since its inception in 1987 (FEE 2019). Criteria can be found at <https://www.blueflag.global/criteria>.

frequency standards, and control the presence of stray dogs and other animals. Stakeholders have indicated that the requirement on stray dogs could be particularly difficult to fulfill. Also, other countries in West Africa could attain Blue Flag status for their own beaches in this time frame, and Cabo Verde’s award would no longer have singular significance. Furthermore, the nearby Canary Islands, though technically part of Europe, received Blue Flag status for 43 beaches and five marinas in 2019 (TheCanaryNews 2019).

The rehabilitation of the WWTP successfully increased the supply of recycled waste-water, benefiting ornamental plant producers and increasing the potential for green space on Sal. With the rehabilitation of the previously defunct Santa Maria WWTP and its connection to the existing APP WWTP, the Sal FASA project amplified the supply of recycled waste-water available for purchase on the island (Figure IX.8). A 2016 presentation from *AquaExpert, Lda*—a subcontractor on the project hired for its expertise on waste-water treatment—highlighted the many potential uses of this water: as an input to cooling systems, evaporative heaters, and boilers; for cleaning exterior pavement; and for agricultural use. Unfortunately, using this water for food production is not yet feasible, because the quality of the recycled water is still poor. However, the recycled water can be used with ornamental plants to extend and enhance green spaces, and this industry is an example of a clear winner from the FASA project on Sal. One ornamental plant producer told us the additional WWTP allowed for more supply at a lower cost per cubic meter of water. This has led to increased production, including an extension of the Pachamama EcoPark, a botanical garden located in Santa Maria that markets itself in English on social media to an international audience (Facebook 2019). Given Sal’s status as an arid island, the Municipal Council believes that more green space will benefit Santa Maria’s citizens and increase tourism.

“[The project] was a breath of fresh air for us. I see it with much pleasure, because it is benefiting our tourism; this is to benefit our populations [and] a very interesting project of reuse of waste-water for the green spaces of both hotels and the municipality. Because this will help in what we always thought about, which is to create ‘green lungs’ in several zones, planting trees in the streets, creation of green spaces with [town] squares and all that.

–Sal Municipal Council member

Figure IX.8. APP tanker truck for treated waste-water



Photo by APP

3. What were the challenges?

Major conflicts and miscommunications between Sociedade de Construções’s social and gender team and Riportico Engenharia slowed and obstructed progress. In Sal, the relationship between Sociedade de Construções’s social and gender team and Riportico Engenharia was rife with problems, ranging from miscommunication on contract extensions and work plans to disagreements on the appropriate methodologies for conducting the community demographic and needs assessment. In their final reports, the two firms even disagreed over whether the final plan for financing home connections on Sal—a significant component of Sociedade de Construções’s scope of work—had ever been approved. In this case, the conflicts and miscommunications interrupted the flow of the project in its early assessment stage, disrupted the allocation of resources and the work plan for community engagement activities and prevented Riportico Engenharia from monitoring certain activities.

Sociedade de Construções did not follow through on its commitment that poor households would be connected to the piped sewer network. Sociedade de Construções identified 30 poor households to connect to the sewer network, established a local committee to oversee the development of the housing connection finance plan, and held a series of meetings with relevant stakeholders, but it couldn’t finalize the household connection financing strategy. Sociedade de Construções discussed a number of options such as rotating savings and credit funds, microcredit, and in-kind contributions to help the households connect to the network. Unfortunately, after they were told they would be connected, it turned out that the families were too poor to contribute the necessary resources for the connection (Sociedade de Construções 2017). Some of these families, in a focus group, expressed their profound frustration with the contractor, citing lack of communication and follow-up as their primary concerns. The lack of connection to the piped network has proved to be expensive for the families, who have since been forced to either pay private septic tank draining companies to come to their homes or wait a long time for a similar service from the municipality.



“But they said that they will connect me to the sewer system, but they have not yet appeared. They said they are going to connect to the sewer system, but have not yet decided on when they will do the job.”

“They had a meeting with us, too, and they told us that we were going to pay a monthly fee because it was not that we were going to pay for the sewer, but a fee that we would pay each month to do some work, like that. But still so far they have not contacted us to tell us anything, nothing.”

—Poor residents, Sal



National regulators have not fully developed and implemented policies that APP needs to enable it to maximize the potential of the new infrastructure. First, at the time of project implementation, ARE had not yet established tariffs for APP's expanded sewer service in Santa Maria (Sociedade de Construções 2017). Consequently, poor households were reluctant to connect to the piped sewer network because they were unable to receive an accurate estimate of how much sewer services would actually cost on a month-to-month basis. Second, as recently as July 2019, ARE still had not produced tariffs for the treated waste-water, nor approved the provisional tariff suggested by APP, despite many letters from the utility asking it to do so. APP views this issue as one of sustainability, with one staff member stating in a 2018 interview that the company's "sustainability depends on the collection of fees and charges" (APP). As of 2019, APP has implemented the temporary solution of charging customers with its developed provisional tariff rates. Third, ANAS has not clearly communicated what its involvement in regulating the quality of treated waste-water is, nor what uses it is safe for. Though ANAS licenses the equipment and other inputs used at WWTPs across the country (ANAS 2017), it is unclear whether it is monitoring the quality of treated waste-water, and one agronomist on Sal lamented that there are no "standardizations, norms, institutions that can give guarantees as to the quality of this water." The unclear status of the quality of treated waste-water produced by APP has left users uncertain about the types of plants that the treated waste-water can be safely applied to.

4. Lessons learned

1. **Recognize the weight of promises made to poor households, and make sure to follow through with communication and support.**

The Sal sewage network project faced a number of setbacks during implementation. In the focus groups, participants were vocal about the false promise of sanitation network connections

to poor households, which was never realized by the project. Implementers must use careful messaging when working with vulnerable communities, and always ensure that follow-up communication is provided so that residents are not left waiting indefinitely. Clear communication helps communities understand if they are receiving connections and why. Drawing on local NGOs who know and understand these communities can help shape communication campaigns and meetings and limit the misunderstandings that can arise when households apply for connections.



"I know there are people who tried to use waste-water, but in a very reduced way, and with tall plants, fruit plants, but a very small amount."

–Agronomist on Sal



2. **Good communication between contractors and monitoring organizations is vital to project success.**

Without good communication skills to maintain the flow and progress of the work, systems break down, leading to missed deadlines, inefficient work schedules, and in the end it reduces the success and impact of the project.

3. **It is crucial that national regulators set in place relevant policies before complementary infrastructure-based projects are begun.**

The inability of ARE to set sewer use tariffs before the FASA project discouraged poor households from connecting to the sewer network,

and uncertainty about the quality of treated waste-water (which should be certified by ANAS) has played a role in limiting the use of the product. This case study serves as an example of the importance of clear, pre-established regulations, and the limitations that their absence can cause.

- 4. Projects at the intersection of economic development and residents' needs can realize greater.** If the project did propel momentum that eventually results in the successful elimination of septic tanks of Sal, all residents on the island will directly benefit from the resulting health benefits of the network, and indirectly benefit from the business brought in by tourists. In this regard, the FASA project was well designed. Donor agencies such as MCC will find high value in their investment by continuing to pursue similar projects that benefit residents in different ways.

X. CONCLUSION

This report has focused on findings from the interim round of the WASH project evaluation, conducted approximately six months after the end of the compact. This chapter summarizes findings in response to each evaluation question and outlines their implications for the final round of the evaluation.

A. Summary of findings

1. Were the activities/sub-activities implemented as designed? What were implementation challenges and successes?

As detailed in Chapter IV, the WASH project was implemented with close fidelity to the original design:

- The NIRR activity successfully established ANAS and enacted policy reforms based on the National Strategic Plan for Water and Sanitation and related frameworks developed with the support of the WASH project.
- Likewise, the URA successfully established AdS, although the process took much longer than it was expected to, leaving less time for the new utility to benefit from the technical assistance that the WASH project had planned to provide.
- Both components of the IGF reached their targets for funding disbursements and number of beneficiaries, although the FASA required much more oversight by MCA-CV than it was expected to, and FAS implementers on Santiago had a hard time identifying households that could meet all the eligibility criteria. Survey data suggest that the FASA effectively targeted areas where a higher share of the population was poor.

2. Is there evidence that the interventions have resulted in the outcomes outlined in the program logic?

As shown in Figure X.1 and Table X.1, some of the outcomes envisioned in the project logic have already been achieved, while there is partial progress on others, and some seem unlikely to ever manifest given the current situation. Despite the admirable success of the project on implementing the activities (instituting significant institutional reforms and completing major infrastructure works), at present it appears that the WASH project has little potential to increase household productivity because households spend relatively little time collecting water and relatively few households' income-generating activities rely on piped water. Likewise, although there are numerous positive signals that AdS is becoming a more efficient utility than the SAAS and ELECTRA formerly were, and is providing a higher quality of service to more customers, it still faces many barriers to cost recovery. Moreover, without a successor to the FASA there is no sustainable solution to how capital investments in the WASH sector will be financed. Taken together, it is unlikely that the WASH Project will lead to more productive government spending.

Figure X.1. Interim findings on outcomes in the project logic

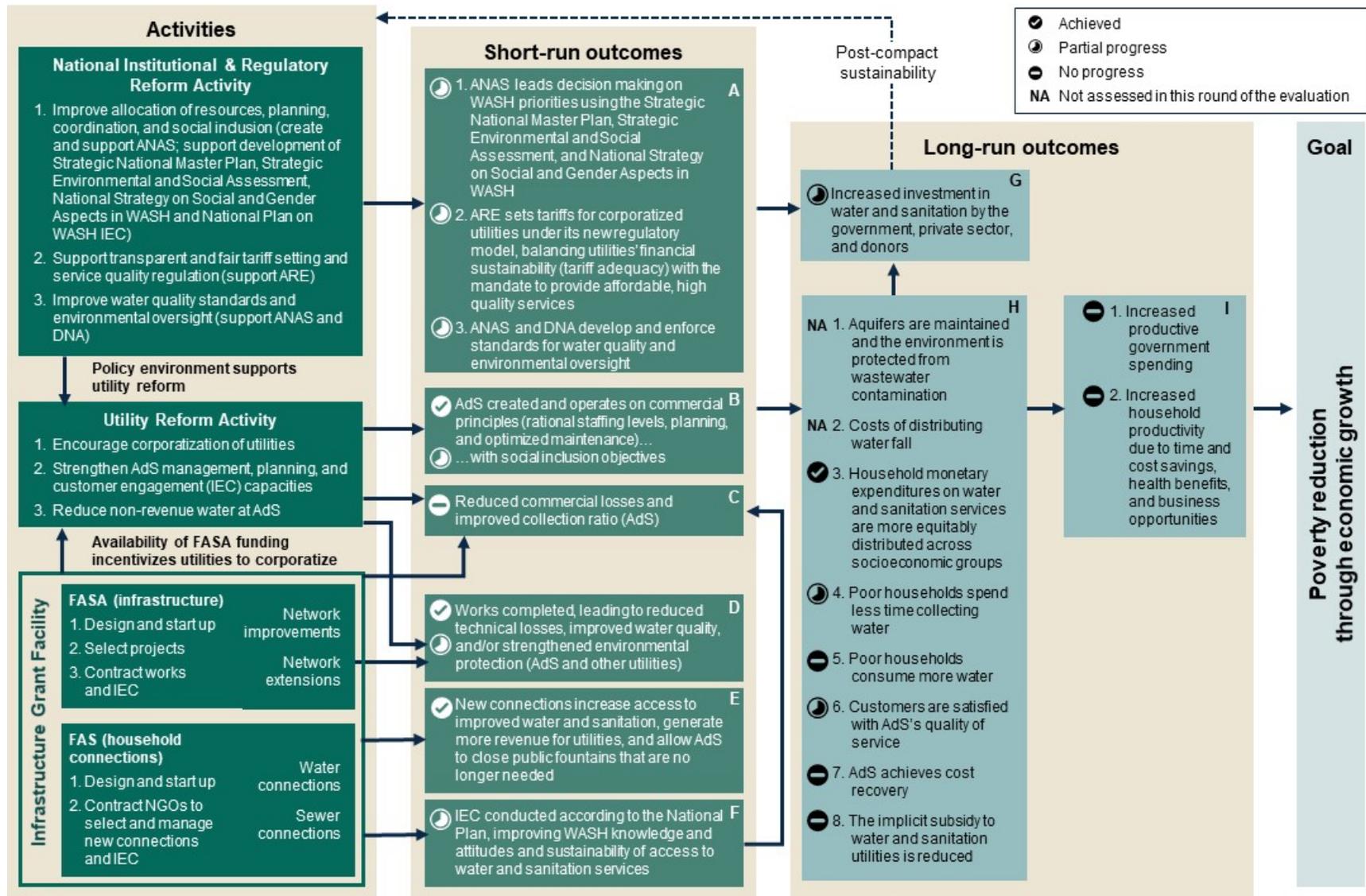


Table X.1. Interim findings on outcomes in the project logic

Outcome	Explanation (chapter references)
A1. ANAS leads decision making on WASH priorities using the Strategic National Master Plan, Strategic Environmental and Social Assessment, and National Strategy on Social and Gender Aspects in WASH	 ANAS is operational but is more focused on its role as the technical regulator for the sector rather than leading strategy for the sector. (IV.A)
A2. ARE sets tariffs for corporatized utilities under its new regulatory model, balancing utilities' financial sustainability (tariff adequacy) with the mandate to provide affordable, high quality services	 With the support of technical consultants, ARE harmonized tariffs on Santiago and is currently reviewing that unified tariff (albeit two years after it was expected to) as well as the price that AdS pays ELECTRA for desalinated water; however, ARE has yet to justify the tariff for sewer services or set prices for treated wastewater. (IV.A.1 and IV.B.1)
A3. ANAS and DNA develop and enforce standards for water quality and environmental oversight	 ANAS and DNA developed standards for water quality and environmental oversight and were starting to ensure compliance by the end of compact. (IV.A.1)
B. AdS created and operates on commercial principles (rational staffing levels, planning, and optimized maintenance)... ...with social inclusion objectives	 AdS still faces many challenges, but the staff to connections ratio has fallen by almost three-quarters since AdS was created and the new utility is working hard to improve (with the support of LuxDev since the compact tended). (IV.B and VIII.A.3)  The evaluation did not explore AdS's commitment to social inclusion objectives other than to note that AdS's has not filled the gender specialist role. (IV.B)
C. Reduced commercial losses and improved collection ratio (AdS)	 There is no evidence of reduced commercial losses (though AdS is starting to study meter inaccuracies) and the bill collection ratio was still quite low at 64 percent in 2018 (though AdS started taking action to cut off delinquent customers in early 2019). (VIII.A.3)
D. Works completed... leading to reduced technical losses, improved water quality, and/or strengthened environmental protection (AdS and other utilities)	 Works were completed with the assistance of the GoCV...  ...but there is very little evidence that the improved infrastructure has led to reduced technical losses (FASA funds were used primarily for expansion rather than reductions in technical losses), improved water quality (only one project related to water quality), and/or strengthened environmental protection (only two projects related to waste-water treatment, though both of these seem to be effective; a thorough analysis of changes in environmental conditions was not included in the interim data collection).

Outcome	Explanation (chapter references)
E. New connections increase access to improved water and sanitation, generate more revenue for utilities, and allow AdS to close public fountains that are no longer needed	 Representative sample data confirm a significant increase in access to the piped water network, thanks in part to FAS connections. It is not clear if these new customers will generate more revenue for the utilities – that depends on the tariff (it seemed unlikely as of the time of data collection). There is evidence that AdS did close public fountains.
F. IEC conducted according to the National Plan, improving WASH knowledge and attitudes and sustainability of access to water and sanitation services	 There was very little documentation of the IEC campaigns conducted by ANAS and AdS, or on the specifics of the diverse IEC campaigns conducted by FASA and FAS implementers. AdS billing data and household survey data suggest customers still do not understand their bills nor do many customers pay on time or in full. (IV.A-D, VIII.B.4, VIII.C.2-3)
G. Increased investment in water and sanitation by the government, private sector, and donors	 The Revolving WASH Fund that was intended to be the successor to the FASA seems to have been dissolved, with seed funding for WASH project that was promised by the government and committed by LuxDev somehow reallocated to other priorities. As a result of the URA, LuxDev is channeling more of its funding to AdS. (IV.B and IV.D)
H1. Aquifers are maintained and the environment is protected from wastewater contamination	NA This will be explored during the final round of the evaluation.
H2. Costs of distributing water fall	NA We did not have visibility into this level of detail in AdS's costs. To the extent that the staff to connection ratio has fallen so drastically, that might also be reflected in the cost of distributing water, depending on how labor compares to other input costs.
H3. Household monetary expenditures on water and sanitation services are more equitably distributed across socioeconomic groups	 The harmonization of the price of water at public fountains with the price per m ³ paid by piped customers was a major advance toward equity. In absolute terms, poor households spend less on WASH than nonpoor households but relative to total spending WASH accounts for a very similar share of expenditure for poor versus nonpoor and rural versus urban households. (IV.B.1 and V.F)
H4. Poor households spend less time collecting water	 Baseline data on time spent collecting water were incomplete so we cannot assess changes over time for poor households in the representative sample, but in 2018 the average per capita time spent collecting water was relatively low for the majority of households. (V.C) Time spent collecting water fell drastically for FAS beneficiaries, but less than 40 percent of them are poor. (VII.B-C)

Outcome	Explanation (chapter references)
H5. Poor households consume more water	<p>⊖ Baseline data on water consumption were incomplete so we cannot assess changes over time for poor households in the representative sample, but average daily consumption among poor households in 2018 was just 24 liters per capita, far below the average for all of Santiago of 40 liters per capita. (V.D)</p> <p>Water consumption increased drastically for FAS beneficiaries (from 23 to 31 liters per capita per day), but less than 40 percent of them are poor. Among poor FAS beneficiaries, consumption actually fell slightly between the 2015 baseline and the 2018 follow-up surveys (VII.B and E)</p>
H6. Customers are satisfied with AdS's quality of service	<p>☺ The majority of AdS customers are satisfied with potability, frequency, duration, and their knowledge of when supply will be available, with higher levels of satisfaction compared to 2011. However, survey and qualitative data agree that many customers are not satisfied with water pressure or the speed with which AdS responds to complaints. (V.B.3)</p> <p>AdS customers in Praia have more favorable opinions of the new utility relative to ELECTRA, while AdS customers outside of Praia generally have a higher opinion of their SAAS than AdS. (VIII.B.2)</p>
H7. AdS achieves cost recovery	<p>⊖ AdS is still far from achieving cost recovery due to a number of factors including the low margin between the price AdS pays ELECTRA for desalinated water and the price AdS can charge its customers, the high share of water that falls into the subsidized block, and the high rate of non-revenue water. ARE is reviewing tariffs which could improve AdS's financial prospects, but the utility will still need to reduce non-revenue water in order to achieve cost recovery. (VIII.A.3)</p>
H8. The implicit subsidy to water and sanitation utilities is reduced	<p>⊖ It is not clear whether or how the national government will support AdS but to the extent that AdS has not yet achieved cost recovery, it will still be reliant on some source of external financing (albeit perhaps not as much as the SAAS and ELECTRA were). To the extent that there is no successor to the FASA, utilities might be tempted to defer maintenance ultimately requiring large capital investments from the government, which is one form that implicit subsidies can take. (VIII.A.3)</p>
I1. Increased productive government spending	<p>⊖ Without a reduction in the implicit subsidy, there is no scope for the WASH project to increase productive government spending.</p>

Outcome	Explanation (chapter references)
I2. Increased household productivity due to time and cost savings, health benefits, and business opportunities	 There was no evidence that households have more time for productive activities: time spent collecting water is quite low on average so there is not much scope to reallocate any time savings into productive uses, and even among the FAS sample who experienced the greatest time savings, household members on average spend only a few hours per day working, with almost twice as much time spent on leisure. Few households engage in income-generating opportunities that rely on piped water; unless there is a drastic increase in economic activity enabled by expanded access or improved quality of service in the coming years, it is unlikely that the WASH project will result in the measurable increases in household productivity that were predicted in the program logic. (V.C and VII.C)

3. How did the political and economic incentives of different sector actors affect the implementation, sustainability, and efficacy of the WASH project? In particular, how did these incentives affect the reform portfolio, and the effects of the WASH project on customers, utilities, and the management efficiency of the sector?

Financial incentives helped motivate key actors. For example, municipal leaders on Santiago were persuaded to discontinue their SAAS and join AdS in part because they hoped to qualify for FASA funding. MCC was also able to use its financial leverage to accelerate achievement of key milestones like getting government approval of the retrenchment plan for SAAS workers that was a necessary step in creating AdS, issuing AdS's first bills in each municipality, and passing the water code shortly before the end of the compact.

Although MCA-CV was able to build buy-in for the reforms among most stakeholders, there are still some gray areas related to the division of authority between the economic and technical regulators for water and sewer utilities (particularly related to how quality of service is regulated, and how that interacts with tariff-setting). In addition, it is not yet clear how ANAS will balance its roles as the technical regulator for the sector and as the key agency responsible for guiding prioritization of investments in the sector using policy tools.

The fact that AdS leaders were accused and convicted of embezzling funds is evidence that even the new corporatized utility is vulnerable to corruption, although the speed and professionalism with which the issue was resolved bode well for the new utility.

4a. Has the FASA mechanism efficiently selected the most effective, high quality projects as measured by the effect of the FASA projects on the socioeconomic well-being of households, the finances and management of the utilities, economy value-added, and business and household productivity?

We did not have access to information on the full set of FASA proposals so we could not assess the relative quality of the proposals that were selected for funding. Moreover, as detailed below, we are not able to disaggregate the effects of FASA projects focused on network improvements from

those focused on expansions, although the two types of projects would be expected to affect different outcomes.

Among the 12 funded projects, nine were completed by the end of the compact. Since then, the GoCV contributed \$275,634 to finish the works under the oversight of ANAS, and all but one element of one project have been inaugurated.

Although we could not assess the quality and effectiveness of all projects in the FASA portfolio, two important themes emerged from the three we profiled in the case studies (that is, the São Domingos-Praia connector, the water network expansion on São Vicente, and the wastewater treatment plant on Sal):

- **Connecting to water and sewer networks remains a goal out of reach for many poor households without substantial subsidies.** We were not able to obtain data from operating utilities on how many households connected to the new networks, so it is possible that the new infrastructure is benefiting many households that are not poor, but in the absence of better sequencing on São Vicente (so FAS subsidies for household connections could come after FASA constructed new infrastructure) and funding for subsidies on Sal, the FASA projects did not make as much progress as hoped toward reducing social inequalities in access to improved water and sanitation, despite application of the new National Strategy on Social and Gender Aspects.
- **Without clarity on regulations and tariffs, utilities and their customers will not be able to take full advantage of new infrastructure.** On Sal, households were reluctant to connect to the new sewer network because ARE had not set a tariff for the new services, and households did not know exactly how much they would have to pay. Likewise, the utility was concerned about the financial sustainability of the newly rehabilitated wastewater treatment plant because it was still waiting for ARE to set a tariff for it to charge for recycled wastewater. At the same time, potential consumers of the product were not sure how they could use it: they were not confident of the quality of the water and wanted guidance from ANAS.

4b. Is the FASA a sustainable institution in Cabo Verde that is and will catalyze additional financing for WASH infrastructure?

The GoCV intended to establish a new WASH Revolving Fund that would continue to use the National Strategic Plan for Water and Sanitation as the basis for prioritizing investments. Unlike the FASA, however, the Fund would not have been purely a grant facility, but rather would have used its funding to guarantee commercial loans so that utilities could get a lower interest rate from commercial banks. This blended financing model was expected to make the Fund more sustainable than the FASA had been. However, despite major efforts to set up the Fund, and despite the fact that the GoCV had committed an initial budget for the Fund to complement seed funding provided by LuxDev and the World Bank, the Fund was ultimately merged into the Environmental Fund, an existing GoCV mechanism to distribute revenues from taxes on imported plastics. Without a successor to the FASA dedicated to water and sanitation infrastructure, there is no sustainable mechanism for financing capital investments in the WASH sector in Cabo Verde.

Box X.1. The FASA: Case study of an infrastructure grant facility

The design: The FASA provided funding on a competitive basis to water and sanitation utilities nationwide to undertake projects prioritized in the National Strategic Plan for Water and Sanitation. Only corporatized utilities or those that were making progress toward corporatization were eligible to apply, so as to bolster the URA and incentivize municipalities on Santiago to join in the creation of AdS. Projects were selected by MCA-CV on the basis of the economic rate of return and other criteria, including environmental aspects and social and gender inclusion. All FASA projects were required to include an IEC component to explain the infrastructure to households in the project's catchment area, encourage them to connect to the piped water network, and promote a culture of paying for services.

Implementation findings:

- The FASA invested almost \$20 million in infrastructure that served 19 of Cabo Verde's 22 municipalities (the other three did not submit proposals). Santiago received half of the funding. Most projects were completed during the compact and the rest were finished by the GoCV.
- Only three of the 13 FASA projects were sanitation infrastructure (one of which was canceled).
- Although water scarcity is a major issue for most of Cabo Verde, there was very little emphasis on increasing water supply or reducing non-revenue water, in part because a large new desalination plant was expected to be built on Santiago (financed by JICA). Expanding networks is also more politically beneficial than reducing leaks, at least in the short run.
- Administering the FASA and overseeing the works was a very labor-intensive process for MCA-CV. The second tranche of FASA grants used "design and build" contracting, which afforded more flexibility than the "design-bid-build" contracting used during the first tranche of FASA projects. MCA-CV found that flexibility was very beneficial because many municipalities did not have the technical expertise to be able to produce designs that could be put out to bid.
- Survey data confirm that the FASA's eligibility criteria targeted poor neighborhoods.
- Because IEC activities were beyond the expertise of the construction firms that implemented the FASA projects, they adopted a variety of strategies to fulfill the IEC requirement, ranging from subcontracting these activities to NGOs to bringing consultants into the team to lead these activities; the most effective approach seemed to be partnering with an NGO.

Effect on key outcomes:

- FASA eligibility played an important role in incentivizing the creation of AdS but stakeholders felt that other factors—such as stakeholder engagement and assistance with retrenchment of SAAS staff—were also critical facilitators to the creation of AdS.
- Due to the diversity of the grant portfolio and the limited information available about the service areas for each project, it is not possible to quantify the benefits to AdS or other utilities in terms of additional customers, reduced technical losses (i.e. leakage), improved water quality, or strengthened environmental protection.

Sustainability: The WASH Revolving Fund would have continued the FASA's commitment to using the National Strategic Plan for Water and Sanitation as the basis for prioritizing investments, but in contrast to the FASA, the Revolving Fund would have used a blend of grants and commercial loans backed by the Fund's capital. Despite major efforts to set up the Revolving Fund, it was merged into a different government funding mechanism not specific to WASH. Without a successor to the FASA, there is no sustainable mechanism in Cabo Verde for financing capital investments in WASH.

5. (a) Was the tariff reform outcome pro-poor (progressive), regressive, or neutral in Santiago? (b) Does the current tariff structure allow for cost-recovery by AdS?

Poor customers consume only 16 percent of the water that is billed in the subsidized price block. Thus, it appears that the current block tariff structure is more regressive than progressive because the majority of the subsidized water goes to non-poor customers.

Forty seven percent of water consumption billed by AdS in 2018 fell under the subsidized block. The small share of domestic consumption in unsubsidized price blocks and by other types of consumers makes it difficult for AdS to recover the revenue lost from subsidized water consumption.

6. Was the WASH project as a whole effective at increasing the management efficiency and sustainability of the sector as measured by non-revenue water, collection ratio, and tariff adequacy? At reducing the [implicit] subsidy to the WASH sector at the municipal and national level?

AdS has shown mixed progress on a range of performance indicators during its first years of existence. From 2017 to 2018, the operating cost coverage remained largely the same, but AdS's operating cost deficit increased by 51 percent. Non-revenue water increased from 46 percent in 2017 to 61 percent in 2018, likely due at least in part to more accurate measurement. At the same time, AdS was able to improve its bill collection rate in 2018, reaching 64 percent, compared to only 44 percent in 2017.

The majority of AdS meters tested against an ultrasonic meter are fairly accurate. Roughly one-sixth of the meters we tested against an ultrasonic meter were under registering by more than 10 percent, contributing to non-revenue water. A similar share was over registering by more than 10 percent—probably because of air in the pipes, an issue AdS is already working to resolve.

7. What has been the effect of the WASH project on access to, quality and continuity of, and total costs of (direct and indirect) water and sanitation services for households and businesses in Cabo Verde? On gender and social equality in access to and cost of water and sanitation services?

As noted, the share of households with access to improved water and sanitation has increased, and the same is also true for poor households, although they are still less likely to be connected to the piped water and sewer networks. Connection rates to the piped water and sewer networks are similar for households headed by females and those that are not, and the access of both groups grew comparably over time.

One to two years after taking over water distribution services on Santiago, AdS provides highly variable service, with roughly one-fifth of customers reporting continuous supply, and 30 percent reporting fewer than four days of service per week, with fewer than four hours per day when it is available.

Three-quarters of AdS customers are satisfied with the quality of piped water, a sentiment that was corroborated in the focus group discussions.

AdS established a social and gender integration plan and as part of this plan it set up a social and gender policy, which influences how the company works with customers, especially more disadvantaged customers. However, gender equality issues are currently not a short-term priority for AdS so the company has not prioritized hiring a gender specialist. As of the end of December 2018, AdS had 235 employees and 35 percent of them were female, although AdS staff noted during the interviews that most positions within the company are highly gender-specific.

The evaluation did not assess changes in any outcomes among businesses.

8. How do the FASA and FAS projects' effects on these outcomes compare?

Data collected during the interim round of the evaluation confirm that both FASA and FAS focused on disadvantaged neighborhoods and/or households. Both funds had a strong emphasis on conducting IEC activities to promote demand for piped water and/or improved sanitation, water management, and good hygiene. Both funds aimed to connect more households to the piped water and sewer networks (the FAS also connected households to improved on-site sanitation in the form of septic tanks), although the FASA extended the network to new areas (sometimes negotiating connection discounts with the utility), whereas the FAS connected poor households to the existing network.

As noted, many poor households were unable to connect to the network without a subsidy, so the FAS appears to have been more effective at increasing poor households' access to improved water and sanitation, although the FASA could have actually enabled more households to connect overall. From the perspective of a utility, newly connected households are additional customers who should generate additional revenue. (Bill payment was one of the themes of the IEC.)

Households that connected to the piped water network thanks to either the FASA or the FAS likely enjoyed better quality and continuity of service than they did with alternative sources. In addition, some FASA projects were expected to improve the quality and continuity of service by refurbishing infrastructure. Several FASA projects were designed to reduce technical losses, whereas the FAS would have had no effect on leakage. We do not, however have data that allow us to determine how effective these projects actually were.

B. Implications for the final round of the evaluation

Although the data collection for the interim round of the evaluation went smoothly, that experience—and in some cases, the findings of this round of evaluation—have led us to reconsider several aspects of our plans for the final round of the evaluation, which was envisioned as an opportunity to assess medium-term outcomes by repeating data collection and analyses for the pre-post comparisons and case studies.

- **To avoid a seasonality bias, we will likely postpone the final round of the evaluation by a few months** so that data collection can be done at the same time of year as it was in 2018. The final round of data collection was originally scheduled for late 2020 and early 2021, but will likely take place between April and June 2021.
- **As planned, we will conduct an update to the process evaluation, but we will also consider doing additional qualitative interviews with the WASH Revolving Fund in the final round of the evaluation to document how the institutional and policy effects of the WASH project continue to evolve.** Based on what we learned from the interviews with key stakeholders in this round of the evaluation, we still believe we should update our description of how ANAS functions and how it works with CNAS, ARE, and DNA. It would also be important to document the status of the new WASH Revolving Fund and Águas do Maio if these two institutions begin operating.
- **We will consider whether to do a repeated cross-sectional survey of the population of Santiago instead of constructing a panel data set** of the same households surveyed in both 2018 and the final round. A panel data set offers simpler interpretation and better power than a repeated cross-section by avoiding differences in the characteristics of the sample and instead reflecting only changes over time, as long as attrition is relatively low. The panel is what we originally recommended, but based on our experience trying to relocate households that were included in the survey for other follow-up data collection (such as installing ultrasonic meters), we are concerned that attrition might exceed the level at which the statistical power of a panel design would exceed that of a repeated cross-section, and bias also becomes a greater concern if certain types of households are systematically more difficult to locate.
- **We will use more creative strategies to obtain survey respondents' AdS customer IDs** during the final data collection round, because this was a major challenge in the 2018 data collection. Almost 40 percent of AdS customers in our survey were unable to show us a copy of their AdS bill so we could use it to record the customer ID. The AdS customer ID allows us to access information about consumption and payment history. Those records are not prone to recall error as self-reported data would be, and the survey's length and the data's accuracy would improve as a result. We are optimistic that by adopting a range of strategies to incentivize and help survey respondents to share their AdS customer IDs with us, we will be able to merge more survey data with AdS billing and payment data, leading to a larger and more representative sample for the analyses that draw on those data.
- **We will discuss with MCC whether or not to follow up with the FAS beneficiaries again during the final round of the evaluation.** The interim round of the evaluation was likely sufficient for understanding the main benefits these households have experienced, so the primary question about FAS beneficiaries for the final round of the evaluation is whether they manage to pay their bills and stay connected to the network. A more cost-effective way to answer that question would be to work with AdS to track whether these households remain active customers, in which case it might not make sense to do another round of household surveys of FAS beneficiaries.

- **We will reconsider whether it is worth doing another round of ultrasonic meter installations.** The activity was more expensive and less representative than we expected it to be because it was so difficult to find households where we could install an ultrasonic meter. It is not clear that a convenience sample of households limited to Praia would be informative enough to justify repeating ultrasonic meter installations in the final round of the evaluation, particularly because we found that most meters were fairly accurate. On the other hand, if AdS takes steps that could lead to a secular change in meter accuracy, such as replacing meters or changing how the network is managed, then it still might make sense to repeat the ultrasonic meter data collection even with the limitations we are now aware of.

The interim evaluation findings suggest that the WASH project achieved many of its targets and set Cabo Verde—and particularly the island of Santiago—on a path toward a more efficiently managed WASH sector that can achieve better outcomes and reduce inequality. However, due to the implementation delays that affected most of the project activities, the final round of the evaluation will be a better time to assess whether the institutional and regulatory reforms have led to better decision making and to take stock of the commercial sustainability of AdS, the physical sustainability of the infrastructure built by the FASA, and the financial sustainability for households connected to piped water and/or improved sanitation by FASA subsidies.

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Appendix 1:

Qualitative Data Collection

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Table A1.1. Summary of primary qualitative data collection

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
MCC and MCA-CV staff	Interviews	<ul style="list-style-type: none"> WASH Activity Management Monitoring and Evaluation Gender and social Inclusion Engineering Compact management 	9	1-4, 6	<ul style="list-style-type: none"> NIRR URA FAS FASA 	<ul style="list-style-type: none"> Project design, implementation, mainstreaming of gender and social issues Successes and challenges Influence of other organizations (such as Coca Cola Foundation and LuxDev) on how WASH project activities were implemented or will be sustained Perceptions of effects on outcomes for each activity Selection process for FASA grants (calculation of ERR, consistency with the Master Plan) FASA project-specific IEC strategy and mainstreaming of gender and social issues Coordination on FASA projects between multiple stakeholders (utilities, construction companies, government agencies, and local communities)
National government ministries	Interviews	<ul style="list-style-type: none"> Ministry of Finance Ministry of Agriculture and the Environment Ministry of Health Ministry of Foreign Affairs 	7	1-4, 6	<ul style="list-style-type: none"> NIRR URA FAS FASA 	<ul style="list-style-type: none"> Changes in roles and responsibilities due to project activities Perceptions of new institutions and policies Factors that facilitated or inhibited the institutional changes and new policies New developments that could influence the same outcomes that the WASH project is targeting Changes in government spending (particularly investments in WASH and non-productive spending such as subsidies to utilities) Donor resources for WASH Sector in future Affects on health outcomes

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
Stakeholders involved in compact design	Interviews		3	1-3	<ul style="list-style-type: none"> • NIRR • URA • FAS • FASA 	<ul style="list-style-type: none"> • Rationale for the project activities • People and factors that influenced the project design • Project logic • Government restructuring
ANAS	Interviews	Senior Staff	1	1-4	<ul style="list-style-type: none"> • NIRR • FASA 	<ul style="list-style-type: none"> • Decision making regarding WASH priorities using the National Strategic Plan for Water and Sanitation • How ANAS works with the DGA to create new regulations and standards to monitor the sector • Whether roles and responsibilities are clear among the government organizations • Whether ANAS is becoming politically and financially sustainable • The extent to which the organization can carry out its role in the absence of technical assistance (including IEC) • Successes and challenges of integrating social inclusion into sector priorities and management processes • New developments that could influence the same outcomes that the WASH project is targeting
ARE	Interview	Senior Staff	2	1, 3-5	<ul style="list-style-type: none"> • NIRR • URA 	<ul style="list-style-type: none"> • How tariffs are set (water and sanitation services) • ARE's relationships with ANAS and the utilities ARE regulates • Successes and challenges of operationalizing a pro-poor tariff • Perceptions of whether the new tariff structure for AdS is pro-poor • Tariffs for Águas de Ponta Preta services on Sal (especially recycled waste-water) • Tariffs for AdS services (including water delivered by interconnection of Praia and São Domingos, water supplied to airport)

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
AdS	Interviews	Senior Staff	2	1-6	<ul style="list-style-type: none"> NIRR URA 	<ul style="list-style-type: none"> Status of and experiences with the process of creating and operating AdS Status of and experiences with the integration of Praia network and customers Effects of national reforms on utility operations, service quality, and financial health Changes in non-revenue water Ability to manage sanitation systems Financial sustainability of AdS and relationship with ELECTRA
NITA and ATAS	Interviews	Technical Assistance Staff	4	1-5	<ul style="list-style-type: none"> NIRR and URA, respectively 	<ul style="list-style-type: none"> Experience and process of providing technical assistance Beneficiary institution's preparation to operate without technical assistance Facilitators and drivers of change
ELECTRA	Interview	Senior Staff	1	2, 3, 6	<ul style="list-style-type: none"> NIRR URA FASA 	<ul style="list-style-type: none"> Business and financial relationship between AdS and ELECTRA How this influences the quality of service AdS provides and the two utilities' prospects for financial sustainability ELECTRA's role in the sustainability of the FASA projects
FASA implementers	Interviews	Technical support staff	8	1, 2, 7, 8	<ul style="list-style-type: none"> FASA 	<ul style="list-style-type: none"> Facilitators and barriers to implementation and sustainability How the projects helped the utility and community, including whether households connect to new lines Perceived effect on the utility and community

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
FAS implementers	Interviews	Technical support staff	4	1, 2, 7, 8	<ul style="list-style-type: none"> FAS 	<ul style="list-style-type: none"> Facilitators and barriers to implementation How beneficiaries were chosen and supported to develop a culture of bill-paying and improve their knowledge of recommended WASH behaviors Perceived effect on households and communities
LuxDev	Interview	Technical Support Staff	1	3, 4, 6	<ul style="list-style-type: none"> NIRR URA FASA 	<ul style="list-style-type: none"> Sustainability of project activities Support provided to ANAS, AdS, and the new FASA
Santiago government and former SAAS	Interviews	<ul style="list-style-type: none"> Former SAAS staff Members of the Camara Municipal 	13	1-4	<ul style="list-style-type: none"> NIRR URA FASA 	<ul style="list-style-type: none"> Motivations to corporatize (including availability of FASA funding) Challenges in the process of creating AdS Perceptions of how corporatization has affected the quality of service provision and household access to and use of water on the island
Maio government and SAAS	Interviews	Municipal Council Member and SAAS staff	2	1-4, 6-7	<ul style="list-style-type: none"> NIRR URA 	<ul style="list-style-type: none"> Effects of national reforms on utility operations, service quality, and financial health Status of and experiences with the process of creating and operating Águas do Maio Motivations to corporatize (including availability of FASA funding) Expected effects for the government, utility, and households Steps in the corporatization process Challenges encountered or anticipated and potential solutions Contextual factors that could influence the process or effects of corporatization

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
Project-specific beneficiaries	Interviews	<ul style="list-style-type: none"> Chamber of Tourism Agricultural Producers Águas de Ponta Preta 	4	1, 3	<ul style="list-style-type: none"> URA FASA (Sal) 	<ul style="list-style-type: none"> Effects of national reforms on utility operations, service quality, and financial health (for process evaluation) Creation of FASA project proposal FASA project-specific IEC strategy and mainstreaming of gender and social issues Coordination on FASA projects between multiple stakeholders (MCA-CV, construction companies, government agencies, and local communities; also Associação dos Amigos da Natureza on São Vicente for linkages with FAS) Successes and challenges Perceived effects of FASA projects on utilities, households, the environment, local economy, and local politicians Management and maintenance plan for FASA infrastructure Perceived effects of FASA project on airport operations Management and maintenance plan for airport infrastructure that connects to FASA infrastructure Progress toward Blue Flag certification in all domains Other influences in tourism sector (including global trends) Satisfaction with operation of waste-water treatment plant and improved sewerage funded by FASA Perceived effects of FASA project on tourism

Respondent	Data collection method	Position or Organization	Number of interviews or focus groups	Evaluation questions	Project activities	Interview/FGD topics
Households	Focus groups		18	1, 2, 6-8	<ul style="list-style-type: none"> • NIRR • URA (Santiago and Maio) • FAS (Santiago and São Vicente) • FASA (Santiago, São Vicente, Sal) 	<ul style="list-style-type: none"> • Familiarity with elements of the WASH project (where the money came from, what the project entailed, messages received through IEC campaign) <p>Perceptions of:</p> <ul style="list-style-type: none"> • If applicable: the construction phase (inconveniences or risks experienced) • Changes in access to public fountains, piped water, and improved sanitation • Quality of service provided by water and sanitation utilities • Effects of improved access on quantity of water consumed, household expenditures, time use, quality of life, household productivity, changes in the neighborhood, and other domains • Choices in water sources • Cost of water from different sources • Benefits of having access to the piped network • Time use and other aspects of household productivity such as health, schooling, and income generating activities

Table A1.2. Summary of documents reviewed (secondary qualitative data collection)

Document
Project-wide
Compact Agreement
Program Implementation Agreement
Constraints Analysis
Economic Viability Study of the WASH Sector
Community Level Study on Social and Gender Issues in WASH in Cape Verde (Parts 1-6)
Compact M&E Plan
Quarterly Indicator Tracking Tables
MCC WASH Project ERR Calculations
Sustainability of Compact Investments Annual Summary Report-2018
Status of Four Years of Implementation for the Second MCC Compact-2016
Compact Closeout Report
SCA mission report-March 2017
SCA mission report-October 2017
Dew Consulting mission reports
NIRR
RFP for NITA
NITA Design Phase Report
NITA Base Period Report September 2014-September 2015
NITA Phase II Strategy Report
AECOM Quarterly Report June-August 2016
ACE Report on Water Quality Management
NITA Project Monitoring and Evaluation System Presentation-January 2017
Annual Report of the Water and Sanitation Services in Cape Verde (RASAS-CV)-2015 and 2016
CNAS Creation Legislation
ANAS Creation Legislation
Water and Sanitation Code Legislation
National Strategic Plan for Water and Sanitation (SNMPWS)
National Strategic Environmental and Social Assessment (NSESAs)
Draft Santiago Water and Wastewater Master Plan Santiago Island (including NSESAs)
NSESAs Report Executive Summary
NSESAs Final Report
Water Quality and Wastewater Discharge Standards Report
URA
RFP for ATAS
ATAS Evaluation Report and Proposed Award
ATAS Base Period Report
ATAS Quarterly Report December-February 2016
ATAS Quarterly Report December-February 2017
AdS IEC strategy workshop documents-October 2017
URA/IGF
Non-Revenue Water Mission 5 Report
Non-Revenue Water Study Tasks 1-6 reports
IGF
FAS Implementer Selection Memo
FAS Implementer Candidate Applications
FAS Operations Manual
RAIN Cabo Verde Close-out Report on FAS, with Appendices
FASA Operations Manual
FASA ERRs

Document

FASA implementation & IEC documents
FASA project evaluation documents
FASA Tranche 1 RFPs
FASA Tranche 2 RFPs
FASA Projects Status Report-September 2016
Interview guide from MCC IGF internal study
IGF Environment and Social Management Framework

Appendix 2:

Sampling and Weighting of Survey Data

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2011 Compact baseline survey

INE used a stratified random sampling approach, which proceeded as follows:

1. The island of Santiago was divided into three domains: Praia, rural areas in Santiago outside of Praia, and urban areas in Santiago outside of Praia.
2. Within each domain, the primary sampling unit was enumeration areas (EAs) from the 2010 census. INE selected 19 EAs at random from each domain, with the probability of selection proportional to the number of households in the EA.
3. Using the 2010 Census Dataset, INE randomly selected 20 households from each selected EA and attempted to interview those households.

Households were not replaced if enumerators were not able to locate or interview people on the selected list: 999 households were interviewed out of a sample of 1,140. According to survey documentation, most households that were not located previously lived in dwellings that had been vacated or had become uninhabitable since the census. The overall response rate was 94.3 percent (MCC 2014), referring to the percentage of households that consented out of the total of households that were located.⁶⁹

INE provided weights at the domain level to correct for different population sizes in the three domains. INE also provided weights at the EA level to correct for different response rates in each EA; these weights are based on the ultimate response rate out of the total sample of 20 households per EA, and not based on the sample of households that were located. INE did not provide the number of households that were successfully located in each EA but then refused or were unable to respond to the survey, so we are unable to correct for response rate among located households. The weights used for analysis combine the domain-level weights for population size and EA-level weights for response rate.

⁶⁹ INE conducted the same household survey on the island of Sal, using the same methodology. Survey documentation reports an overall response rate of 94.3 percent without breaking down the response rate by island.

2018 Interim survey: representative sample

Because we did not have access to the personal identifiers from the 2011 compact baseline, we drew a new representative sample for the interim analysis. We used a random sampling approach that intentionally over-sampled households from EAs where FASA projects were completed. Our approach proceeded as follows:

The interim survey used as a sampling frame the same 2010 census EAs that were used in the 2011 survey, with updated household counts. We identified EAs where FASA projects were located based on information provided to us by MCA-CV.

We randomly selected 50 EAs with FASA projects and 50 EAs without, with the probability of selection within each of the two groups proportional to the number of households in each EA.⁷⁰

We did not have a full census from which to randomly select households, so within each sampled EA, we used the random route approach to select households. Enumerators were given a starting point, a direction, and a randomly generated number N. Enumerators then surveyed every Nth household until they had surveyed 10 households in each EA.⁷¹

Enumerators were instructed to find an appropriate respondent, defined as someone who lives in the house and knows about water usage and billing (if the household receives a bill) at each house. If no such person was available—or if no one was home—enumerators were instructed to return up to three times to find a respondent. If, after three attempts, they were unable to find an appropriate respondent, they added a new household, continuing to use the random route approach.

Despite repeated instructions to the data collection firm to carefully track survey refusals, the response rate delivered by the firm seems implausibly high: of 1,006 households targeted, 999 agreed to be surveyed.⁷²

The sample sizes by municipality are presented in Table A2.1.

⁷⁰ We selected two FASA EAs with certainty because they were part of the case study, and one with certainty because the population constituted more than 2 percent of the population of all FASA EAs and thus had a probability of being selected of greater than 1. The remaining 47 EAs were then selected randomly with probability proportional to the number of households in each EA. The sampling with certainty of these three EAs is corrected for in the analysis.

⁷¹ Because of logistical considerations, not every EA had exactly 10 households: 94 EAs had 10 households, three EAs had nine households, and three EAs had 7, 11, and 13 households, respectively.

⁷² Because the reported refusal rate was negligible, we did not attempt to correct for it in our weighting.

Table A2.1. Sample size by municipality

Municipality	Sample size	Percentage
Tarrafal	80	8%
Santa Catarina	120	12%
Santa Cruz	130	13%
Praia	518	52%
São Domingos	20	2%
São Miguel	30	3%
Ribeira Grande de Santiago	40	4%
São Lourenço dos Órgãos	20	2%
São Salvador do Mundo	40	4%

Because EAs were selected with probability proportional to the number of households, the sample was weighted only to correct for oversampling of certain EAs and for the varying completion rates in each EA.

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Appendix 3:

Stakeholder Comments and Mathematica Responses

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Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Environmental and Social Performance	7	The text makes sense that the DNA is the least affected by the reform process. This is not surprising since their role in regulation of water is less direct than ARE or AdS. There was some discussion that best practice in natural resource is for the protection of the resource (like water) should be separated from the primary user of the water – such as ANAS, in this case, or the Ministry of Agriculture. MCC accepted that CV as a small island may not have the ability to divide regulation across multiple agencies. However, there is still a potential conflict in water management with Agriculture being a key user and somewhat outside the ANAS control, for example. To address this, we did include Agriculture in CNAS. One other point, for DNA, the SESA was the first time that they had participated in developing a strategic environmental and social assessment to help them build environmental risks into a policy and planning tool. It was also intended to demonstrate on how to address cumulative and secondary environmental impacts. According to discussions with MCA and DNA (formerly DGA), use of the traditional ESIA tools does not control for multiple actors in the same economic activity or location causing cumulative impacts. While the SESA was not perfect, it was intended to demonstrate how such a tool could be used and integrated into a national plan.	We have noted the concern about the conflict of interest with ANAS being part of the Ministry of Agriculture in the Executive Summary (this issue was already addressed in chapter IV). We did not encounter any references to the traditional ESIA tools through our document review and interviews, so we do not have any basis to compare the SESA to them.
MCC Environmental and Social Performance	7/8	The comment by stakeholders alludes to the same point above about a conflict of interest between managing a resources and having a conflict of interest in prioritizing how that resource is used.	We have made this more explicit in the report.
MCC M&E	8	“Reliance on public fountains as a primary water source fell from 27 percent to 9 period percent...” Delete word in red	Addressed

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Environmental and Social Performance	9	Cost recovery: It may be interesting to look at some of the tariff calculation assumptions. MCC was concerned that cross-subsidization for first block consumers implies that higher use consumers need to cover most of the costs. In CV, unfortunately, many of those high users of water invested in their own desal plants like hotels and industry. It is unclear if those high-end users have shifted to network connections. It was assumed that they would because (even at higher rates per increment) the network water would be cheaper than using desal from their own plants. If they have not converted to network water, is it a question of reliability? Their sunk costs for equipment? Water costs of higher blocks starts to compete with the desal costs? A combination of factors? Still not clear if our assumptions were wrong or if something else is at play.	This is beyond the scope of the evaluation questions; as explained in our Evaluation Design Report, we did not attempt to collect any data from non-residential customers of AdS so unfortunately we are not able to explore these issues.
MCC Environmental and Social Performance	9	“Households that received subsidies from the FAS program experienced even larger improvements in access to piped water and improved sanitation (not shown).” – It would be very useful to cite the specific statistics here.	Addressed
MCC Environmental and Social Performance	10	“On average, water and sanitation expenditures account for about 7 percent of household spending among households on Santiago (not shown).” - Here too, it would be useful to cite the specific statistics for poor and for non-poor—what percentage of household spending for each?	We have specified the difference in expenditures in the bolded statement.
MCC M&E	10	There was a large decline in water the share of FAS...” correct the typo in red	Addressed
MCC Environmental and Social Performance	11	“Water consumption is still relatively low on Santiago, and poor households consume far less water than non-poor households.” It would make for better flow to put this point right after the first main point about spending on water.	We moved this paragraph to the beginning of the section.
MCC M&E	11	Figure I.5. Time spent collecting water, among households who collect (2018)- We should definitely try to emphasize that the figure represents average time collecting water which I think could be added to the title of the figure.	Added "average" to the title of Figure I.5.
MCC M&E	12	“Though more than half of households are satisfied with piped...” add word in red	Addressed

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	15	“Though there have been increases in access to improved water and sanitation, initial evidence suggests that there is minimal scope for the WASH project to lead to increased household productivity.” This will be an important finding for MCC and raises questions about where is the breakdown in the logic? How much time savings should be realized to see the potential for increased productivity? What else in addition to time savings is needed to create increase productivity?	These questions are indeed important but are beyond the scope of the evaluation. We agree that in designing future projects where time savings are being considered as a driver of the ERR, it would be important to do a literature review and exploratory work in the country to understand the factors that would influence whether time savings would be redirected to productive uses.
MCC M&E	22	“...cash and in-kind contributions from beneficiaries, valued at about \$500,000.” How did you come up with this estimate. A footnote with a brief explanation would be helpful.	This estimate comes from the Replenish Africa Initiative (RAIN) FAS implementation report. Added in-text citation.
MCC M&E	37	“In 2018, we focused on our analysis on 361 households...”	Addressed
MCC M&E	40	Ultrasonic meter data—Another goal of this was to understand NRW—AdS financial loss from inaccurate meters. I suggest mentioning that to the objective.	Updated text to say the following:“ Data on meter accuracy will allow us to assess the contribution of meter inaccuracy to non-revenue water, because of the revenue lost from meters under-registering water consumption.”
MCC M&E	41	I don’t see any mention of the originally proposed sample size of 400 from the EDR. The information on this page explains factors that led to the smaller sample but I think context for the first sample should be provided, even if it’s just a footnote.	Added information on original sample in a footnote.
MCC M&E	43	This chapter draws from interviews	Addressed
MCC Environmental and Social Performance	44/45	Among the environmental protections, it may be worth mentioning the re-use standards as well. Since the Compact was supposed to promote tourism, there were also discharge and marine waters standards. Not sure if those standards are being evaluated.	We have added these points.
MCC Environmental and Social Performance	46	Reference to “National Strategy on Social and Gender Aspects” in the box: This is unclear; are you referring to a strategy as per the title, or a study as per the text that follows? I assume this refers to the strategy on key integration requirements developed out of a study....	Clarified

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Environmental and Social Performance	48/49	Master Plan/SESA: This was intended as a framework at the national level to guide more specific MMU/island planning processes and localized SESA. MCA supported the planning process on Santiago. It would be curious if other islands are following the planning approach in their respective jurisdictions.	This did not come up during our interviews with ANAS or ARE and we did not conduct island-specific interviews so we can not comment on this.
MCC Environmental and Social Performance	50	Water Quality Standards: Glad to see these are being complied with. Note that MCC was not able to provide support for testing of compliance across all 64 (?) parameters and all five quality standards (human use, discharge, marine/tourism, reuse, etc.). MCC's support for water testing was largely restricted to potable water and most of the equipment on Santiago. Has CV continued to invest and expand its water quality monitoring regime? If so, water standards/indicators are covered?	While this is an interesting question, the evaluation is unable to answer it.
MCC Environmental and Social Performance	51	CNAS defunct!: While not surprising, this was one way to keep key stakeholders like Agriculture engaged with ANAS since Agriculture is a big user of water and somewhat outside of ANAS's direct control. Any plans to re-invigorate CNAS?	We have noted that there is no evidence from qualitative interviews on any plans to re-invigorate CNAS.
MCC M&E	57	"Ultimately, AdS had to find the customers and inherited a many customer billing ..." Delete word in red	Addressed
MCC M&E	57	"Finally, AdS must address very high rates of non-revenue water in Praia, due to both technical losses and old—and therefore probably inaccurate—meters." The reference to meters in this discussion doesn't seem to be in context, and why "probably due to..." Instead of this reference to meters you could instead say "technical losses and commercial losses"	Made suggested revision.
MCC M&E	58	"The original board was appointed by the government, so members were selected based on their political ties and not their knowledge or qualifications to help advise the water sector." This seems like a sensitive finding but it was a point mentioned by stakeholders so I don't think it should be changed.	As suggested, we kept this finding.
MCC Water, Sanitation, & Irrigation	59	It's interesting that stakeholders did not mention challenges in the sorting out the customer database and billing system as a contributor to non-revenue water. When AdS was interviewed did they mention this as possible contributor to revenue loss?	Indeed, this was a major problem for AdS which they also included in their comments on the report. We have added this in the paragraph about the challenges of the handover of customers from Electra to AdS.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	61	"The following itemss..." Correct spelling	Addressed
MCC M&E	61	"Many focus group participants noted that they service requests..." correct the typo in red	Addressed
MCC Environmental and Social Performance	62	"...the importance of reliable water supply, fair water pricing, efficient water use, and water treatment and storage" - The scope of IEC was wider than this and included messaging around understanding and managing bills and the importance of paying. Did this not surface?	No, a broader scope did not come up through our document review or interviews. These are the topics that we understood the campaigns to cover.
MCC Environmental and Social Performance	64	"...local NGOs implemented information campaigns and meetings to teach families about the importance of managing water usage and paying their bills" - This is confusing, because in the point I commented on above, these topics, nor NGOs as a medium, were mentioned.	We have clarified that the NGO involvement and these messages came up when we investigated IEC efforts under FASA and FAS, but not the TA to AdS.
MCC Environmental and Social Performance	65	"Strategic Environmental Assessment and the Study on Social and Gender Aspects" - Called a Study here, called a strategy in the earlier box.	Corrected here
MCC Environmental and Social Performance	65	"contractors for the FASA works implement gender and social inclusion activities in addition to building the infrastructure" - Not at all clear what this means, and subsequent section is no clearer. It would be helpful to note that these largely focused on support to connect, and to manage bills, among a population whose economic vulnerability made this challenging.	Addressed
MCC Environmental and Social Performance	63-67	FASA: Is the facility still using the grant application and manual that was established by MCA? While this facility may not have many resources to fund projects, the loss of staff and weak institutional stability may result in many of the processes not being followed such as reviewing applications against the master plan, confirming water quantity/quality availability, social/gender requirements, etc. It would be a shame if the process was no longer followed. This could results in a politicized process.	We have updated our description of the status of the successor fund to the FASA based on what we learned during the dissemination trip in September of 2019.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	69	“Closure of the public fountains was confirmed by most focus group participants. MCA-CV and its partners took a balanced approach to selecting which fountains to close.” Although some closures may have happened under the compact it would be more appropriate to say that ADS closed the kiosks since I think they are the ultimate authority on closing these.	Revised to say AdS closed the public fountains.
MCC M&E	71	“In addition to screening out some of the poorest households in the neighborhoods originally selected for the FAS, in some cases the NGOs had to expand to different neighborhoods in order to meet enrollment targets, but in doing so ended up serving less needy populations.” Is it possible to give any idea of the extent to which this might have been the case?	Unfortunately, the FAS implementers and MCA-CV were not able to provide us with any data that have allowed us to answer this question. During the trip to prepare for data collection, we identified this as a major gap in our ability to assess the effectiveness of the FAS in terms of how well the targeting worked and the effects on those who received FAS subsidies.
MCC Gender and Social Inclusion	69	<p>“ According to international oversight consultants, key informant interviews, and household focus groups, the IEC campaigns were a success. MCA-CV created an IEC strategy, which included standard recommended hygiene practices as well as a focus on improving the population’s knowledge around water management and nonrevenue water losses.”</p> <p>I’m pleased to see these were a success. However, the IEC strategy had three components, at the national level through the social/gender unit at ANAS, through the social/gender unit at AdS, in FASA and FAS. It would help to distinguish between these. Also, the topics were far more than knowledge of water management and NRW. Please add reference to the full set of topics—this is important.</p>	We have clarified the three components of the IEC strategy and added as much detail on the topics covered by the campaigns as was available to us.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Gender and Social Inclusion	70	The report says “Although the community-level study on Social and Gender Aspects in Cabo Verde sought to bring lessons learned into the design of WASH activities and ensure that the project addressed the needs of the poor—and women specifically—gender equality within institutions still requires additional support and improvement.” This does not make sense. The community-level study referred to was a small study conducted by OPM in 2013, one of many to help inform MCC design of activities, but is not at all considered a main activity carried out to “ensure that the project addressed the needs of the poor—and women specifically.” The main activity designed to ensure that the project addressed the needs of the poor and women was the TA consultancy with AdS, which had a strong set of gender and social inclusion/pro-poor objectives and tasks, as well as a few other contracts. The overall conclusion of this paragraph that these objectives need additional support and improvement, is correct. But the reference to this community level study should be replaced with “studies and technical support contracts” .	Made suggested revision.
MCC Gender and Social Inclusion	70	The box with the quote on women in departments at AdS is misleading. I recommend replacing that with a quote more pertinent to the work done on poverty and gender at AdS, because increasing the number of women at AdS was never an objective of the project or TA. The main focus of this GAISG unit was on first on strengthening capacity to serve the poor, and secondly on capacity to serve women customers. The quote implies that the sex of the staff at AdS was an issue, which it wasn't.	Although we are aware that the intent was for AdS to integrate gender considerations in all of its operations, we think it is important to note that the management mainly focused on gender balance among staff; we have clarified the purpose of the quote in the text.
MCC Gender and Social Inclusion	72	” When it became apparent that the FASA would not be able to make use of its full budget, MCA-CV and MCC decided to add an additional funding mechanism to help poor and/or vulnerable households connect to the piped water network.” - This does not correspond with my recollection of how the FAS originated. The FAS originated out of an objective of the work to ensure the Compact had reach and sustainable impact for poor populations who faced high affordability hurdles in connecting to the network.	Made suggested revision.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Gender and Social Inclusion	72	“Funding for the FAS included \$1.9 million from the WASH project, \$400,000 from the Coca-Cola Africa Foundation, and cash and in-kind contributions from beneficiaries valued at approximately \$500,000. These funds were pooled together...” - Confusing. Beneficiary contributions were not pooled for distribution to the NGOs	Clarified
MCC Gender and Social Inclusion	72	“FAS enabled over 4,000 households to connect to the piped water network and/or improved sanitation.” - FAS did not provide just improved sanitation (which can include e.g. compost toilets, pit latrines, etc); it provided access specifically to networked sanitation and septic tanks. This should be made clear.	Clarified
MCC Gender and Social Inclusion	73	Are there any lessons learned regarding the timing of communication campaigns vs implementation of activities? E.g. the announcement of the AdS tariff across the various municipalities and the campaigns that went with it.	This was not among our research questions and we did not attempt to collect data that would be nuanced enough to draw any lessons on the timing of communication campaigns relative to implementation of activities. In chapter IX we address the lack of coordination between IEC and construction on one of the FASA projects.
MCC Gender and Social Inclusion	79	“MCA-CV and its partners focused on multiple goals when getting information out to the public.” - This was true for AdS and for FASA as well, although the paragraph seems to refer only to FAS	Clarified
MCC Gender and Social Inclusion	80	First bolded sentence on this page is challenging. ‘Improve’ instead of ‘improved’, ‘build’ instead of ‘building’ might be one way to help.	Addressed
MCC Environmental and Social Performance	79-82	Connections: While moving up to piped water on the network was a goal, internally, there was some recognition that moving households up the water quality ladder was also important and a near-term goal. It was not going to be possible for everyone to get network connections. A harder question, but more appropriate is whether people moved up for a lower water quality source to a better one? Ultimately, some of the low water quality options were also more expensive over time (Like using tanker trucks versus a connection that was initially expensive, but ultimately more consistent and potentially cheaper on a monthly basis). Figure V.6. (page 86) may be getting to this question.	Yes, Figure V.6 addresses changes in reliance on all types of water sources. Our sample size is too small for the lower-quality options to be able to make statistical comparisons for non-piped sources and fountains.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	90	“Contrary to perceptions that water collection is a woman’s task (as expressed repeatedly in the focus group discussions), the 2018 survey data suggest that both men and women and both adults and children collect water.” This is interesting. Is it possible to provide any further descriptions of the men who collect water? How are they generally related to the head of household?	Men collect water even if there are women in the household: in 85 percent of households in which men collected the water, there is at least one woman in the household.
MCC Gender and Social Inclusion	90	“Contrary to perceptions that water collection is a woman’s task (as expressed repeatedly in the focus group discussions), the 2018 survey data suggest that both men and women and both adults and children collect water.” Which focus group discussions are being referred to here? Are these the focus group discussions carried out by Mathematica as part of this evaluation?	Revised to say "as expressed repeatedly in the focus group discussions conducted as part of the interim evaluation".
MCC M&E	91	Why doesn't water consumption have a baseline? I think we had discussed this during the EB review so the same approach applied to that could be applied to the report to clarify why certain outcomes don't have a 2011 baseline. In those cases, it would also be helpful to indicate to the reader how they should or shouldn't interpret a 2018-only data point, in the context of an evaluation report.	We have expanded footnote 38 to provide additional explanation for why we do not present baseline figures for water consumption. We added a sentence to section III.B explaining that without baseline data we can not determine if there have been any changes over time and noted the explanation for the lack of baseline data in the "source" below each graph with only 2018 data.
MCC M&E	99	Can we provide any more details on wash educational campaign? What exactly was implemented?	We added the topics for the FAS IEC campaign in chapter IV. The messages included in the national IEC were not provided to us.
MCC Gender and Social Inclusion	102	“The WASH project was expected to increase water consumption—particularly for poor households—through improvements in the quality of service offered by the new corporatized, multi-municipal utility,”. How did the increases in water consumption related to the project compare for men and women?	We do not have data on consumption at an individual level.
MCC Gender and Social Inclusion	104	First paragraph on this page - Because one concern in the Compact was related to affordability, it would be very helpful here to have information on the relative expenditures on water and sanitation for those in poverty vis a vis those not in poverty	The paragraph states that “Households in poverty—which were identified based on their lower levels of expenditures—spend about one-third as much as nonpoor households on water and sanitation.”

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Gender and Social Inclusion	108	“because FASA was intended to benefit disadvantaged areas” - Is FASA being confused with FAS here? Multiple criteria were used to select FASA projects (financial, economic, technical, environmental...). Social was just one criterion, not a defining focus. The fact that FASA areas are less affluent is more likely a reflection of where infrastructure expansion was present/lacking.	No, this statement is specifically about FASA. We have clarified that social considerations were not the only selection criteria.
MCC Gender and Social Inclusion	110	“Despite the educational campaigns implemented as part of the WASH project, it does not appear that people’s knowledge of the causes of diarrhea improved between 2011 and 2018. This is likely because residents of Santiago already had a reasonably good understanding of its causes in 2011.” Did you learn through the research that education campaigns taught about the causes of diarrhea? While that is typical for WASH programs, and maybe UNICEF did that, the MCC supported IEC focused on other issues, water use and conservation, costs of water, connections, understanding bills, maintaining toilets. Hygiene practices was part of this, but not the main thing. I don’t recall about water treatment. But most was designed to support the kinds of investments we were making. To what extent did the evaluation track the topics that were covered in our national, utility level, FAS and FASA IEC work?	Without documentation of the topics that were covered in the national and FASA IEC campaigns we were unable to tailor the survey questions to align with the messaging that was delivered, so we followed the topics included in the baseline survey. We have cut this paragraph from the report based on MCC’s guidance that the IEC campaigns did not include messages about the causes of diarrhea.
MCC Gender and Social Inclusion	112	“Because FASA targeted disadvantaged areas, and in some cases provided subsidized connections...” - Please verify with M&E and IEPS; as far as I remember, subsidies were only provided under FAS support.	This was a surprise to us as well based on what we initially understood about the FASA, but it came through very clearly and consistently (and with a high level of credible detail) in the qualitative interviews.
MCC Gender and Social Inclusion	119	“Six percent of FAS beneficiary households had been disconnected from the piped water network at some point since becoming connected, but more than half of those households had been reconnected (Figure VII.1).” - The fact that so few of these beneficiaries---among the more vulnerable in their communities---stay connected (94% never disconnected, 4% still connected despite a disconnection) seems to me to be a major finding worth highlighting as a major takeaway. Much focus under FAS went to design that facilitated sustainable access, so this sounds like a success. However, elsewhere in this paper, there was a discussion of the percentage of FAS beneficiaries that were at risk of disconnection. Could you discuss that here as well, for a fuller picture of what’s really going on here?	Good point. We have added a reference to the relevant section as a caveat on the otherwise very encouraging results regarding sustainability of connections.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Gender and Social Inclusion	121	“Although FAS beneficiary households appear to be less well off on most measures, they are more likely to own their home than households on Santiago more broadly.” Presumably this is because one had to own a home to be a FAS beneficiary, right? You had to have a house that could be connected to a network (so excluding the poorest informal settlements) and if you were a renter, renting a home from a wealthier person, it’s not clear that the free connection would have gone there.	Clarified that one criterion of FAS was home ownership.
MCC Gender and Social Inclusion	169-70	Discussion of households benefitting from FAS before FASA. This point is well taken, re insufficient coordination. FAS was leaner, through NGOs, a grant, organizations with close community ties. FASA’s infra may have been more complex, but still, But what does it say about the implementation modalities between the two. Can we draw any lessons here?	We do not have any further lessons to add about how the FAS and FASA implementers operated. Our point was not to compare the modalities of implementation (we do not have detailed enough data to be able to do that), but rather just to identify the coordination failure which had to do with the parameters MCA-CV set out for how the two organizations should work (our qualitative data indicate that no coordination or sequencing was imposed or even suggested).
MCC M&E	103	Table VI.1 I think table headings for which group the mean relates to, difference and p values are missing from the table -and which mean is FASA or non-FASA.	Added missing information.
MCC M&E	147	“Most of the remaining households in each sample say they usually pay their bill in part.” Earlier in this section there is mention of installment plans. Is it possible to tell from the AdS bill how many of the respondents who are poor or the respondents who don’t pay the full bill are paying in installments?	Unfortunately, it is not possible for us to examine this.
MCC M&E	149	“then the tariff schedule is progressive poor and non-poor customer is the same then the tariff is neutral.regressive.hat is goi” this is floating after the first paragraph and should be deleted.	This seems to have been a problem with how the document displayed on a different computer. We have confirmed that this is not a problem in the pdf version.
MCC Gender and Social Inclusion	152	First paragraph in the section D on tariff - Neither the earlier section on household expenditures nor this section gives us a real look into the impact of reducing kiosk prices per liter on households and on whether the tariff structure is progressive or regressive. Prices of kiosk water are part and parcel of the AdS tariff structure and it would be helpful to assess the importance of that water lifeline---this was a major aspect of the tariff reform.	We have noted that AdS also subsidizes kiosk water, but we do not include kiosk water in the analysis of whether AdS’s tariff structure is progressive or regressive since there is no reason that the price of water at kiosks has to be the same as the first block. See the footnote added to the next page with clarification of this point.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	162	Interesting finding –especially in light of other finding about men’s role in collecting water. “In doing this, MORABI increased young men’s understanding of water management best practices. This unique approach to reaching a historically disengaged demographic serves as a successful example that can be used by other local NGOs engaged in IEC efforts.”	No revision necessary.
MCC Gender and Social Inclusion	167	“247 to the sewer network” – should this be water and sewer?	Yes - addressed
MCC M&E	168	“MCA-CV had to support these governments to strengthen their design, and then bid out and procure the contraction component...”	Updated to say "construction component".
MCC Gender and Social Inclusion	169	Better to remind in words what the types mean. It was long ago in the paper they were described...	Addressed
MCC M&E	180	In the conclusion section (particularly section 5 on page 180), I would like to see a discussion of the interim results in the context of the program logic. Similar to my previous comment on a grant facility call out box, I see this as a synthesis of findings that are already in the report. It would be helpful to place the results in the context of the theory of change and to point out where the logic has potentially broken down, based on interim results, since we don't have evidence that we've impacted water consumption, health, etc.	We have reordered the evaluation questions so that the question about evidence on the outcomes in the logic model comes second, immediately after the question about implementation. The other evaluation questions are all more specific probes on certain outcomes or assumptions. In addition to featuring this question earlier in the conclusion, we have incorporated an annotated version of the logic model and a new table cataloging the evaluation's findings with respect to each outcome.
MCC M&E	182	“We will consider doing additional qualitative interviews in the final round of the evaluation to document how the institutional and policy effects of the WASH project continue to evolve. According to our original evaluation design, the process evaluation was only going to be included in the interim round of the evaluation,...” I thought he EDR had planned for 2 rounds of this data collection (pg 31 of the EDR).	Thank you for pointing out this inconsistency with the EDR. Indeed, we always planned to interview key stakeholders as part of the endline round of the evaluation so the only additional qualitative interviews we might want to add would be with the new WASH Revolving Fund if it comes into existence. The confusion stems from the fact that we will not re-interview MCA-CV or MCC staff during the endline, although these interviews were a central component of the process evaluation during the interim round. We have revised this text to be more clear.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC M&E	A2.4	Reformat footnote 66 to superscript.	Addressed
MCC M&E	A2.4	"Despite repeated instructions to the data collection firm to carefully track survey refusals, the response rate delivered by the firm seems implausibly high." What can be done in the next round to ensure this is tracked?	In the next round, we will add a refusal question to the electronic survey so that enumerators are required to record this information for each attempted interview.
MCC M&E	General	Could Mathematica produce a call out box on the FASA grant facility (potentially FAS too, but I'm less sure about that since it was added later), answering the following Qs: (1) Was the facility implemented as planned, i.e. did it follow its stated investment criteria and did it generally run on time/scope (this relates to the section in the report about how FASA projects went to lower income areas, as planned); (2) Did the FASA achieve its higher purpose, i.e. incentivizing consolidation of SAASs and anything else in the policy realm (also already answered in the report); (3) Did the FASA-funded grants achieve their intended purpose? This might be a more complicated question to answer, but I see the report's discussion about how/whether FASA work contributed to the overall beneficiary-level objectives and/or whether it supported the water network's infra priorities (related to the discussion with AdS in Praia, focused on Santiago's NRW vs. the FASA access investments). I'd like a call out box to pull together the relevant findings already in the report to provide a mini case study on the facility as an intervention.	We agree that these important findings were scattered throughout different places in the report. We have added a call-out box as suggested and linked to it in our answer to evaluation question 4 (using the new numbering).
MCA-CV	Dissemination Workshop	There wasn't mention of how the new reforms respected social and gender inclusions ex. communication and sensitization? What is the status of the gender and social inclusion office for ANAS and AdS? It was MCA-CV's innovation to require that bidders on the FASA and FAS projects include a focus on gender in their proposed approaches.	We have added updates on the status of the gender units at ANAS and AdS to chapter IV. require gender focus in the FASA and FAS tender documents. We have clarified this in the text at the beginning of section IV.C about the FASA (the information was already stated at the beginning of section IV.D about the FAS).

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCA-CV	Dissemination Workshop	<p>He lives at end of line and has 24 hrs of water. We will see if when people have 24 hour access if their consumption is closer to 40 L per person/day or 90.</p> <ul style="list-style-type: none"> • (related to figure V.4) The evaluation should look into the 22% of people who have water 24 hours. Well-to-do households that receive 24 hours of water a day are more likely subsidizing households that don't get 24 hour supply.C55 • FAS wasn't part of the initial design of the project, it was only done because there was funds in the project and should be treated differently from FASA. 	<p>This was an excellent suggestion to use the data on continuity of supply to test for differences in consumption and expenditures. We have added subgroups to Figures V.10 (consumption) and V.15 (expenditures).</p> <p>We have updated the beginning of section IV.D to explain that FAS was an addition to the original project design.</p>

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCA-CV	Dissemination Workshop	<p>It will take a long time to see institutional reform effects - these indicators are more difficult to evaluate but there is a difference between before (with 8 municipalities) and after.</p> <ul style="list-style-type: none"> • The evaluation should make a distinction with other projects that might confuse MCA's results. • What are the impacts of the project on people who now have access to the network and don't have water? It's normal to have related gender and social issues • At what point were retrenchment policies useful? 	<p>We agree with all of these points. Hopefully this interim round of the evaluation will be useful to key stakeholders at ANAS, ARE, AdS, and various entities within the GoCV and donor community to shed some light on what worked well over the short-run and to identify some areas of concern where additional attention and possibly even resources could help to bolster the sustainability of the effects of the WASH project. It is possible that the endline round of the evaluation in 2021 will find larger changes driven by project activities (including the reform aspects) which could take longer to materialize. On the other hand, it is also possible that over time the effects could diminish if institutions gradually shift back to their old ways of working from prior to the compact.</p> <p>We have attempted to distinguish the WASH project from related efforts when appropriate but also to call out synergies when other programs (such as LuxDev's current project) complement the WASH project's investments. We will monitor the status of the new desalination facility that JICA is partnering with the GoCV on, since this could be an important confounder for understanding the project's longer-term effects.</p> <p>It would indeed be interesting to explore how an increase in access to the network without increased supply to serve those new connections has affected customers, but this is beyond the scope of our evaluation.</p> <p>We have noted in the report that retrenchment was an important step for the creation of AdS, since reductions in the wage bill and increased staff productivity will be important to the new utility's financial sustainability.</p>

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCC Resident Country Mission	Dissemination Workshop	<p>The time lost in collection for non-connected HH- 2 minutes (this may create some confusion) it's short to fill the container and walk home (the UN computes this with time from leaving and the way back home).</p> <ul style="list-style-type: none"> • How do the results inform future programs in the WASH sector? • How will AdS/ANAS be reflected in the report with them not having a functioning gender office and community engagement office to make connections to their clients? • How and where can AdS present their funding request; there is a void with FASA not existing anymore? 	<p>We have clarified in the text that Figure V.9 shows the average time per person per day, including days when no one in the household collects water and including household members who never collect water. Statistics for the median time per trip are provided in the text, but it is the average time per person per day that factors into the ERR.</p> <p>It remains to be seen how the results will inform future programs in the WASH sector.</p> <p>We have noted that AdS and ANAS did not have functioning gender offices / community engagement officers as of September 2019.</p> <p>Finally, we have updated our description of the status of the WASH Revolving Fund and the implications for AdS now that there is no entity for them to apply to for financing capital expenditures.</p>
NGO	Dissemination Workshop	<p>Water collection times and implications for women to use it for other activities to generate revenues for the family</p> <ul style="list-style-type: none"> • Changes of behaviors and attitude: they carried out work but it needed more implementation time since behavior change doesn't happen immediately (after FAS). There should have been more time to work with HH on attitudes and behaviors, how they use water, reducing waste. Was there perception of improvement in the quality of water? In the communities where they worked people complained about the water quality (perceiving that it's dirty)—they have to open the tap and wait for the water to get cleaner. The evaluation should have looked at that to show the effect in the reforms that were implemented? 	<p>Since baseline data on time use were incomplete in both the 2011 Compact Baseline and the 2015 FAS Baseline surveys, we are not able to look at whether time savings from less water collection translated into additional income generating activities.</p> <p>In section IV.D we had already mentioned that the behavior change elements of the project were jeopardized by the short time frame during which the implementers had to work with beneficiaries.</p> <p>The project did not have specific activities designed to improve the quality of piped water (although it could have happened as an indirect outcome of the institutional reforms, better management at AdS, and/or some of the FAS projects), so changes in water quality were not included among the evaluation questions posed by MCC.</p>
Former GoCV	Dissemination Workshop	<p>They were very ambitious about what they were trying to achieve with the project and aimed for a big impact on the economy. Did the evaluation look at the impact on the other part of the economy? Are more private sector entities ready to invest? What is the link to other sectors (global perspective so others can learn from it).</p>	<p>It was beyond the scope of the evaluation to look at the impact on other parts of the economy.</p>

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
MCA-CV	Dissemination Workshop	The project was not aimed at improving availability of water as it did not include activities to increase water. Increased availability will only come with projects that improve the resource. There will be more water in the network with JICA project. This relates to collecting water and the chafariz—increasing access and not the amount of water available is complicated.	We have made this more explicit in the process evaluation findings in chapter IV, sections B (URA/AdS) and C (FASA).
AdS	Dissemination Workshop	There is a positive impact from the project. Institutional reform had a major impact and coverage of the network increased. There is increase in access of households and we did move forward on improved sanitation. So it is possible to quantify some results. The social tariff will focus on the vulnerable. There is still a need for investment for AdS to address its challenges.	The report (pg. 63) now mentions that financing for investments is a crucial factor for AdS's future success as a company.
AdS	9	Change "Roughly one third of FAS customers have struggled to pay their bill ..." to "At least one third of ..."	We have made this change in the figure and updated the text accordingly.
AdS	11	"the average household on Santiago consumes only 40 liters of water per person per day" is based on billing data and census information	Updated text to say "According to 2018 interim survey and AdS billing data, the average household on Santiago consumes only 40 liters of water per person per day".
AdS	28	Tariffs are being revised. There is already a law approving the creation of a social tariff, but it hasn't been implemented yet (ARME)	We added this information.
AdS	28	See with ARME: data show that the current tariffs (along with NRW current levels) doesn't allow for financial sustainability	We have added this point to section IV.B.2. It was already also addressed in section VIII.A.4.
AdS	53	Suggest removing "(including using jobs at SAAS and subsidized water to curry favor with voters or friends and family)"	We have softened this language to be clear that this was just a possibility that could have factored into municipal politicians' decision-making.
AdS	54	"The nine municipalities on Santiago are AdS's shareholders (with Praia having the largest number of shares)" Same number of shares for every municipalities	Made suggested revision.
AdS	54	"AdS distributes water that it purchases from ELECTRA (which produces it using desalination) and extracts from groundwater sources" Should be: "groundwater sources, springs and other desalination plants"	Made suggested revision.
AdS	55	Figure IV.3, "Nov 2014" should be "Nov 2015"	Addressed
AdS	55	Figure IV.3, "AdS business", more adequate word? (agency, branch, ...)	Addressed
AdS	57	"barely above the price that AdS's customers pay" should be "barely below the price"	Made suggested revision.
AdS	58	"technical losses" should be "technical and commercial losses"	Made suggested revision.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
AdS	58	"The original board was appointed by the government, so members were selected based on their political ties and not their knowledge or qualifications to help advise the water sector. The implication of these appointments was that the board was not able to provide strong guidance and support to AdS"	We received conflicting guidance from reviewers on this point. We have decided to leave the original statement since it reflects what we heard in the qualitative interviews.
AdS	59	Suggestion: being less affirmative (probably, would be etc. "Stakeholders identified two main contributors to non-revenue water in Cabo Verde: (1) technical losses related to aging or poor infrastructure that leaks and (2) illegal connections." Commercial losses include illegal connections, but not only	Revised to say "commercial losses".
AdS	61	"Finally, AdS staff still lack the necessary skills to respond to customer concerns; many focus group participants noted that they service requests often go unanswered and that "AdS is an unresponsive" organization." Also lack of procedures revision/implementation and reorganization of company (staff, logistics, etc) + lack of software efficient use + lack of investments	Updated text to say the following: "Finally, AdS staff still do not have all of the necessary skills, resources, and procedures in place to adequately respond to customer concerns."
AdS	62	"The ability of AdS management and technicians to handle the effort lies at the core of whether AdS will be sustainable." Needs of investments and other critical factors	Added financing for investments as a critical factor.
AdS	62	More than 600 pending connexions + around 12000 pending services to execute. There are "yet to come" complaints that were inherited too, regarding water meters without reading for months before AdS start in Praia, incorrect data migrated into the CRM, etc	Updated to say "AdS inherited over 12,000 service requests"
AdS	62	Needs of investments!	Added financing for investments as a critical factor.
AdS	62	The following problematics could also be mentioned: - Inadequate tariff structure (notably Electra's ater selling price) - Water disponibility - Infrastructures improvements - Investments capacity (infrastructures, material, equipments, transportation, ...)	We have added these issues to section IV.B.
AdS	82	As FASA projects were more oriented toward network extensions, the opposite seems more correct: more network to supply water to, with the same production/distribution capacity = less time with water availability	Clarified that the project logic envisioned improvements in the water supply infrastructure, but that most FASA projects were network extensions, which resulted in more connections but no changed in the amount of water supplied.

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AdS	87	Howcome that the major part of households still have a public fountain within 250m if the fountain they used has been closed? We don't have that level of fountain density in Santiago island....	This is based on information provided by 2018 interim survey respondents. The survey included the following question: "How far away is the nearest chaffariz to your house (in meters)?"
AdS	125	"probably because of air in the pipes and old-meters" OR "maybe/potentially because of air in the pipes"	Made suggested revision.
AdS	132	The current tariff structure is not adequate (doesn't allow AdS to recover its costs).	Updated text to say: "AdS's operational data indicate that the current water tariff structure does not allow the utility to recover its costs."
AdS	132	The tariffs don't enable AdS to recover its cost: the billing is lower than the operational costs. Collection ratio is unlinked to cost recovery. The main factor is the NRW vs Tariff structure	We have added a footnote in section VIII.A.3 to point out that the tariff structure is of course a major determinant of a utility's financial health, but we have left our analysis of the effect of the tariff in section VIII.A.4 since it is outside of AdS's control (unlike the other factors mentioned in VIII.A.3: NRW, the bill collection rate, and staff productivity). The fact that the tariff is lower than the operational costs for most customers was already stated in section VIII.A.4. Although it is possible that the way the accounting is done, the collection ratio does not affect cost recovery (if the figures used to calculate the cost recovery ratio assume that all outstanding bills will be paid), it certainly affects the utility's bottom line.
AdS	133	AdS is not necessarily the supplier of non-piped households (community wells, springs, private distributors, ...)	Clarified this in the text.
AdS	140	or if the reading is not validated during the billing process	Revised text.
AdS	142	Not only > seasonal consumption, frauds, reading process disfunctionment, etc	Added additional reasons.
AdS	142	25 to 35 days	Made suggested revision.
AdS	145	Only? or does it take into consideration answers to the survey?	Made suggested revision.
AdS	150	Those numbers don't match with what we are aware of: <ul style="list-style-type: none"> • Medium age in Praia (around 50% of meters) is 11 years • 5 years seems low, 10 years for a calibre 15 (1/2"). Looking at it in another way, a meter can be less accurate after 1 month of use... 	Updated text based on numbers provided by AdS.
AdS	150	Change "AdS is not equipped" to "AdS is not fully equipped"	Made suggested revision.
AdS	150	change "after water returns to the system" to either "supplied" or "distributed"	Made suggested revision.

Reviewer name/ Institution	Page number (in the first draft of the report)	Comment(s)	Mathematica response
AdS	151	"Hence, the findings on meter accuracy are not generalizable to the population of piped network customers in Praia." Or to the water meter fleet in Praia	Made suggested revision.
AdS	7	Plan should be called "Water and Sanitation National Strategic Plan" instead of "Strategic National Master Plan"	Corrected name.
AdS	62, 180	AdS scandal, use less aggressive language, such as "AdS leaders were accused of ..."	We have removed references to a scandal but also clarified that the former leaders of AdS were not only accused but also convicted on corruption charges.
AdS	9	Remove two month grace period from FAS bill payment calculation	Removed the two month grace period
AdS	Executive summary	Add definiton of household poverty to executive summary	Added a footnote with the definition for household poverty.
AdS	14	In terms of comparison also want explain that AdS started its operations in Praia in July 2017 meaning that the comparison between 2017 and 2018 has to be done with this in mind. As can see in the data, the weight of Praia in revenue is more than 50 percent. Should put something in text regarding this. Put some sort of asterick and explain that 2017 was a year of transition so that would not expect it to be comparable and that Praia started in July 2017.	We have made this clearer in the report.
ANAS, ARM, LuxDev		Note: None of these organizations registered any comments on the report, but the evaluation team met with them during the dissemination trip to seek their input and they participated in the dissemination workshop.	

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