WASH
Poverty Diagnostic | SERIES

The Connections between Poverty and Water Supply, Sanitation, and Hygiene (WASH) in Panama

A Diagnostic

WORLD BANK GROUP

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Acknowledgments

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Abbreviations

ASEP	Public Service Authority (*Autoridad de los Servicios Públicos*)
CCAS	WAS Indigenous Provincial Commissons (*Comisiones Comarcales de Agua y Saneamiento*)
CDS	Sustainable Development Committee (*Comité de Desarrollo Sostenible*)
CEDLAS	Center for Distributive, Labor and Social Studies
CIAPAS	Inter-Institutional Committee for Water and Sanitary Sewerage (*Comite Interinstitucional para Agua y Sanamiento*)
CONADES	National Council for Sustainable Development (*Consejo Nacional de Desarrollo Sostenible*)
DAPOS	Department for Potable Water and Sanitation (*Departamento de Agua Potable y Saneamiento*)
DDS	District Health Directorates
DASI	Directorare for Indigenous Affairs (*Dirección de Asuntos Indígenas*)
DISAPAS	Directorate for the Potable Water and Sanitary Sewerage Subsector (*Dirección del Subsector de Agua Potable y Alcantarillado Sanitario*)
EPM	Multipurpose Survey (*Encuesta de Propósitos Múltiples*)
EML	Labor Market Survey (*Encuesta del Mercado Laboral*)
GP	Global Practice
HOI	Human Opportunity Index
IDAAN	Institute for National Aqueducts and Sewerage Systems (*Instituto de Acueductos y Alcantarillados Nacionales*)
INEC	National Statistical Institute
JAAR	Administrative Board for Rural Aqueduct (*Junta Administradora de Acueducto Rural*)
JIAR	Integrated Board for Rural Aqueduct (*Junta Integrada de Acueducto Rural*)
JMP	Joint Monitoring Programme
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoE	Ministry of Education
MoEF	Ministry of Economy and Finance
MoG	Ministry of the Interior
MoH	Ministry of Health
MoP	Ministry of the Presidency
MoSD	Ministry of Social Development
OD	open-air defecation
O&M	operation and maintenance
PPP	public-private partnership

PRODEC	Community Development Program (*Programa de Desarrollo Comunitario*)
PROINLO	Local Investment Program (*Programa de Inversión Local*)
PRONADEL	National Program for Local Development (*Programa Nacional de Desarrollo Local*)
PSM	propensity score matching
RdO	*Red de Oportunidades*
SEDLAC	Socioeconomic Database for Latin America and the Caribbean
SENADE	National Secretariat for Decentralization (*Secretaría Nacional de Descentralización*)
SIASAR	Rural Water and Sanitation Information System (*Sistema de Información de Agua y Saneamiento Rural*)
SDG	Sustainable Development Goal
TERCE	Third Regional Comparative and Explanatory Study
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UN	United Nations
WASH	water supply, sanitation, and hygiene
WB	World Bank

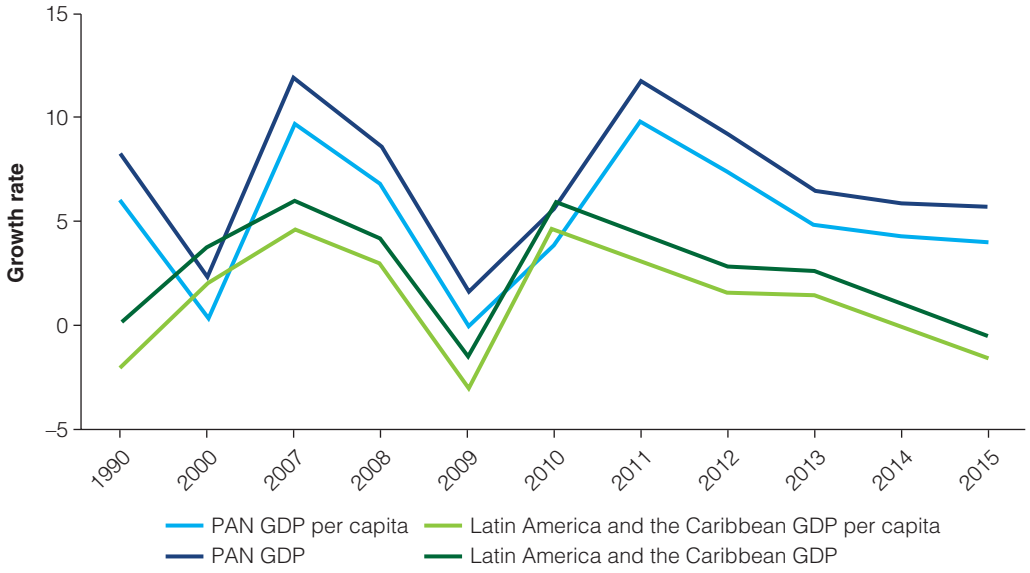
Executive Summary

The present report summarizes the evidence and findings from a series of studies and new data collection around water supply, sanitation, and hygiene (WASH) on the one hand, and poverty on the other hand. This WASH Poverty Diagnostic was undertaken to increase our understanding of the linkages between monetary poverty and WASH services. The work focuses on answering four key questions: Who are the poor? Does access to WASH vary by poverty level? What are the synergies between WASH and other sectors and how does this affect welfare? And, finally, what are the constraints to service and potential solutions to providing universal access to safely managed water and sanitation? While the work done in the context of this diagnostic covered both urban and rural areas, the main focus has been on the rural and, particularly, the indigenous areas, as these are the ones facing the greatest gaps in services. A more in-depth exploration of urban issues has been left for a future date.

Context

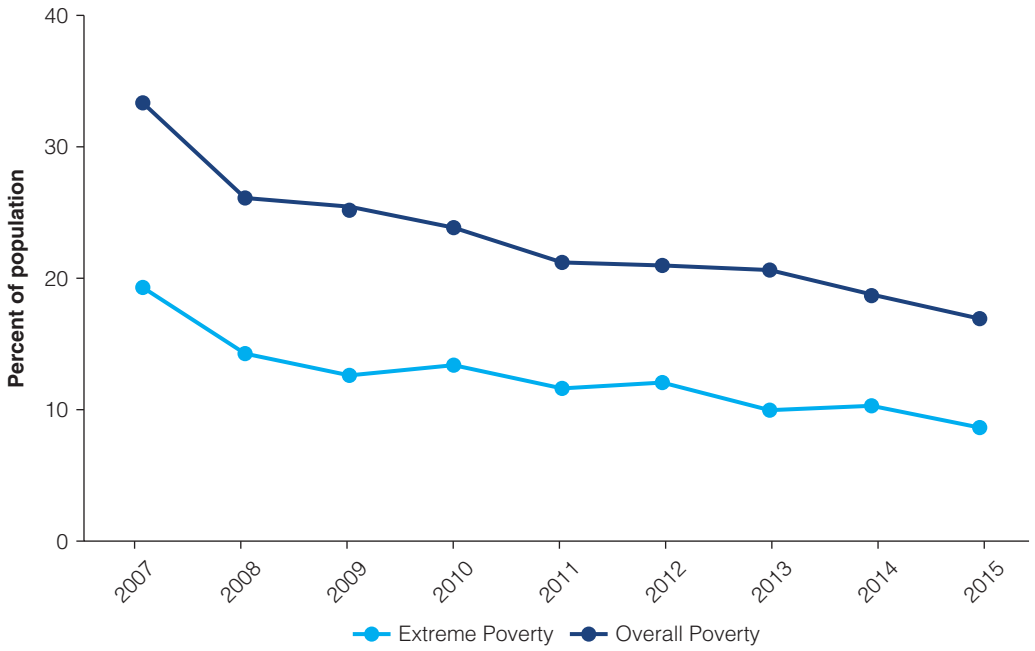
For more than a decade Panama has stood out in the Latin American and Caribbean region in terms of economic growth. Average growth between 2007 and 2015 was 7.5 percent compared to the Latin American and Caribbean region's average of only 2.7 percent (figure ES.1). While growth was substantially lower during the years of the global financial crisis, falling to 1.6 percent, Panama was one of the few countries able to maintain positive economic growth, and the country also recovered more quickly from the dip in 2008–09 than the region as a whole. Per capita growth was also substantial and above the average performance for the Latin American and Caribbean region. In recent years, growth has declined, only reaching 4.8 percent in 2016, but this is still well above the regional average.

Figure ES.1: Growth Rates, GDP and per Capita, in Panama and in Latin America and the Caribbean



Source: World Bank 2015a.
Note: GDP = gross domestic product; PAN = Panama.

Figure ES.2: Poverty Trends, 2008–15



Source: Authors' calculations using EPM 2008–10 and EML 2010–15.
Note: Poverty is measured at US$4 per capita per day in 2005 public-private partnership.

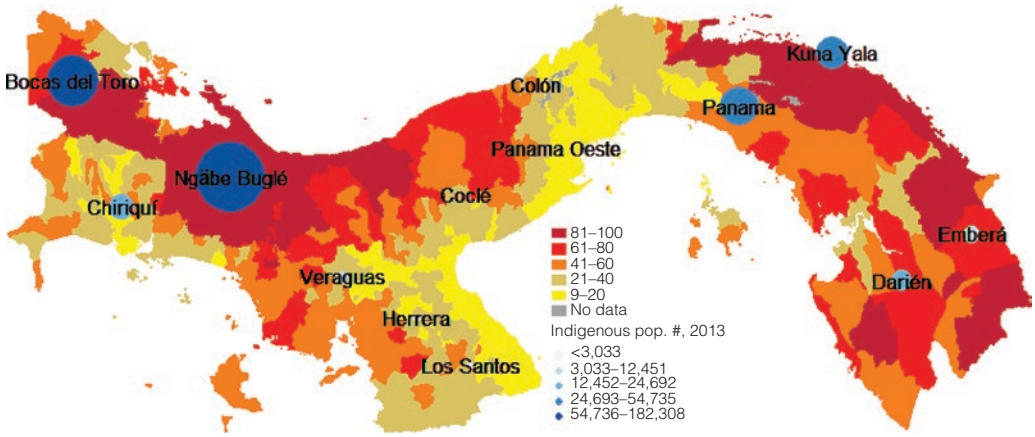
Economic growth, along with social spending, has led to substantial and continuing declines in poverty in Panama. Between 2007 and 2012, poverty fell from 33.5 percent to 20.9 percent based on an international poverty line of US$4 per person per day (figure ES.2). In the past four years, despite the slowing rate of economic growth, overall poverty has continued to fall, down by one-fifth to 16.9 percent in 2015, and extreme poverty (measured at US$2.50 per person per day) down by one-fourth, to 8.6 percent. Panama has also experienced consistent shared prosperity: the average income growth of the poorest 40 percent of the population (ranked by income) has been over the 2008 to 2015 period.

Despite these positive trends there is a lack of convergence of poverty rates geographically. There remain significant variations in monetary and non-monetary welfare within the country. In 2015, monetary poverty rates ranged from a low of 6 percent in the Province of Panama to a high of 89 percent in the Ngäbe Buglé *comarca* (map ES.1). Poverty and poorer development outcomes have become further concentrated in rural regions, and within the indigenous comarcas, or semi-autonomous provinces.[1]

Diagnostics

The uneven trends and levels of poverty are reflected in unequal access to basic services critical for human health and development such as water supply, sanitation, and hygiene (WASH). Rural and indigenous communities are the most deprived. Of particular note is the gap between indigenous comarcas and the rest of the country. A study of 12 Latin American countries[2] showed that the overall levels of access to adequate sanitation in Panama are lower than in all but Nicaragua; however, the gap between the access of the indigenous populations and nonindigenous populations was the greatest in Panama.[3] For piped water, again, the gap is largest in Panama although the absolute level of access for indigenous groups in Panama is higher than in Colombia, Nicaragua, and Peru. The Human Opportunity Index (HOI), an

Map ES.1: Poverty Map (Percent), 2015



Source: Poverty rates from Ortiz 2017; population from the Census of 2010.
Note: The poverty rates here are estimates using small area estimation and the official poverty definition of the Ministry of Economics and Finance in Panama.

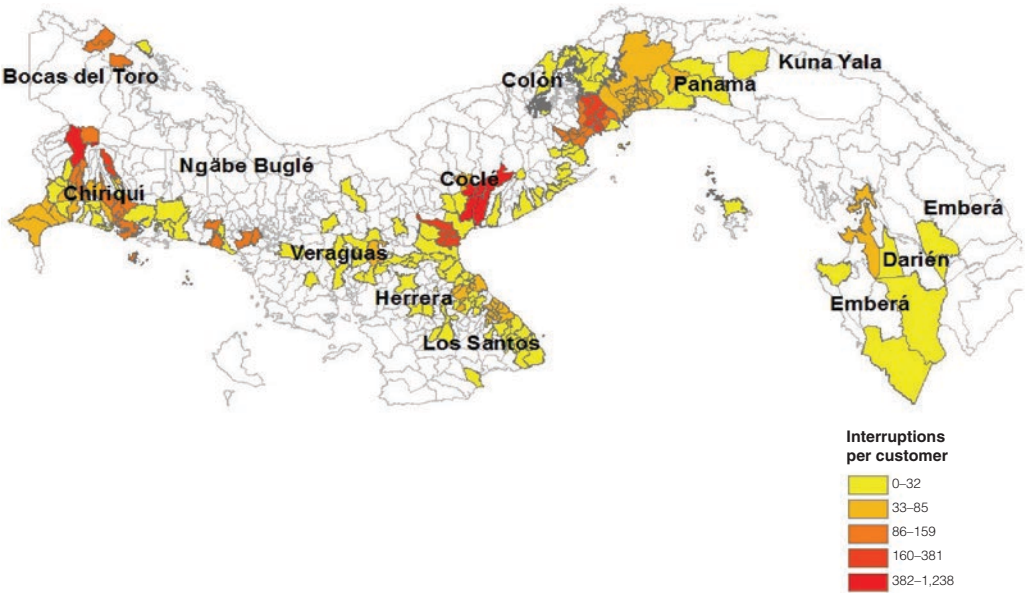
equity-adjusted measure of service coverage, shows that access to services among children is not randomly distributed but, instead, depends on characteristics such as the income level of their household, rural location, and whether their household head is indigenous, among other things. Access to a sewer system exhibits the largest gap between overall coverage and the equity-adjusted coverage. Circumstances drive a significant proportion of access to sanitation. Sanitation coverage is an alarmingly low 22 percent and the HOI is only 11.5 percent.

Water quality issues undermine the urban population's access to adequate water resources. Tests of residual chlorine and water turbidity show that the quality of water is lower in wealthier areas of the country, including the province of Panama (map ES.2). The most common reported problems are leaking pipes, service interruptions, and sewer pipe breakages, and these are more concentrated in the Panama region. However, service interruptions in water provision tend to be correlated with poverty: it is in poorer areas where interruptions seem to be more frequent. In Colón, as many as 5 of its 12 *corregimientos* (subdivisions of a district, which is a subdivision of a province) have service levels of less than six hours of continuous service for at least 30 percent of their population per day.

The situation with regard to sewerage is of greater concern (map ES.3). More than half of the corregimientos with a community numbering more than 1,500 inhabitants are not served by National Aqueducts and Sewer Systems (Instituto de Acueductos y Alcantarillados Nacionale [IDAAN]) even though they should be. In the densely populated urban corregimientos in and around Panama City where sewerage service is provided, the system remains incomplete. This represents serious health and environmental risks. If all of the quality issues could be taken into account (the Sustainable Development Goal [SDG] definition), coverage rates for both water and sanitation would be lower than under the previous Millennium Development Goal (MDG) definitions of adequacy.

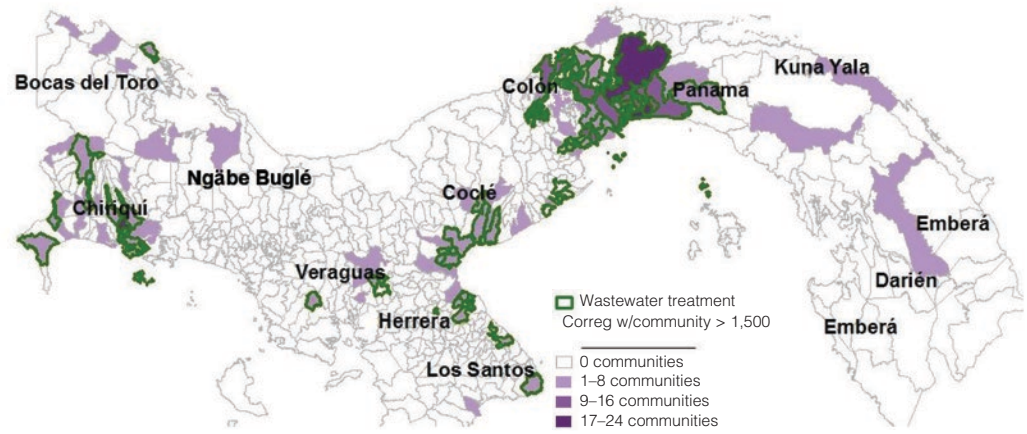
Water and sanitation quality is substantially worse in the rural areas, and more specifically in indigenous comarcas. More than 60 percent of the indigenous communities studied do not have access to water and sanitation systems compared with only 19 percent of nonindigenous communities. Rankings on three domains linked to adequate water and sanitation—characteristics of the community in terms of coverage, the water system (infrastructure), and the service providers—show sharp differences between indigenous and nonindigenous communities. The community environment is ranked lower in indigenous communities, in large part simply due

Map ES.2: Interruptions to Service, 2015



Source: Authors' calculations based on IDAAN data.
Note: The areas worst hit by interruptions per customer are in red (Public Service Authorities 2015).

Map ES.3: IDAAN Sewerage Network Coverage versus Its Mandate



Source: Authors' calculations based on IDAAN data.
Note: Corregimientos where IDAAN has a sewerage network are bordered in green. Corregimientos with communities with over 1,500 inhabitants are in purple.

to the complete absence of sanitation services. With regard to water, where services exist, the physical infrastructure is considered adequate in many communities but the level of service is poor in terms of quality of water provided and the service provider mechanisms are often seen as in need of improvement. Only 50 percent of costs are covered by tariffs and as many as 46 percent of the providers do not have a specialized/professional operator.

The lack of access to adequate water and sanitation undermines the impact of Panama's extensive social spending. Access to water and sanitation are fundamental human rights

and affect many dimensions of welfare, from health to productivity in the labor force. Additionally, having adequate water and sanitation has been shown to be associated with an increase in the positive impacts of social programs. Panama's *t* conditional cash transfer program *Red de Oportunidades* (RdO) and the *Beca Universal* scholarship program are designed to increase human capital by increasing the incentives of households to use health and education services. Both programs entail a cash transfer and are linked to substantial poverty reduction and to improved human capital. Using robust statistical methods, the interaction between the spending, water and sanitation aspects, and outcomes was explored. The results show that children living in households with better access to sanitation services that are also beneficiaries of the RdO show better health outcomes than those without such access, while schools with better water and sanitary facilities have lower dropout rates, particularly among girls. In short, positive interactions between social spending and adequate water and sanitation services lead to a greater impact of spending on the outcomes of interest.

The observed access patterns reflect the way in which water and sanitation services are provided. In urban areas, services are provided by IDAAN. Founded in 1961, IDAAN is responsible for providing water services to all communities with populations greater than 1,500. The bulk of IDAAN's services benefit a few heavily populated urban areas. Today, IDAAN covers only 38 percent of the nation's 600-plus corregimientos, and 68 percent of the population. While the agency, overall, does a reasonable job of fulfilling its mandate, there are still errors of exclusion in its coverage. IDAAN fails to provide service in the districts of Boquete in Chiriqui and Changuinola and Chiriqui Grande in Bocas del Toro. Additionally, there are other communities with over 1,500 inhabitants that, despite being classified as rural, should receive IDAAN coverage and do not, such as those in Guna Yala and Bocas del Toro. Largely due to its mandate, IDAAN does not reach the poorest populations of the country.

The institutional setup for water and sanitation provision in rural indigenous areas is complex and involves different sectors and levels of government. In 2014, the National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible [CONADES]) was granted responsibility for the national coordination and implementation of the Plan for Basic Health 100-0 of the Ministry of the Presidency. This mandate overlaps with some key functions assigned to the Directorate for the Potable Water and Sanitary Sewer Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario [DISAPAS]) in the Ministry of Health which is responsible for sector policy coordination and long-term planning according to the Law No. 2 1997. The decentralization process has also led to the emergence of the National Secretariat for Decentralization (Secretaría Nacional de Descentralización [SENADE]) as an institution with a mandate to implement water and sanitation projects as well. DISAPAS has seen its authority and financial capacity decrease partly as a result of these changes. However, and while all three agencies are in charge of planning and infrastructure development, it is only DISAPAS, with the assistance of regional and local bodies such as Potable Water and Sanitation Department (Departamento de Agua Potable y Saneamiento [DAPOS]), that is in charge of providing training and support to, and monitoring of, the activities of the 2,836 rural community organizations (Water Association Committees or JAAR) that are responsible for the operation and maintenance of systems.

Recommendations

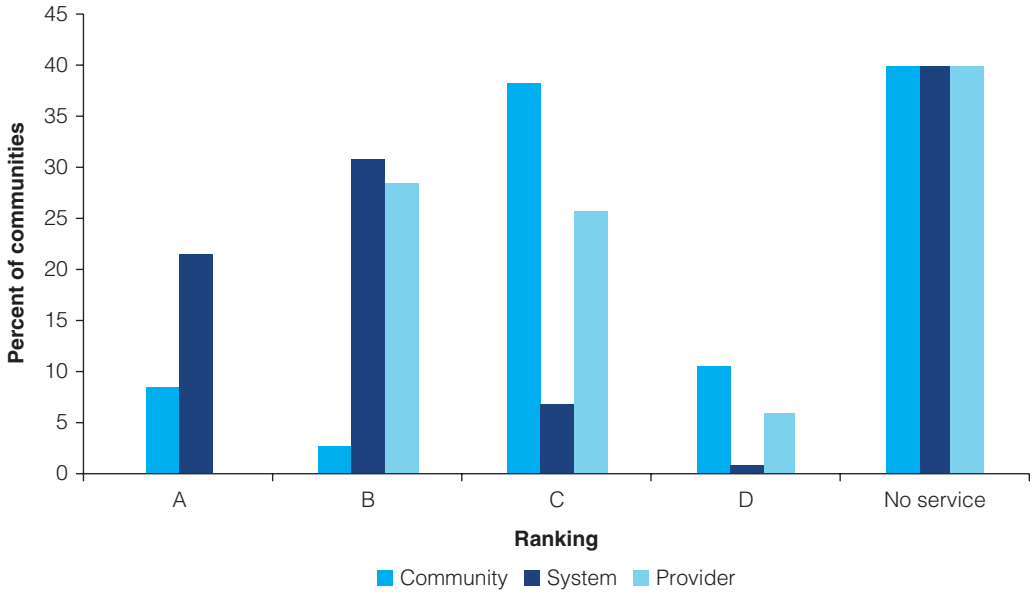
To ensure the success of the government's major new investments in the water sector will require a clarification of institutional roles. The overlapping mandates of various government agencies lead to coordination and accountability issues which affect the provision of services in rural areas and comarcas. With regard to the latter, not only is there a challenge in coordination among government agencies but also between these and the indigenous responsible institutions of water provision. Legally the government is required to ensure that the indigenous populations are engaged in the development of new systems—under the agreements on free and informed consent. However, the government does not always reach this goal. Consultations with

indigenous communities are not common in the design and development of projects by CONADES, for example. In addition, local representatives in government bodies and traditional authorities have limited power with regard to the final decisions adopted. This leads, in part, to a lack of adaptation of the technical standards required by the Plan 100-0 to the characteristics of the comarcas, which can make the costs of construction, operation, and maintenance unsustainably high and reduce usage by indigenous population putting sustainability at risk. In addition, the lack of mechanisms for communication and accountability between DISAPAS and the local authorities, water management boards, such as the JAAR or Integrated Board for Rural Aqueduct (JIAR), and communities leads to deficiencies in the training and awareness activities required in project development and the fulfillment of quality oversight. JAARs also most often lack the financial resources to operate and maintain the infrastructures delivered, largely due to the low tariffs that prevail in comarcas in connection with a lack of demand for services. The inadequacies in water systems in indigenous territories, where these exist, are particularly high in terms of water quality (part of the community indicator in figure ES.3).

The analyses in this report provide insights into the need for institutional reforms if the country is to meet the SDGs in water and sanitation. The government has acknowledged the need to improve access to, and the quality of, WASH in urban areas through the reform of IDAAN. The Plan 100-0 is expected to fill the gaps in rural areas: no further major changes have been planned in this sector. However, the new and overlapping mandates of various institutions have led to confusion in the sector. A streamlining of the sector could enhance effectiveness in both providing coverage and maintaining quality.

Within the comarcas, prioritization of WASH investments might usefully follow new criteria. The findings of the report, based on new data collection, suggest that rural indigenous communities, supported by the government, should prioritize investments around: (i) sanitation services, (ii) strengthening the operators of water and sanitation services, and (iii) water systems, with a

Figure ES.3: Assessment of Water Systems in Indigenous Territories and Comarcas, 2016



Source: SIASAR data 2017, weighted.
Note: Reflects data on a sample for 138 communities in indigenous territories and comarcas. Ranking system: A = very good; B = adequate; C = less than adequate; D = failure.

special emphasis on the distribution components rather than the production of water. To this end, some necessary reforms include strengthening the effective capacity of DISAPAS, as well as that of coordination mechanisms, such as the Inter-Institutional Committee for Water and Sanitary Sewerage or the Department for Potable Water and Sanitation and of operators (JAARs/JIARs). There is a need to provide indigenous populations with a real voice in planning, infrastructure development, and service provision to facilitate service delivery that would be better adjusted to their specific circumstances and needs.

Notes

1. The ancestral lands and territories of indigenous peoples in Panama have different levels of recognition and autonomy, ranging from collectively owned communities, with no official recognition, to indigenous collective territories, such as the Naso territory, that comprises several communities, to formal comarcas (there are five) where the government has recognized significant levels of autonomy in traditional forms of government, land, and natural resource rights and ways of living. There are seven indigenous peoples or ethnic groups in Panama who, because of their geographical dispersion and mixed land regimes, are represented by 10 Congresses and 2 Councils. These 12 governing structures comprise the traditional representative authorities of the indigenous peoples of Panama.
2. See World Bank 2015, which compares Panama to Brazil, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, Nicaragua, Peru, and Venezuela.
3. Note that throughout this document the definition of adequate sanitation and water are based on MDG definitions and not the stricter definitions used in the SDGs, as these latter are not available in their entirety in Panama. The SDG definitions of safely managed water and sanitation include important issues that affect water quality, availability, and location; sanitation treatment; and hygiene. Clearly, if the new, stricter definitions of adequacy existed, the picture they would paint would be more negative than that contained in this report.

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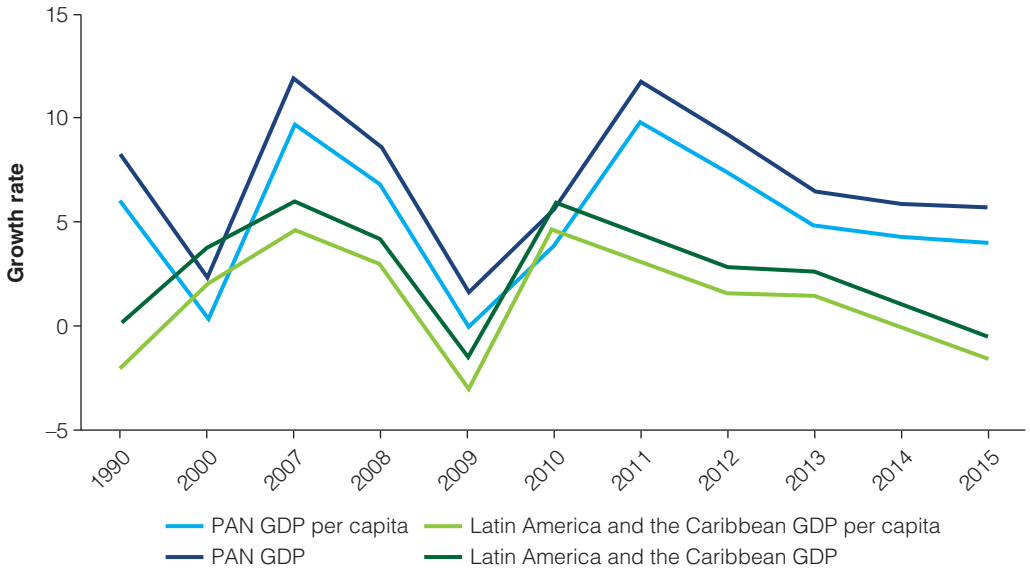
Chapter 1
Context and Motivation

Panama has been one of the best performers in Latin America and the Caribbean over the last decade with regard to economic growth and overall poverty reduction. However, important gaps remain. On the one hand, substantial geographical discrepancies exist in poverty reduction; on the other, and in connection with this trend, progress has also been uneven in closing gaps in access to quality basic services such as water and sanitation. To address the linkages between poverty and water and sanitation services, both new data collection and analytic work have been carried out in collaboration with various actors in the country. This report summarizes the main results of these different studies, identifies the principal challenges, and proposes recommendations on how these challenges might be addressed.

Welfare Progress and Gaps

For more than a decade Panama has stood out in the Latin American and Caribbean region in terms of economic growth. Average growth between 2007 and 2015 was 7.5 percent compared to the Latin American and the Caribbean region's average of only 2.7 percent (figure 1.1). While growth was substantially lower during the years of the global financial crisis, falling to 1.6 percent, Panama was one of the few countries able to maintain positive economic growth and the country also recovered more quickly from the dip in 2008–09 than did Latin America and the Caribbean as a whole. Per capita growth was also substantial and above the average performance for Latin America and the Caribbean. In recent years growth has declined, only reaching 4.8 percent in 2016, but this is still well above the regional average.

Figure 1.1: Growth Rates, GDP and per Capita, in Panama and in Latin America and the Caribbean, 1990–2015



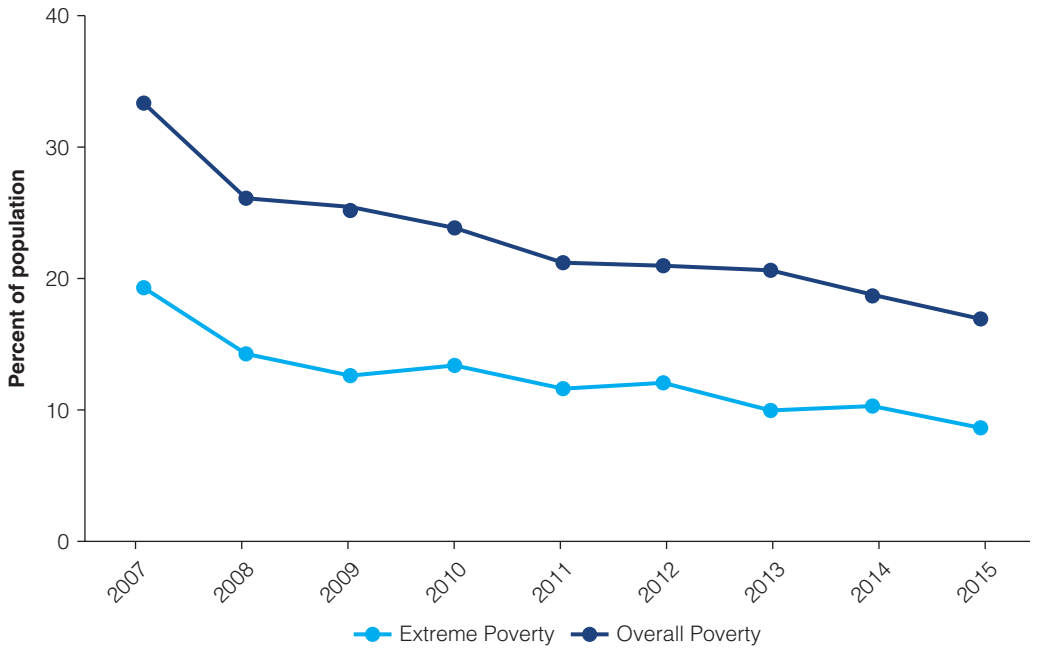
Source: World Bank 2015a.
Note: GDP = gross domestic product; PAN = Panama.

Economic growth, along with social spending, has led to substantial and continuing declines in poverty in Panama. Between 2008 and 2015, poverty fell from 26.2 percent to 16.9 percent (Koehler-Geib et al. 2015) based on an international poverty line of US$4 per person per day.[1] In the past four years, despite the slowing rate of economic growth, overall poverty has continued to fall, down by a fifth to 16.9 percent in 2015 (figure 1.2) and extreme poverty (measured at US$2.50 per person per day) down by a fourth, to 8.6 percent.[2] Average income growth of the bottom 40 percent of the population (ranked by income), has consistently been positive, showing shared prosperity in Panama over the last decade.[3]

The overall success story of Panama hides, however, significant variation in monetary and non-monetary welfare within the country. In 2015, monetary poverty rates ranged from a low of 6 percent in the province of Panama to a high of 89 percent in the Ngäbe Buglé *comarca* (figure 1.3). Of continuing concern is the lack of convergence of poverty in geographic terms (figure 1.4). The two provinces that saw the greatest percentage change in poverty were among those with the lowest levels of poverty in 2011: Los Santos and Hererra. On the other hand, the two *comarcas* with the highest poverty rates in 2011, Ngäbe Buglé and Guna Yala, showed almost no change in poverty in percentage terms. The net result is a widening of the poverty gaps across the country and a further concentration of the poor. The only exception appears to be the comarca of Emberá, which showed substantial poverty reduction.

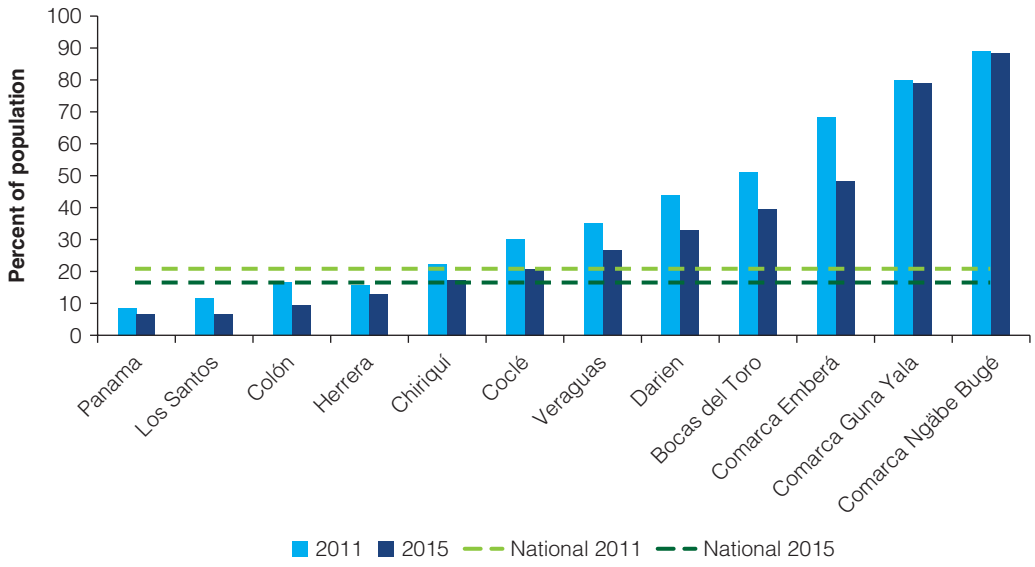
In terms of non-monetary indicators of welfare Panama has seen improvement but not across the board. The country met the Millennium Development Goal (MDG) on child mortality, life expectancy has risen, and preschool education has been substantially increased (Koehler-Geib et al. 2015). Average years of schooling are up as are the enrollment rates of both males and females in all levels. However, the country falters in indicators related to maternal mortality, with rates actually rising between 2000 and 2011, only seeing any substantial decline since 2014 (World Bank 2015a). And the gaps in education across ethnic groups are marked:

Figure 1.2: Poverty Trends, 2008–15



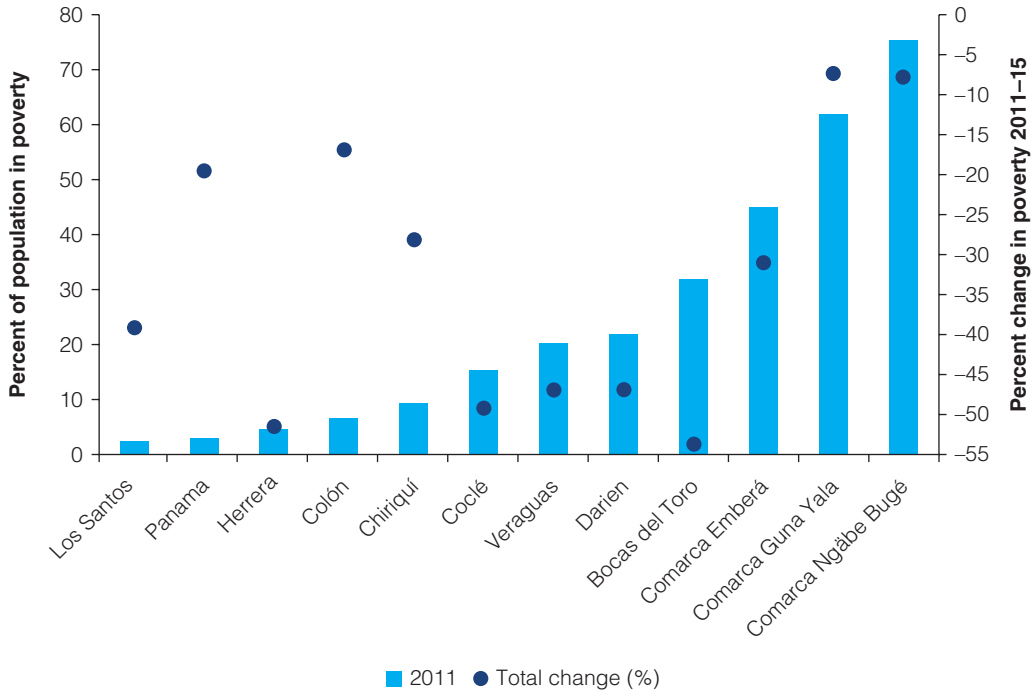
Source: Authors' calculations using EPM 2008–10 and EML 2011–15.
Note: Poverty is measured at US$4 per capita per day in 2005 public-private partnership.

Figure 1.3: Poverty at Provincial Level, 2011–15



Source: Authors' calculations based on EML 2011 and 2015.
Note: Poverty is measured at US$4 per capita per day in 2005 public-private partnership.

Figure 1.4: Changes in Overall Poverty, 2011–15



Source: Authors' calculations based on EML 2011 and 2015.
Note: Poverty is measured at US$4 per capita per day in 2005 public-private partnership.

average years of schooling of household heads in the three main comarcas was 3.5 compared to 9.5 years among nonindigenous and non–Afro-Panameños.

Also at odds with the image of a vibrant, middle-income country are the sharp geographic discrepancies in access to basic services critical for human health and development, such as water supply, sanitation, and hygiene (WASH). Of particular note is the gap between indigenous comarcas and the rest of the country. A study of 12 Latin American countries showed that the overall levels of access to adequate sanitation in Panama are lower than all but Nicaragua, but the indigenous–nonindigenous gap was the largest in Panama (World Bank 2015). For water, the gap is again the largest, although the absolute level of coverage is above that in three other countries. Limited access to clean water and safe sanitation constrains the time and capacity of people for productive activities, raises the risk of infection from water-borne illness, contributes to stunting caused by diarrhea-related malnutrition, reduces life expectancy and lowers school attendance, especially for girls (Bosch et al. 2000).

Panama is, on the one hand, a success story, with strong economic growth and poverty reduction; however, gaps remain. And growth has been shared: the incomes of the poorest have risen along with the incomes of the better off. Yet, there remain deep pockets of poverty in the country and the state has been unable to provide equal access to the services that are critical for development, most notably water and sanitation. Further poverty reduction, especially in the poorest areas, will require both continued economic growth along with targeted interventions to ensure universal access to good quality basic services.

Given the importance of understanding the inter-linkages between poverty and WASH services, a WASH Poverty Diagnostic was undertaken for Panama. This study is part of a global effort to systematize the analysis of WASH services and poverty (see box 1.1). By looking at who the poor are, how their access to WASH services differs from that of the non-poor, how WASH is linked to outcomes in other sectors, and what the key barriers are to access, the WASH Poverty Diagnostic aims to improve the understanding of how water, sanitation and poverty are interlinked and identify both the barriers to expanding access to water and sanitation services and potential points of entry to move toward universal access. The range of activities undertaken as part of the diagnostic were designed to inform WASH policy to ensure that it is aligned with poverty reduction goals, to improve country poverty data collection systems to allow for monitoring of progress on core WASH indicators, to improve targeting of programs and projects, and to catalyze multisector responses to improve WASH service delivery to the poor population.

Box 1.1: WASH Poverty Diagnostic

Access to safely managed WASH services is becoming ever more central in the international development agenda. The focus of the UN MDGs and the World Bank WASH agendas over the last decades has been on halving the percentage of people without improved water and sanitation services. Acknowledging the relevance that equality in access has for poverty reduction, the post-2015 Sustainable Development Goals (SDGs) for 2030 and the Bank's new twin goals of eradicating extreme poverty and improving the welfare of the bottom 40 percent of the population have shifted the spotlight towards stricter and more refined dimensions of access, such as the quality of services, and towards equity concerns.

box continues next page

Box 1.1: Continued

The Global Country WASH Poverty Diagnostic is an initiative designed to inform policy and investments in the water and sanitation sectors to ensure these are aligned both with the World Bank's twin goals and the newly adopted SDGs. This flagship initiative is supporting the piloting of WASH Poverty Diagnostics, such as the present report, in 18 countries. The initiative seeks to identify key challenges and opportunities to improve access, quality, and sustainability of WASH services to the 40 percent of the population with the lowest incomes. The WASH Poverty Diagnostics focus on a set of four core questions aimed at characterizing the extent to which the needs of the poor and the bottom 40 percent are met in relation to WASH services, the service delivery constraints that exist, and how these vary by geography, ethnicity, and water supply and sanitation subsectors, as well as looking to solutions.

The core questions the WASH Poverty Diagnostics are designed to answer are:

Q1: Who are the poor and where do they live?
Q2: What are the levels and quality of WASH services for the poor as compared with the non-poor?
Q3: What are the linkages and synergies between WASH and other sectors?
Q4: What are the WASH service constraints and potential solutions to improving services to the poor?

The WASH Poverty Diagnostic is of particular relevance in the present Panamanian context. There is a renewed focus on water and sanitation by the current administration in Panama with the government committed to fulfilling the SDG goals by 2030. At the same time the investment plan for 2016 places the emphasis on improving various facets of the Panamanian WASH system, including[4]:

- Increasing improved water and sanitation coverage with the Basic Health Plan 100–0 (*Plan Sanidad Básica* 100% water and zero latrines), which aims to provide the whole population with a 24-hour water supply and replace latrines with toilets in more than 300,000 households;
- Strengthening the role of the regulator (Public Service Authority, Autoridad de los Servicios Público [ASEP]) to effectively coordinate the subsector;
- Creating a network of water quality testing laboratories known as Red Lab to better monitor and control the quality of water for human consumption and to better protect biodiversity and the environment;
- Rehabilitating and improving existing aqueducts.

The WASH Poverty Diagnostic in Panama

This report summarizes evidence from a series of studies (see box 1.2) conducted jointly by the Water and Poverty Global Practices throughout 2016. Both analytic work and new data collection were carried out under the WASH Poverty Diagnostic. The results of the different

analytical activities provide an integrated body of valuable, up-to-date and geographically disaggregated information on the trends and current situation regarding access to and quality of WASH service provision in the country. It is hoped that work done under the Diagnostic will contribute to deepening and expanding the existing knowledge on the sector in Panama and its connections with poverty, and thus to improving the design of government policies and programs in these areas.

The analyses were carried out in collaboration with a broad range of actors in the Panamanian government and the World Bank. Among government institutions that the team worked with are the Institute for National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionales [IDAAN]), ASEP, the Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario [DISAPAS]), Ministry of Health (MoH), the Ministry Interior (MoG), and the Ministry of Economics and Finance (MoEF), among others. Within the World Bank the team benefited from extensive collaboration with the country teams in the WASH and poverty sectors and in education, health, social protection, and social development.

Box 1.2: Main Outputs of the Panama WASH Poverty Diagnostic[5]

Q1: Who are the poor and where do they live?

- Income-based poverty maps 2015 using survey-to-census imputation using the Labor Market Survey 2015 (Encuesta del Mercado Laboral [EML]) and Census 2010 data, in collaboration with the Ministry of Economy and Finance (MoEF), (Ortiz 2017).
- Inequality profiling by quintiles, geographical area, and ethnicity including descriptive statistics by incidence and inequality, and correlations by regression. National level analysis.

Q2: What are the levels and quality of WASH services for the poor as compared with the non-poor?

- Inequality in access to WASH Services among children in Panama. This analysis calculates the Human Opportunity Index (HOI) in access to WASH services for households with children under the age of 16, drawing from the Multiple Indicator Cluster Survey (MICS) 2013 database.
- WASH access analysis, using a cross tabulation of descriptive statistics by subgroup and SDG categorizations.
- "Mapping Quality of Urban Water and Sanitation Services in Panama" (Perochena and Laca 2016). This report presents the conclusions of a quantitative and qualitative analysis of quality of and access to water and sanitation services in urban areas served by the national water utility Institute for National Aqueducts and Sewerage Systems (IDAAN). It uses data from the Census 2010, IDAAN, ASEP, household surveys and MICS 2013, and the main counterparts were IDAAN, ASEP, and Directorate for the Potable Water and Sanitary Sewerage Subsector (DISAPAS).

box continues next page

Box 1.2: Continued

- "Comparative Analysis of Indigenous Communities and Others in Rural Areas of Panama" (Ayling 2016). This note presents the results of the analysis of the quality of WASH service provision in rural areas of the country, comparing the situation in 150 selected indigenous communities with that of nonindigenous communities. The study was based on SIASAR 2017 data, and the main counterparts were DISAPAS and Ministry of Interior (MoG).

Q3: What are the linkages and synergies between WASH and other sectors?

- "Water Infrastructure, Lifestyle Behaviors, and Social Programs: Assessing the Synergies in Indigenous Panama" (Arteaga 2016). Using data from a sample of Indigenous children in Panama collected for an impact evaluation of the conditional cash transfer program (Red de Oportunidades [RdO]) the study applies multivariate regression techniques to examine the relationship between participation in the RdO and having adequate water and sanitation infrastructure. The main counterparts were the Ministry of Social Development, Ministry of Health, and MoG.
- Access to Water and Sanitation in Panamanian Schools and Student Outcomes (Almeida and Oosterbeek 2016). This report uses the United Nations Educational, Scientific, and Cultural Organization (UNESCO) and Third Regional Comparative and Explanatory Study (TERCE) dataset to analyze the empirical relationship between the availability of water and sanitation services, and test scores in mathematics and reading on the one hand and, on the other hand, absenteeism of students in the third and sixth grade in Panama. The main counterpart was the Ministry of Education (MoE).

Q4: What are the WASH service constraints and potential solutions to improving services to the poor?

- "Potable Water and Sanitation in Indigenous Territories of Panama: Failures and Opportunities for an Improved Service" (Mujica and Azcárate 2017). This study attempts to identify the main barriers to access to adequate WASH services among indigenous populations in Panama based on a review of the legislation and the most recent literature as well as on interviews with key actors in this sector. The main counterparts were DISAPAS, IDAAN, and MoG.

Structure of the Report

Chapter 2 summarizes the result of a new poverty mapping exercise, which allows trends across small geographical areas of the country to be identified. This analysis indicates that, despite the significant overall poverty declines registered over the last 15 years, the poor have become further concentrated in rural indigenous comarcas. Chapter 3 presents evidence of the role played by social programs for poverty reduction in Panama, as well as the results of two studies conducted to assess the linkages between WASH and other development outcomes and sectors in the country, including health, education, and social protection. Chapter 4 offers new and up-to-date data and analyses that provide further evidence that the rural–urban and indigenous–nonindigenous divide in access to WASH quality services is of concern in the country, and will require specific responses. In addition,

new evidence of quality issues in provision in urban areas of the country by the national facility IDAAN is presented. Chapter 5 focuses on the factors that explain the identified trends with a special focus on the increasingly confusing institutional architecture for WASH that results in duplications and a lack of clear direction in the sector, the weakening or absence of adequate coordination mechanisms and the lack of voice of indigenous peoples in policy making and accountability. Finally, chapter 6 summarizes the main conclusions and offers some related policy recommendations.

Notes

1. The regional poverty line of US$4 per person per day, in 2005 PPP terms is used throughout this report. The international threshold of US$1.9 is less relevant in Panama, as only 3.8 percent of the population were below this threshold in 2014.
2. Due to variations in methodology, these figures do not match exactly the official poverty rates of Panama. The differences are, however, small, and both the trends using the international methodology and the trends using the national methodology tell the same, very positive story of poverty reduction.
3. LAC Equity Lab tabulations of SEDLAC (CEDLAS and the World Bank) and Word Development Indicators (WDI), http://www.worldbank.org/lacequitylab.
4. Propuesta de Presupuesto Programa de Inversión Nacional – MEF-SINIP 2016, p1-3.
5. The full set of background papers will be made available online. Maps and descriptive statistics are available upon request.

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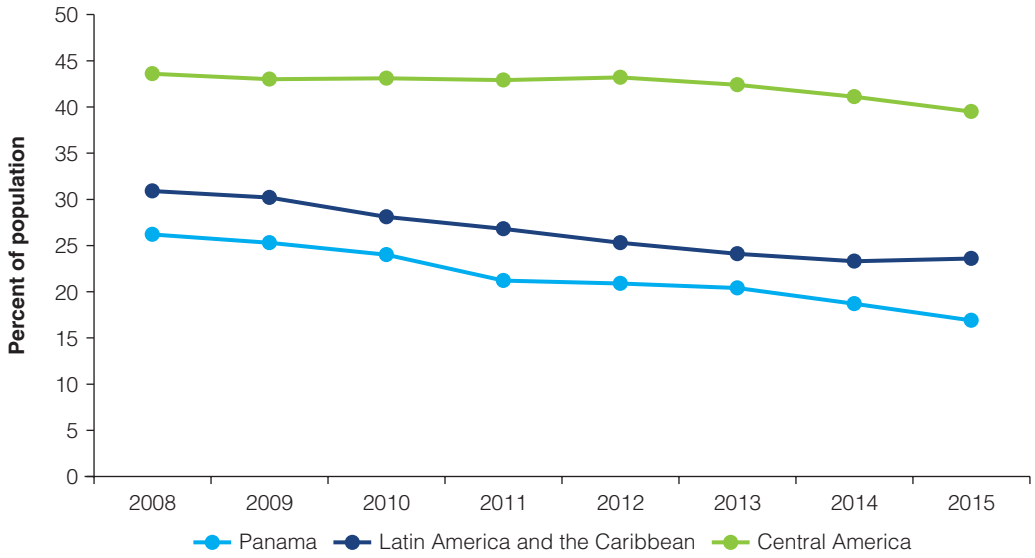
Chapter 2
Poverty, Water, and Sanitation: Levels and Trends

The new poverty map constructed using small area estimation techniques shows the heterogeneity of poverty levels and poverty reduction in the country. In rural areas, and in particular in the indigenous *comarcas*, poverty remains high. Despite some convergence—the rate of change is greater in many of the poorer areas—the gaps are large. A lack of access to water and particularly sanitation is associated with higher poverty rates. In particular, despite overall high coverage rates of water services (90 percent), access to piped water is lower in rural areas and among indigenous populations. The situation with regard to sanitation is more severe: only 32.7 percent of the population lived in a dwelling connected to a sewage system in 2015, and this share was only 4 percent among rural inhabitants. The Human Opportunity Index (HOI) also shows that income distribution, living in a rural area, and being of indigenous ethnicity have a significant impact on access to water and sanitation among children.

Changes in Poverty

Panama has seen a substantial decline in poverty in the past years, change that is greater than in Central America as a whole or in Latin America and the Caribbean. Panama's poverty rate is below that of Central America and Latin America and the Caribbean, and has also decreased more rapidly (figure 2.1). However, while extreme poverty is below that of Latin America and

Figure 2.1: Trends in Poverty Rates in Panama and in Latin America and the Caribbean, 2008–15

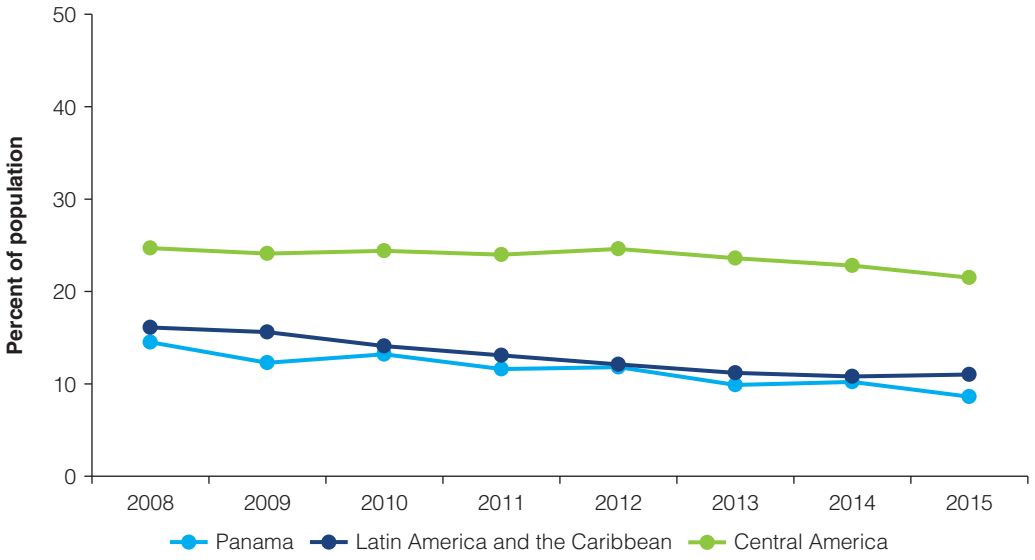


Source: LAC Equity Lab tabulations of SEDLAC (CEDLAS and the World Bank 2017).
Note: Since the numbers presented here are based on SEDLAC, a regional data harmonization effort that increases cross-country comparability, they may differ from official statistics reported by governments and national statistical offices.

the Caribbean, the data show that it has been falling more slowly (figure 2.1). Moreover, and in connection with these trends, inequality remains high and is also declining at a slow pace (figure 2.2).

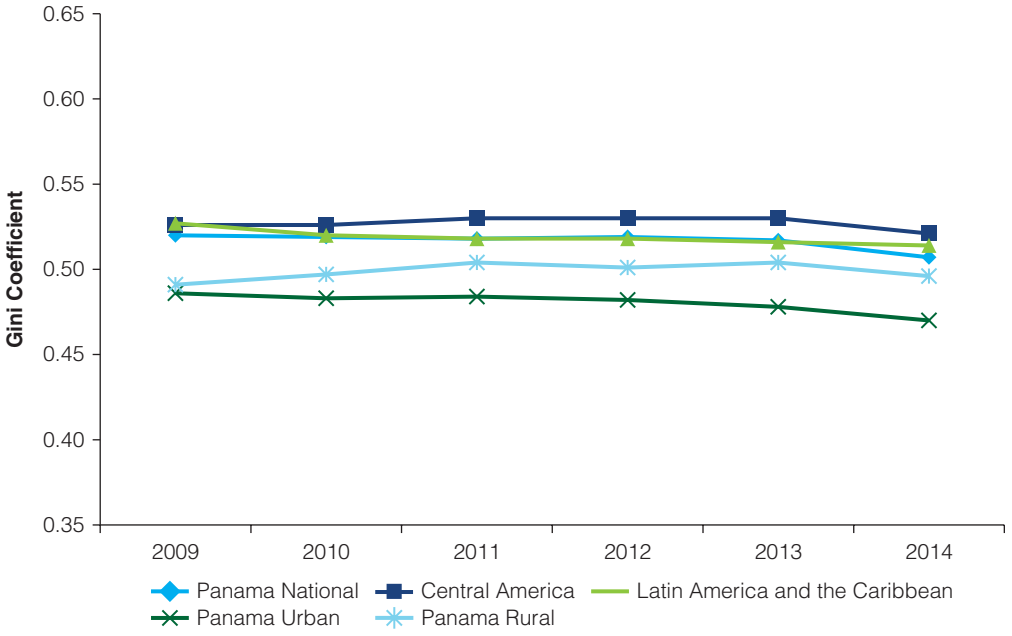
Differences in how certain groups have benefited from economic growth over the past several years in Panama are also reflected in gaps in social outcomes. As an example, in 2013, life

Figure 2.2: Trends in Extreme Poverty in Panama and in Latin America and the Caribbean, 2008–15



Source: LAC Equity Lab tabulations of SEDLAC (CEDLAS and the World Bank 2017).
Note: Since the numbers presented here are based on SEDLAC, a regional data harmonization effort that increases cross-country comparability, they may differ from official statistics reported by governments and national statistical offices.

Figure 2.3: Inequality Trends (Gini Coefficient) in Panama and in Latin American and the Caribbean, 2009–14



Source: LAC Equity Lab tabulations of SEDLAC (CEDLAS and the World Bank).

Box 2.1: Data Sources in Panama

The research for the WASH Poverty Diagnostic relied on a series of data sources.

The Multipurpose Survey (Encuesta de Propósitos Múltiples [EPM]) and the Labor Market Survey (Encuesta del Mercado Laboral [EML]). Both of these household surveys measure the labor force characteristics, poverty, and income. They are both carried out each year (in March and in August, respectively). There is some recent evidence of incomparability between the income poverty series of pre- and post-2008. For that reason, most of the analysis of poverty starts in 2008. Unlike most other countries in Latin America, Panama has not traditionally collected water and sanitation information in these surveys. It was only in 2015 that variables on housing characteristics related to water and sanitation were included. Prior to that available data on water and sanitation came only from the National Population Census and a one-off Multiple Indicator Cluster Survey in 2013. Thus the analysis on trends in water and sanitation in this report is a bit problematic. Going forward, the monitoring will be much more straightforward given that these variables will continue to be collected.

National Population and Housing Census of Panama, 2000 and 2010. The census is designed and implemented by the National Statistical Institute (INEC) and provides basic data on housing, infrastructure, and household demographics. The WASH Poverty Diagnostic relied mainly on the 2010 Census to address the core question numbers two and three. As Panama has not collected data on WASH variables in the annual household surveys the census analysis is thus core to the assessment of quality of water service delivery and to look at the relationship between water and education outcomes. In addition, the census is the only data source that allows disaggregation by ethnicity (all indigenous people, not just those living in the three largest comarcas) and race (Afro-Americans are not identified in the household surveys).

Multiple Indicator Cluster *Survey (MICS),* 2013. This is a one-off cross-sectional household survey, focusing on health and sanitation issues. The MICS is an international household survey network that collects standardized WASH measures in over 100 countries every 3–5 years. The MICS has the most complete data on water and sanitation. Unfortunately, it cannot be clearly linked to poverty as it contains no income variables: only an estimate of wealth based on an asset index could be constructed.

Data at the water utility level. Data from Institute for National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionale [IDAAN]) and Public Service Authority (Autoridad de los Servicios Público [ASEP] about the quality of water and sanitation service provision were obtained and analyzed.

Rural information system of WASH services. A database of all water and sanitation services in the country is under construction at present in Panama as part of the regional Rural Water and Sanitation Information System (Sistema de Información de Agua y Saneamiento Rural [SIASAR]) project in Central America.

box continues next page

Box 2.1: Continued

The WASH Poverty Diagnostic helped design and fund data collection in indigenous territories and comarcas. The database contains variables on the quality of service analysis in rural areas.

Third Regional Comparative and Explanatory Study (TERCE) data. International database containing information on student attainment and the variables that affect this.

Impact Evaluation of the conditional cash transfer program, Red de Oportunidades (RdO) database: Data collected on welfare of children in indigenous comarcas in Panama.

expectancy in the comarcas was between 7 and 9 years lower than for the rest of the country. In addition, the burden of communicable illnesses such as diarrhea among children falls disproportionately on indigenous peoples, and is estimated to cause 130 premature deaths and 1 million cases of diarrhea in children under five each year. There are also large differences across quintiles and subregions in enrollment and graduation rates for lower and upper secondary levels. As an example, in 2013, only 46.2 percent of the poorest quintiles had access to upper secondary education as opposed to 88.6 percent among the richest quintile (World Bank 2015).

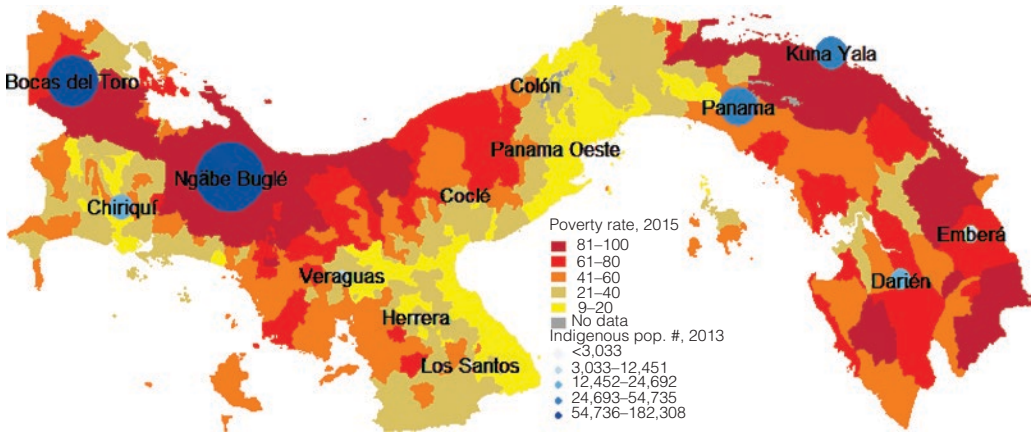
The Distribution of Poverty at the Subprovince Level

The existing data show the heterogeneity of poverty across provinces but provide no information on differences within them. As noted in chapter 1, the differing rates of poverty reduction have led to the poor becoming ever more concentrated in specific geographic locations and among certain ethnic groups. The household survey data are, however, only representative at the level of the province. Given the variation in other community characteristics within provinces and comarcas—population size, isolation, urbanization, among other factors—it is expected that there is substantial heterogeneity within the provinces. This was certainly the case in 2003.[1]

To provide a more accurate picture of poverty reduction trends a new poverty map of Panama was constructed. This map was developed using small area estimation techniques, constructing regional models to predict poverty with the household survey data from the 2015 Multipurpose Survey (Encuesta de Propósitos Múltiples [EPM]).[2] The coefficients from these models were then applied to the data of the most recent Population and Housing Census (2010) to estimate poverty rates at lower levels of disaggregation, in this case at both the district and *corregimiento* levels. The work was carried out in collaboration with the Ministry of Economy and Finance (MoEF). To look at changes in poverty overt time the new map is linked to the previous map developed by the MoEF and the World Bank based on 2011 data.

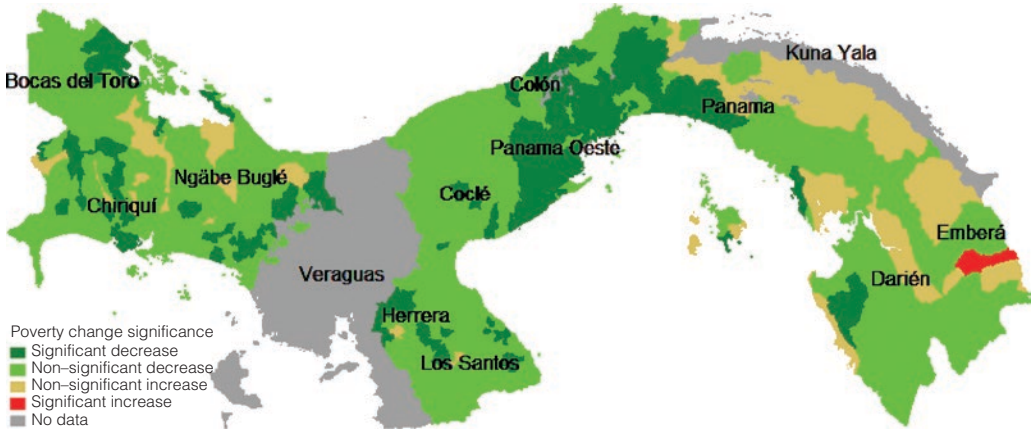
Despite the remarkable economic and social progress registered in Panama in recent years, pockets of poverty exist in the country. In particular, the substantial improvement in overall indicators has been accompanied by a concentration of poverty and vulnerability in certain regions, especially in rural areas and among indigenous peoples. The regions that show the highest poverty rates are some of the rural comarcas where the majority of the indigenous peoples live (map 2.1).[3] The Ngäbe Buglé comarca has poverty rates of 87–89 percent, Emberá of 68–75 percent, and Guna Yala of 78–85 percent.

Map 2.1: Poverty Map, 2015



Source: Author's calculations based on Ortiz 2017.

Map 2.2: Map of Poverty Changes, 2011–15



Source: Author's calculations based on Ortiz 2017.
Note: Green indicates a decrease in poverty with dark green indicating that the change was statistically significant. The color pink indicates a poverty increase but the change is only significant in the red areas. For two provinces/comarcas, Veraguas and Guna Yala, there are some concerns about the 2011 estimates: for this reason, no effort is made to compare the changes over time in these areas.

The map shows the unevenness of poverty reduction across the country between 2011 and 2015. As the household survey data is cross-sectional, the movements of households into or out of poverty cannot be identified. However, one advantage of poverty maps is that a panel can be constructed at both the district and corregimiento level using the 2011 and 2015 poverty maps. As was found in the provincial-level analysis (see chapter 1) the most significant decreases in poverty are found in the wealthier areas, such as Panama and Colón, while in most of the rural, indigenous areas there have been statistically insignificant movements in the poverty rates movements in the poverty rates (map 2.2). Poverty fell faster over the period in the regions where poverty rates were lowest in 2011, leading to a further concentration of poverty.

Inequities in Access to WASH Services

Overall, access to piped water is high in Panama although the opposite is true for sanitation access. In 2015, just over 90 percent of the population has access to piped water. The main

public provider, IDAAN) provides 69.8 percent of all water in the country. Community systems are the other main source of water, providing 21 percent of all water used by households (table 2.1). In contrast to the fairly high levels of access to water, only 32.7 percent of the population lived in a dwelling connected to a sewage system, with another third relying on latrines or no facility at all. (See box 2.2 for a more detailed discussion of measures of access.)

Similar to the trends in poverty, access to adequate water and sanitation has improved over time but remains pockets of deprivation. Although access to sewage connections is still relatively low, fairly large gains have been made between 2000 and 2010, with increases of 10 to 15 percentage points in many regions (figure 2.4). The comarcas and Darien have the lowest level of piped water and practically nonexistent access to improved sanitation. There is, however, some evidence of convergence as the change in access was greater in the poorer areas of the country (figure 2.4 and figure 2.5).

More recent trends show a continuation of the convergence as greater changes are taking place in the comarcas. To look at more recent trends a comparison of WASH indicators from the 2015 EPM and the same 2010 Population and Housing Census was made. This is not ideal as the comparisons can be affected by the use of different data sources: some caution should be taken when using these results.[4] The more recent (2010–15) trends show that access to piped water remains lower in rural areas and among indigenous populations than in urban or nonindigenous populations (figure 2.6 and figure 2.7). However, while change in access nationally has been quite smal—IDAAN coverage increased only 3 percentage points—the convergence seen in the previous decade continues with more changes occurring in the comarcas.

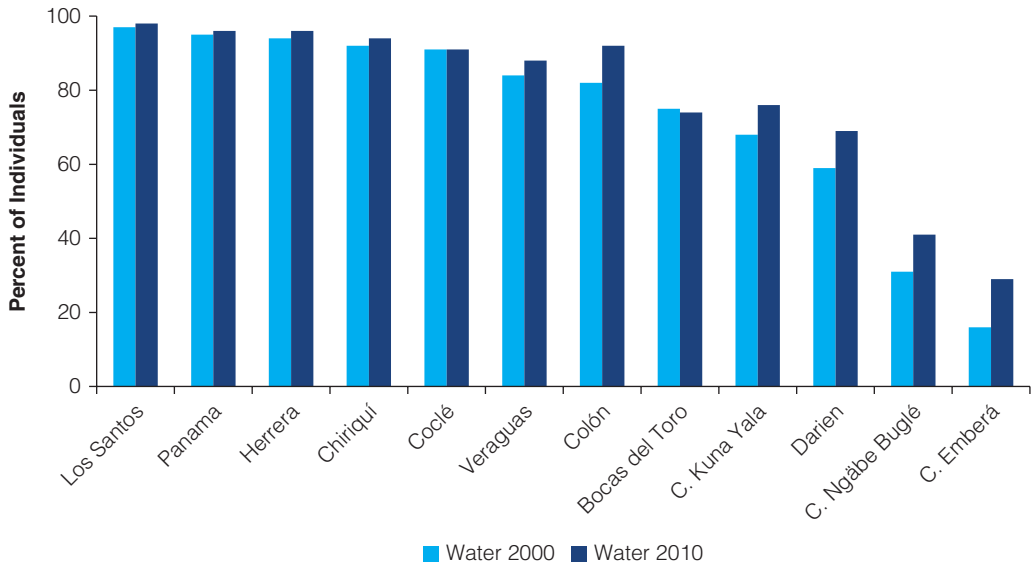
The recent changes in access to improved sanitation have not been as positive as those related to water, with important gaps remaining. In 2015, only one-third of the population lived in a dwelling with a connection to a sewer system and as many as 7 percent had no access to any sanitation service (figure 2.8). Moreover, the urban-rural divide remains wide with only

Table 2.1: Main Sources of Piped Water and Sanitation, 2015

Source of water	Percent	Source of sanitation	Percent
Piped water, public* (IDAAN)	69.8	Sewage system	32.7
Piped water, community*	20.9	Septic tank	36.3
Surface well	1.2	Latrine	25.4
River, stream, lake	0.1	Nothing	5.6
Sanitary well	2		
Unprotected well	2.9		
Piped water, private*	1		
Water truck	0.7		
Rain water*	0.2		
Bottled water*	1		
Other	0.3		
**Improved*	*92.9*		

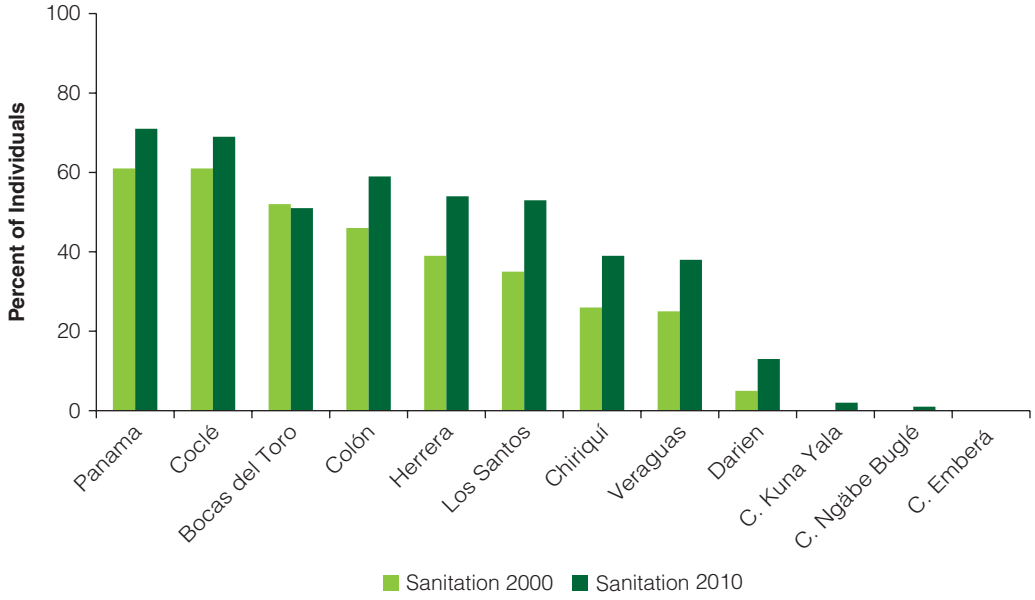
Source: Authors' calculations based on the 2015 EPM.
Note: Bottled water was considered improved, and sanitary well ambiguous.
* = improved; IDAAN = Institute for National Aqueducts and Sewerage Systems.

Figure 2.4: Change in Access to Piped Water in the Dwelling, 2000–10



Source: Koehler-Geib et al. 2015.
Note: Based on data from Panama 2000s and 2010 Population and Housing Censuses.

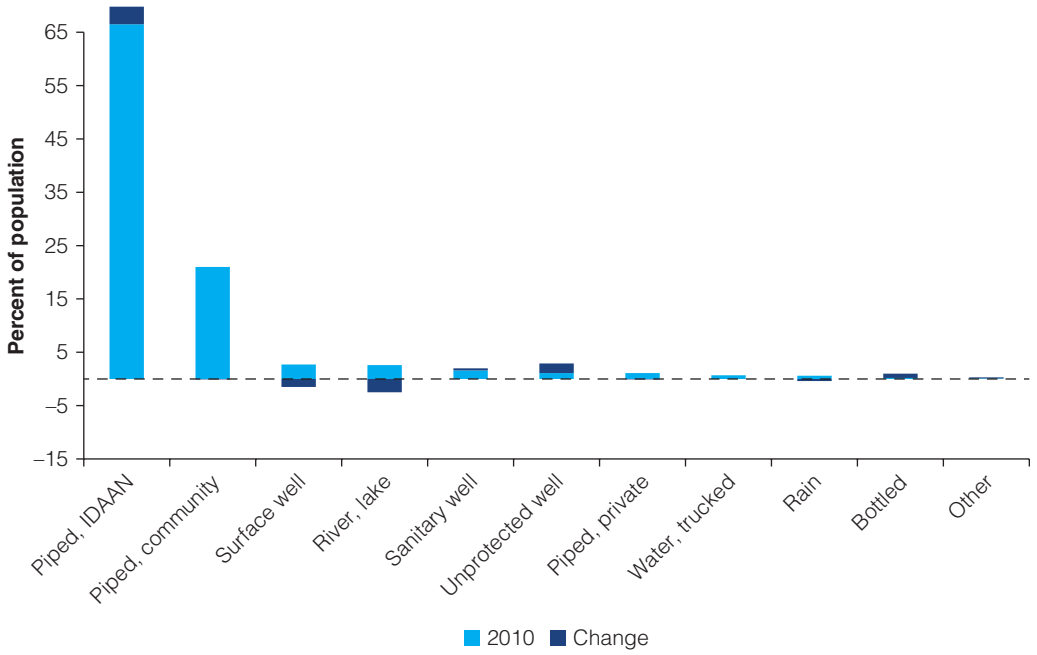
Figure 2.5: Change in Access to Sewage Connection in the Dwelling, 2000–10



Source: Koehler-Geib et al. 2015.
Note: Based on data from Panama 2000s and 2010 Population and Housing Censuses.

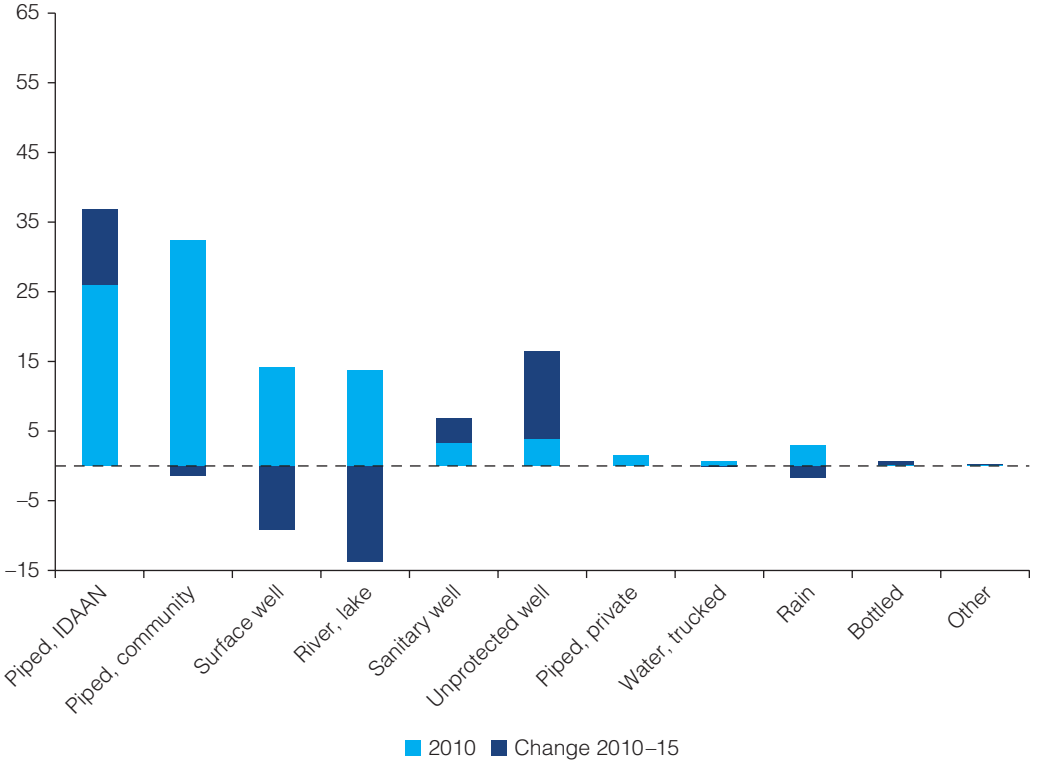
4 percent of rural inhabitants being connected to a sewer system (figure 2.9 and figure 2.10). There has been, however, an increase in the use of septic tanks, another improved source of sanitation, in the last 5 years (figure 2.11). Indigenous groups have the least access to improved sanitation and as many as 81 percent of this population has no access to any sanitation system. The changes in the comarcas have been significant in the past five years.

Figure 2.6: Water Sources Nationally, 2010 and 2015



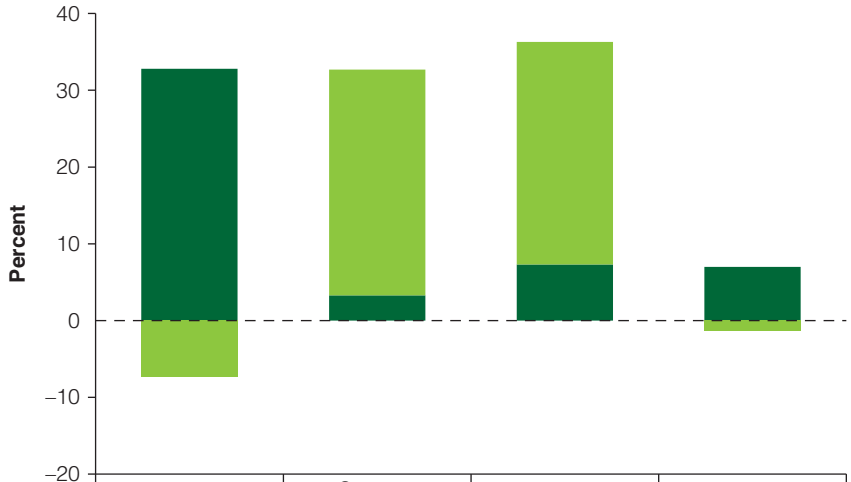
Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EML.

Figure 2.7: Water Sources in the Comarcas, 2010 and 2015



Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EML.
Notes: Refers to the three largest comarcas only: Ngäbe Buglé, Emberá Wounan, and Guna Yala.

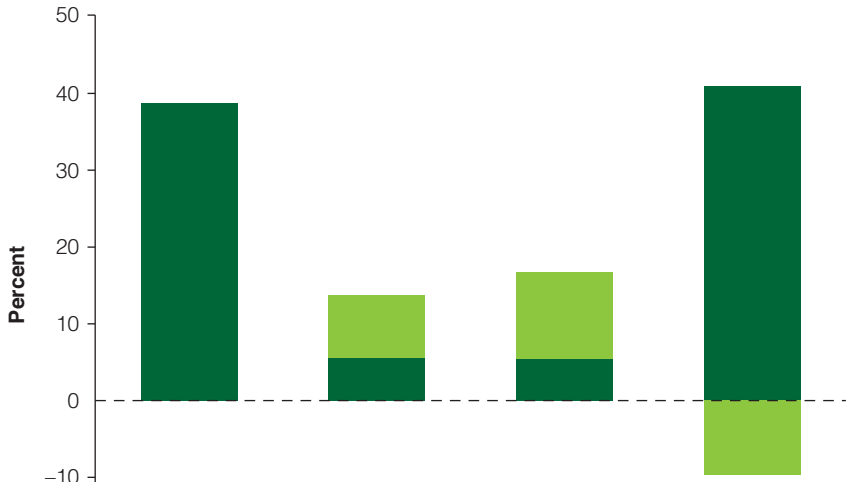
Figure 2.8: National Sanitation Coverage, 2010–15



	Latrine	Sewage system	Septic tank	Nothing
Change 2010–15	–7.4	29.4	29	–1.4
2010	32.8	3.3	7.3	7

Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EPM.

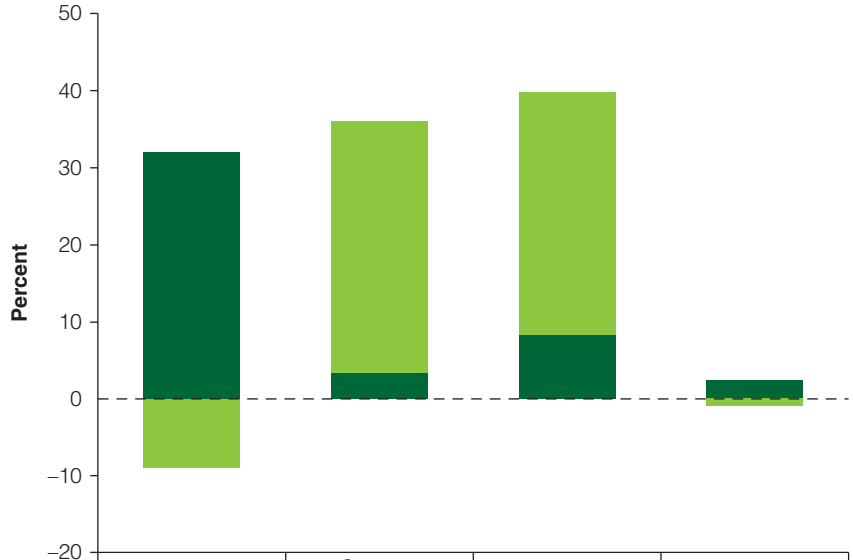
Figure 2.9: Sanitation Coverage in Comarcas, 2010–15



	Latrine	Sewage system	Spetic tank	Nothing
Change 2010–15	0.1	8.1	11.2	–9.7
2010	38.6	5.5	5.5	40.8

Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EPM.

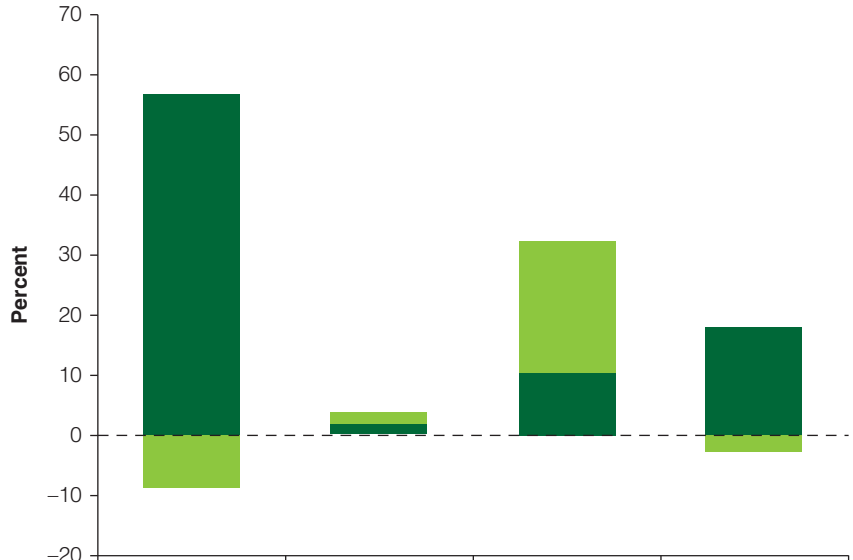
Figure 2.10: Urban Sanitation Coverage, 2010–15



	Latrine	Sewage system	Septic tank	Nothing
Change 2010–15	–8.9	32.4	31.5	–1
2010	32	3.6	8.2	2.3

Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EPM.

Figure 2.11: Rural Coverage in Comarcas, 2010–15



	Latrine	Sewage system	Septic tank	Nothing
Change 2010–15	–8.6	1.8	22	–2.6
2010	56.8	2.1	10.4	18.1

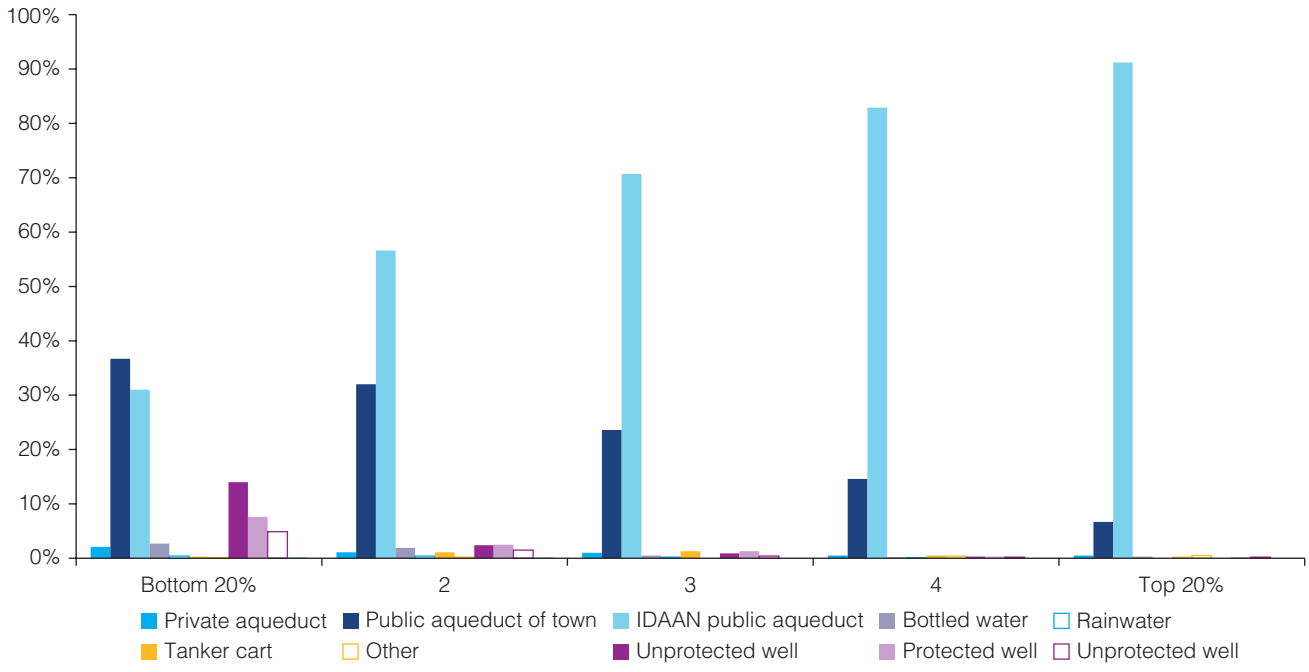
Source: Authors' calculations based on 2010 Population and Housing Census and 2015 EPM.

Access to water and sanitation is also linked to poverty and income status, not just ethnicity and geographical location. Those in the top income quintile are almost exclusively receiving water from the public utility, IDAAN (91.2 percent), while those in the bottom quintile are more likely to receive water supplied by community water systems (figure 2.12). Of concern is the fact that almost one in five people in the bottom quintile have unprotected wells as their water source. On the sanitation side, the discrepancies in coverage are even greater, with just less than 10 percent of the poorest quintile having access to a sewer system compared to 62 percent of the top quintile. Among the poorest, one-fifth have no sanitation system of any sort (figure 2.13).

Access to basic infrastructure in Panama is a function of the characteristics of a person's household. As coverage in Panama is not universal, there is an equity gap in access to water and sanitation. An additional equity gap exists due to the fact that the distribution of the existing infrastructure in water and sanitation neither random nor even. Instead, access is correlated with specific characteristics of the population. A simple logit model that regresses household characteristics on access variables illuminates these equity gaps. The characteristics that are found to be positively and significantly associated with improved access to water include: (i) urban location; (ii) the household head being nonindigenous, more educated, and female; (iii) household not living in monetary poverty; and (iv) having access to electricity and non-dirt floor. In the case of improved sanitation, the characteristics positively and significantly associated with access are: (i) urban location; (ii) the household head being nonindigenous, more educated, and female; (iii) being non-poor; (iv) having access to electricity and a concrete roof; and (v) having low levels of overcrowding in the household.

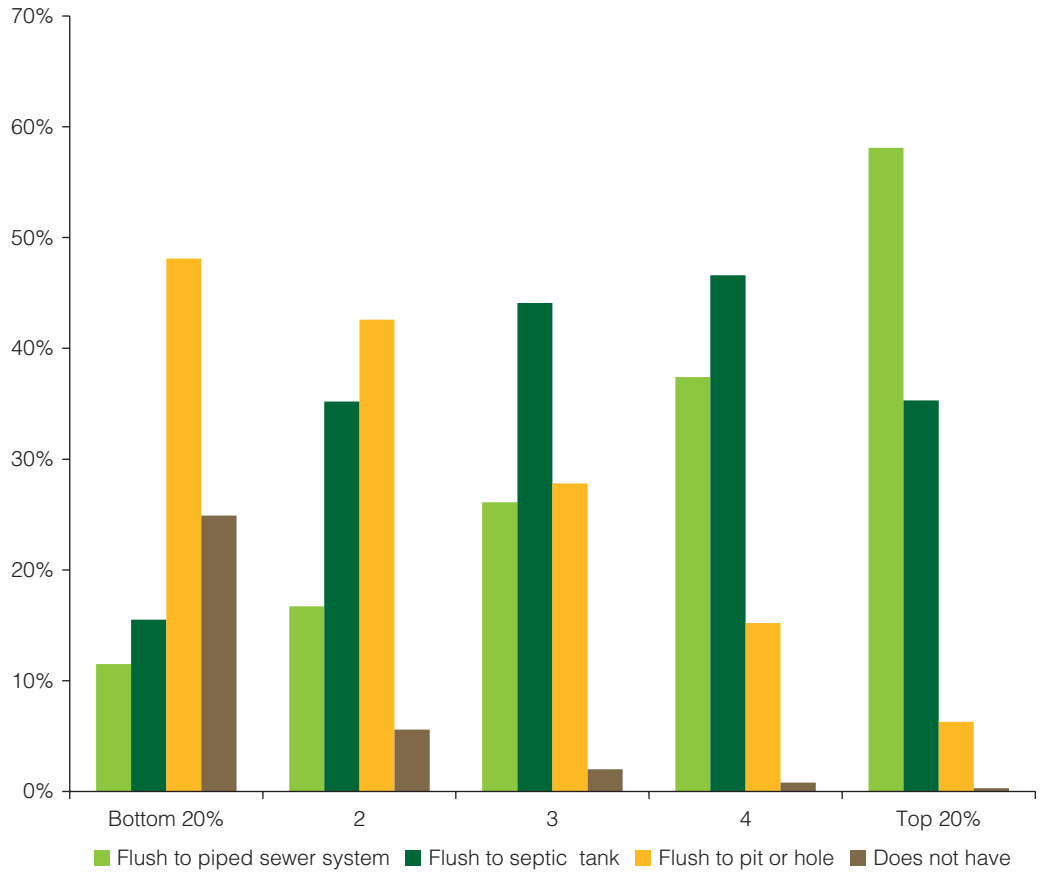
Findings on the gaps in children's access to basic services reinforces this picture of inequitable access. It can be argued that, among adults, access can be endogenous; in short, people's decisions about where to live may be linked to their access to services. Looking, instead, at the extent to which children's characteristics or circumstances

Figure 2.12: Access to Water by Income Quintile, 2015



Source: Authors' calculations based on 2015 EPM.

Figure 2.13: Access to Sanitation by Income Quintile, 2015



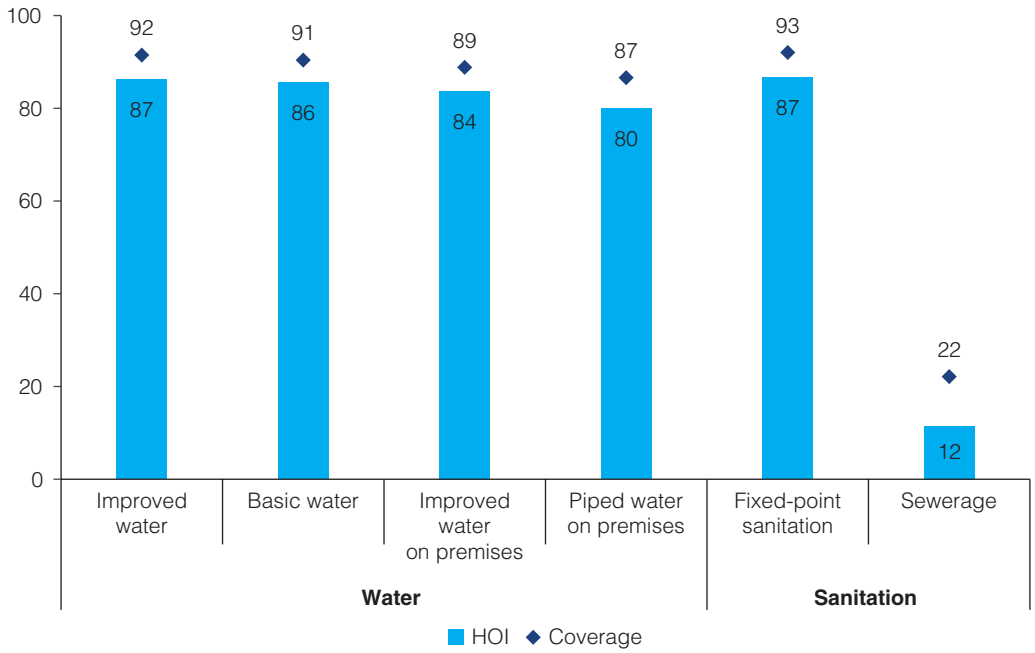
Source: Authors' calculations based on 2015 EPM.
Note: The categories included have been translated from the Spanish questionnaire: *"¿Tiene esta vivienda servicio sanitario?"*: with responses being: "*conectado a alcantarillado," "conectado a tanque séptico," "de hueco o letrina,"* and *"no tiene."*

beyond their control are correlated with access provides a clearer picture equity. The HOI[5] is an equity-adjusted measure of coverage that shows the extent to which the distribution of service provision (in this case, access to improved water, piped water on premises, fixed-point sanitation and access to sewage systems) is correlated with a range of circumstances including whether the household is in bottom 40 percent of the income distribution, is located in a rural area, and has a household head who is indigenous, *among other things*.[6]

The HOI analysis provides evidence of significant inequalities in access, particularly sewerage (World Bank 2016). Overall coverage levels for access to improved water and even piped water on premises are fairly high at 89 and 87 percent. When coverage is adjusted for equity the rates are only 84 and 80 percent respectively. This shows the extent to which the coverage gap is correlated with specific circumstances and not simply randomly distributed. However, it is access to a sewer system that exhibits the largest gap between overall coverage and the equity-adjusted coverage. Circumstances drive a significant proportion of access to sanitation, with overall coverage being 22 percent but the HOI only being 12 percent (figure 2.14).

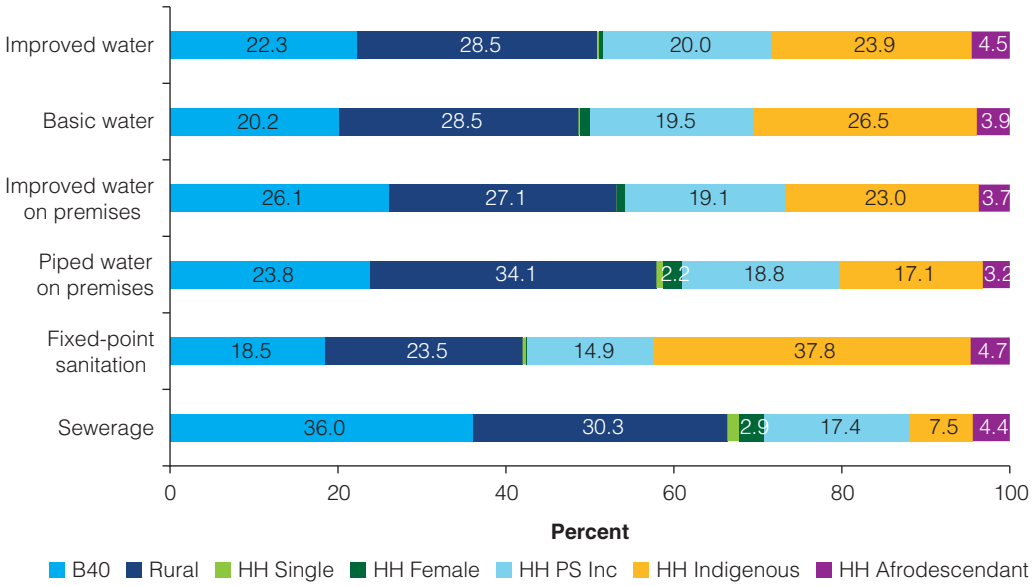
Inequality in access to water services in Panama is mostly a result of where the household resides (figure 2.15). Among the seven circumstances considered, location of the household—namely, residing in a rural area—has the most significant impact on inequality

Figure 2.14: HOI and Coverage of WASH Services in Panama for Children



Source: Authors' calculations based on the 2013 MICS.
Note: HOI = Human Opportunity Index.

Figure 2.15: The Circumstances that Explain the Unequal Distribution of Access to WASH for Families with Children



Source: World Bank 2016.
Note: B40 = household income is in the bottom 40 percent of the income distribution; HH = household head; HH PS Inc = household head having incomplete primary school.

in access for all water services. This is most pronounced for piped water (34 percent). To a lesser extent, whether or not the household head is indigenous is a strong determinant of inequality for access to improved water (24 percent) and basic water (27 percent). For improved water on premises and piped water, the second predictor of inequality is being in the bottom 40 percent of the overall income distribution. Inequality in access to piped water is also affected by parents' education. Marital status, gender, and whether or not the household head is an Afro-Panamanian seem to have relatively low significance in the distribution of water services.

Inequality in access to sanitation services is mostly a result of income and ethnicity. Income distribution is the most powerful predictor of whether or not a child will have access to a sewerage system (36 percent). The location of the household has also a significant effect (30 percent). To a lesser extent, 17 percent of the inequality is explained by the parents' lack of education. In contrast, inequality in access to fixed-point sanitation services appears to be largely determined by the household head being indigenous (38 percent), followed by location (24 percent). Moreover, and similar to water services, marital status, gender, and whether or not the household head is an Afro-Panamanian explain only 5 percent or less of the observed instances of inequality in sanitation services.

Overall, this analysis suggests that despite progress, new efforts are needed to expand coverage and equality in access to WASH in Panama. Poverty, living in a rural areas, and ethnicity are all correlated with lower levels of service. Convergence across the country in terms of access is occurring, in contrast to poverty. However, the low starting point suggests that universal coverage is still a distant goal. It is worth noting that this section has focused on the more basic, Millennium Development Goal (MDG) indicators of improved water and sanitation and not the more comprehensive measure of safely managed water and sanitation contained in the new Sustainable Development Goal (SDG) indicators (box 2.2 details the differences). If the full SDG indicators could be constructed for Panama, the overall coverage levels would be lower than described in this chapter. In chapter 4 some of the additional dimensions of safely managed services are addressed that demonstrate that the figures in this chapter are an upper bound for coverage.

Box 2.2: The Shift from MDGs to SDGs

In 2015, the international community shifted from the MGDs (1990–2015) to the SDGs (2015–30). The targets on WASH coverage are in Goal 6 of the SDGs: "Ensure availability and sustainable management of water and sanitation for all":

(i) Target 6.1: By 2030, achieve universal and equitable access to safe and affordable drinking water for all;
(ii) Target 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

The new goals, targets, and indicators reflect evolving global consensus on what can best be monitored to support development. In terms of WASH services, the monitoring framework builds on the MDG framework, integrating more comprehensive indicators for a more refined estimate of WASH access. The new access indicators are the highest rungs in the monitoring framework that the international community has endorsed (see table B2.2.1).

box continues next page

Box 2.2: Continued

Table B2.2.1: The SDG Monitoring Framework for WASH

Drinking water ladder	Sanitation ladder	Handwashing ladder
SAFELY MANAGED: Drinking water from an improved water sources which is located on the premises, available when needed and free of fecal and priority contamination.	SAFELY MANAGED: Use of an improved sanitation facility which is not shared with other households and where excreta are safely disposed in situ or transported and treated off-site.	BASIC: handwashing facility with soap and water in the household.
BASIC: Drinking water from an improved source provided collection time is not more than 30 minutes from a roundtrip including queuing.	BASIC: Use of improved facilities which are not shared with other households.	
LIMITED: Drinking water from an improved source where collection time exceeds 30 minutes for a roundtrip to collect water, including queuing.	LIMITED: Use of improved facilities shared between two or more households.	LIMITED: Hand washing facility without soap or water.
UNIMPROVED: Drinking water from an unprotected dug well or unprotected spring.	UNIMPROVED: Use of pit latrines without a slab or platform, hanging latrines, and bucket latrines.	
SURFACE WATER: Drinking water directly from a river, dam, lake, pond, stream, canal, or irrigation channel.	OPEN DEFECATION: Disposal of human fasces in fields, forest, bushes, open bodies of water, beach, or other open spaces or with solid waste.	NO FACILITY: No handwashing facility.

Note: Improved water sources include piped water, boreholes or tube wells, protected dug wells, protected springs, and packaged or delivered water. Improved sanitation facilities include flush, pour, flush to piped sewer system, septic tank or pit latrine, ventilated improved pit latrine, composting toilet, or pit latrine with slab.

There are three core indicators:

- "The percentage of the population using safely managed drinking water services" where "safely managed" is defined as an improved drinking water source, which is: (i) located on the premises of the household's dwelling, (ii) available when needed, and, (iii) compliant with fecal and priority chemical standards.

box continues next page

Box 2.2: Continued

The protocol for compliance is to verify that there is zero *E. coli* in a 100ML sample of the household's source of drinking water.

- "The percentage of the population using safely managed sanitation services" is defined as the use of (i) an improved sanitation facility that is (ii) not shared with other households and where (iii) excreta are safely disposed *in situ* or transported and treated offsite. Thus, sanitation monitoring is extended to monitor whether the human waste is effectively kept form human contact after it goes into the latrine or toilet.
- "The percentage of population with handwashing facilities with soap and water at home."

The indicators embedded in the World Bank and national WASH agendas over the previous MDG decades were less strict. During the 1990–2015 timeframe, the focus was on halving the proportion of those without "improved" drinking water (i.e., the threshold for having at least "limited" drinking water in SDG terms). For sanitation, the focus was on halving the proportion of those without "improved" sanitation (i.e., the threshold for having at least "basic" sanitation in SDG terms). There was no core international hygiene MDG indicator.

Not only do the SDGs refine the definition of access, they also involve countries committing to monitoring in new domains beyond the household/population level. Monitoring of water and sanitation at health care centers and schools is now included. In these institutional settings, the monitoring will also include whether elements are in place allowing menstrual hygiene management (MHM).

Furthermore, monitoring must verify whether there is a progressive reduction of inequity: that is, to examine whether subpopulations with traditionally lower access (e.g., rural or indigenous groups) are catching up with the general population.

These stricter definitions of the SDGs are designed to represent opportunities. They better represent the full water cycle and fecal-oral chain, help quantify important issues that were less visible through the MDG lens, and will greatly aid efforts to inform action to meet domestic targets as well as the World Bank Group twin goals of extreme poverty eradication and the promotion of shared prosperity.

Data constraints mean that only limited insights are possible on how the shift to the SDG framework will play out in Panama. This is not trivial. The MICS 2013, the only data source in Panama that integrated many elements of "safely managed" drinking water to date (whether the source is improved, on premises, and available when needed) gives some indication of how much this matters. The data suggest that if MDG-style access to improved water was 95 percent, then the requirement that this water be available on the premises of the dwelling would decrease it marginally to

box continues next page

Box 2.2: Continued

about 93 percent, while including a criteria of water being available when needed would reduce coverage to only 76 percent.

Given the data limitations, this report largely continues to focus on "improved" or "least limited" in SDG terminology. Additionally, a switch to the full SDG definitions needs to be done carefully so as not to undermine time series of key indicators. Efforts have been made (see chapter 4 in particular) to incorporate more SDG elements into the analysis. In addition, some other available measures are presented that are not key to SDG monitoring, but for which data are available and which offer useful insights. Finally, it is worth acknowledging the ongoing relevance of the old MDG categories in Panama where signification portions of the population still do not have even "improved" services.

Notes

1. A poverty map of the *Encuesta de Niveles de Vida* data from 2003 was constructed that showed substantial differences within provinces/comarcas.
2. The small area estimation is based on Elbers, Lanjouw, and Lanjouw 2002.
3. The majority of indigenous peoples in Panama live in five semi-autonomous regions called "comarcas" and in collectively owned territories and communities that are within close proximity of the comarcas.
4. There is no more recent census data and the WASH access variables have only been included in the EPM from 2014 onward. While there are concerns about tracking trends from such disparate data sources, the sample design of the survey is based on the census structures and there is no reason to expect that the survey comparisons are biased.
5. See Paes de Barros et al. 2009 for a discussion of the HOI methodology.
6. The analysis looks at children under age 17. A total of seven circumstances were included in the analysis.

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Chapter 3
Access to WASH and the Effect of Social Spending

Social spending has played an important role in poverty reduction in Panama. Two new studies show that there are important synergies between social spending and adequate water and sanitation services. The joint impact of the participation in the *Red de Oportunidades* (RdO) program and access to WASH services found that participation and access to an adequate sewage system are negatively related with prevalence of diarrhea and the number of days of diarrhea for children under 60 months of age in both urban and rural areas. In rural areas, in addition, participation and access to adequate sanitation are negatively correlated to wasting for children under 60 months of age. In terms of education, there is a positive and significant association between access to water supply, sanitation, and hygiene (WASH) services and student outcomes for some subgroups including girls, rural inhabitants, and children with low socioeconomic levels.

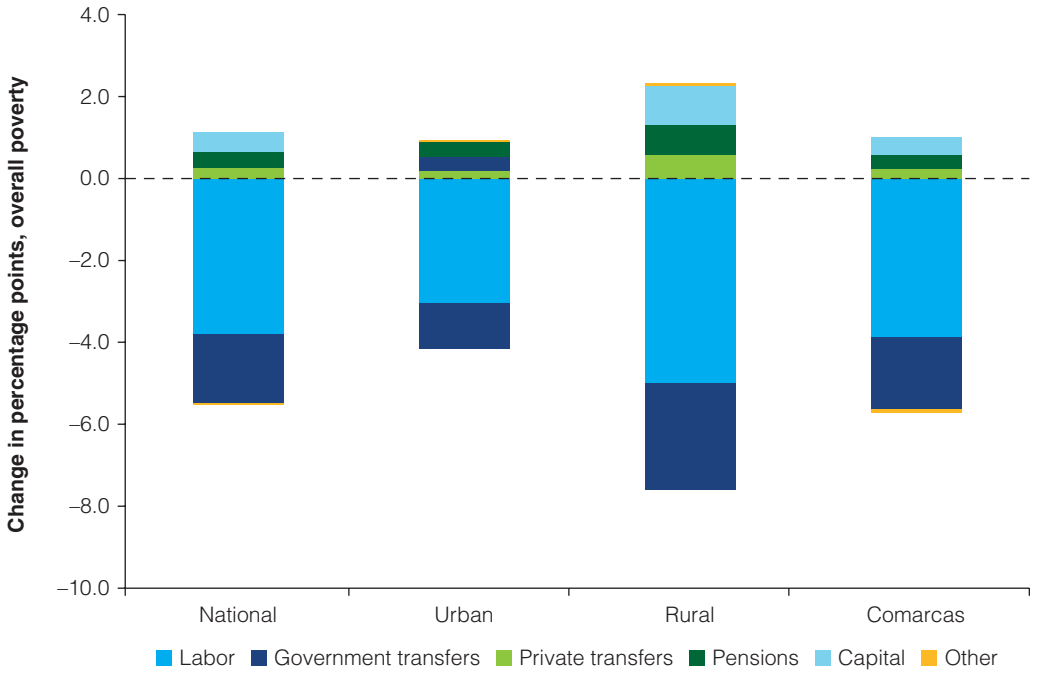
The low and inequitable access to WASH services shown in the previous section can undermine the effectiveness of social spending on welfare. Panama has devoted significant resources to social assistance programs aimed at improving health and educational outcomes. The major social assistance program, RdO is designed to reduce poverty in the short run and to break the vicious cycle of poverty by increasing health and education levels. Another important, albeit less well-targeted, program aimed at school attainment is the *Beca Universal*, or Universal Scholarship program, which provides cash benefits to promote educational attainment. Both programs, in addition to other spending programs such as the social, or non-contributory pension, program have helped to reduce poverty in Panama. However, and as will be shown in this chapter, their effectiveness is improved when they are accompanied by adequate access to WASH services.

The interaction of WASH access with other social spending may also increase the effectiveness of the later. This chapter presents two studies that look at the extent to which access to water and sanitation affects the impact of social spending on health and education. The first study looks specifically at the associations between child health and WASH, while the second explores the link with educational outcomes. The results of these studies suggest that, on the one hand, including water and sanitation considerations in the RdO program could enhance its effectiveness with regards to the health status of beneficiary children, and, on the other hand, that improving access to adequate water and sanitation infrastructure in Panamanian schools could positively affect student performance and attendance, particularly among teenage girls.

Social Spending and Poverty Reduction

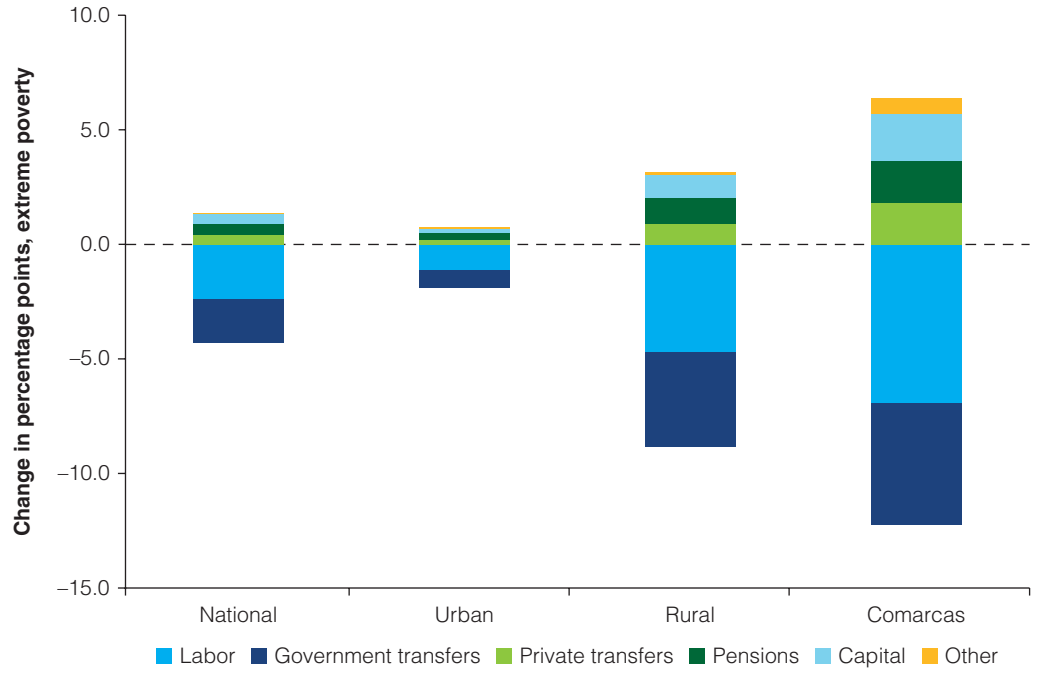
Social spending in Panama has played an important role in poverty reduction. Most of poverty reduction in Panama over the last 15 years has, as would be expected, been driven by the outstanding economic performance of the country, mainly through means of substantial job creation and increasing labor income in urban areas. A Datt-Ravallion decomposition of the effects of income growth and the changes in the distribution of income among the population between 2011 and 2015, shows growth accounting for 85 percent of overall poverty reduction and a change in the distribution of income accounting for the remainder.[1] Public transfers have also played a key role, especially in rural areas and the *comarcas*. During this period, government transfers were particularly linked to the reduction of extreme poverty while labor income was more important for overall poverty declines (figure 3.1 and figure 3.2).

Figure 3.1: Contribution of Different Income Sources to Overall Poverty Reduction, 2011–15



Source: Authors' calculations based on EML 2011 and 2015.

Figure 3.2: Contribution of Different Income Sources to Extreme Poverty Reduction, 2011–15



Source: Authors' calculations based on EML 2011 and 2015.

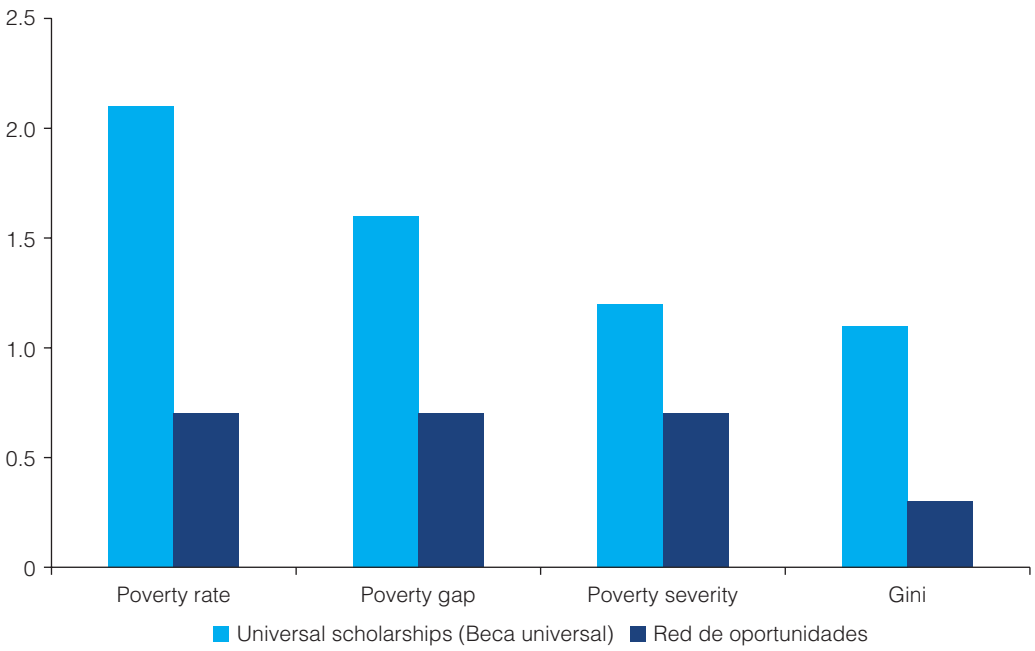
Two main programs account for this trend. The first is the RdO, a conditional cash transfer program in which households receive a cash transfer contingent on the enrollment of their children in school and the use of preventative health care services. The Beca Universal is designed to improve both enrollment and attainment by providing households with a cash transfer contingent on children attending school and maintaining a minimum grade level. These programs affect a substantial number of households: One in four households (26.3 percent) in Panama benefits from the Beca Universal, and 2.2 percent are recipients of the RdO.

A simple simulation of the poverty impact of removing each program shows their relative importance. Poverty and inequality would have increased in Panama in the absence of these programs (figure 3.3).[2] Without looking at any secondary effects, eliminating the programs would lead to a rise in extreme poverty of 2.7 percentage points, or more than 15 percent. The Beca Universal would have the most impact, just more than half of the total impact. Given the share of household enrolled in the RdO, its removal would have a more limited effect.

WASH and Health in Panama

The link between WASH and health is clear: about 10 percent of the world's diseases[3] have been linked to unsafe water and inadequate sanitation and hygiene (Prüss-Üstün et al. 2008).

Figure 3.3: Hypothetical (Simple) Impact of Removing Key Public Transfer Programs (Increase in Percentage Points)



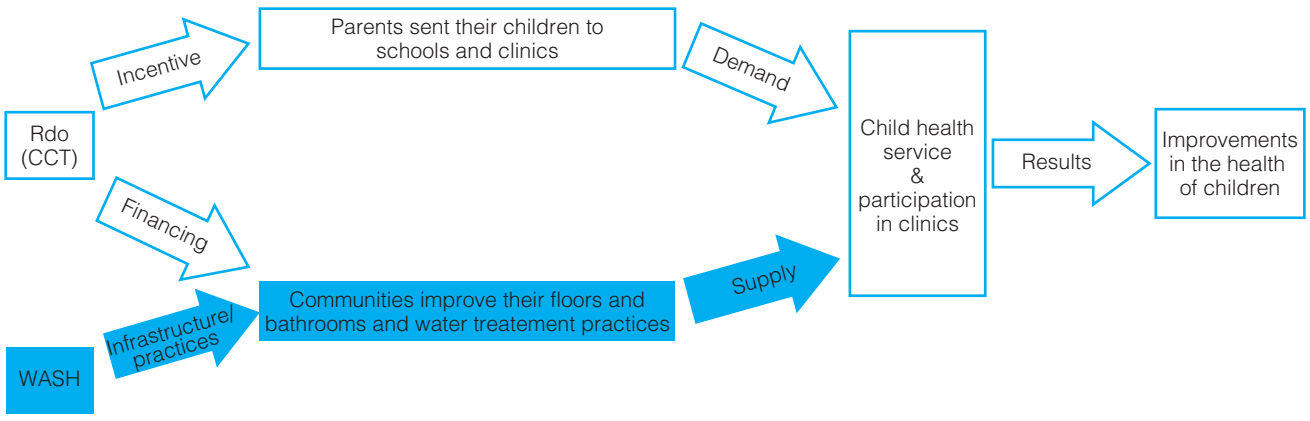
Source: Poverty and Social Impact Analysis for First Fiscal Sustainability and Enhanced Competitiveness Development Policy Financing to the Republic of Panama, World Bank 2016.
Note: This represents an upper bound effect as secondary effects of changes in private transfers or labor market activities, not included in this calculation, might be able to somewhat mitigate the negative effects of a change in benefits.

Indeed, poor water and sanitation conditions have been found to increase stunting and the incidence of diarrhea (Checkley et al. 2004; Esrey et al. 1988; Fink, Günther, and Hill 2011) as well as the prevalence of other diseases among children (Checkley et al. 2004), and sanitation infrastructure, handwashing, and water treatment are fundamental to combating acute diarrhea, respiratory infections, and malnutrition (Curtis and Cairncross 2003; Huttly, Morris, and Pisani 1997; Mara, Scott, and Trouba 2010; Rabie and Curtis 2006). Moreover, lack of access to these services can have an impact on mortality rates among children. Research shows, for instance, that children living in households with high quality toilet infrastructure have lower mortality risks than those living in households with no toilet facility with the effect strongest on children between one month and one year of age (Fink, Günther, and Hill 2011). Evidence suggests that access to a more convenient water supply can have significant benefits. For example, replacing water sources that are more than 30 minutes away with household connections makes it more likely that the household will use at least the minimum amount required for personal hygiene (Cairncross and Valdmanis 2006).[4] Finally, hygiene promotion, specifically handwashing, also reduces the incidence of diarrheal significantly and has been associated with a reduction in respiratory illnesses (Rabie and Curtis 2006).[5]

In addition to the basic importance of water and sanitation for health, these can also interact with other social investments. One question that the WASH Poverty Diagnostic has attempted to answer is whether, and to what extent, including a WASH focus in the RdO could act to increase the health/nutritional impact of the program. The RdO program, designed to improve health and education outcomes, does not have an explicit focus on water and sanitation. Nonetheless, a background paper for this Diagnostic explores whether having adequate water and sanitation infrastructure affects the impact of participation in the RdO program and the combined effects of both on the health and nutrition of children between 6 and 60 months. Specifically, the study tests the logic model presented in figure 3.4 examining causal effects using a pairing propensity score approach to control for selection bias from RdO program participation (see appendix A) (Arteaga 2016). The hypothesis is tested in a comparison of urban and rural indigenous children of parents who are beneficiaries of the RdO.

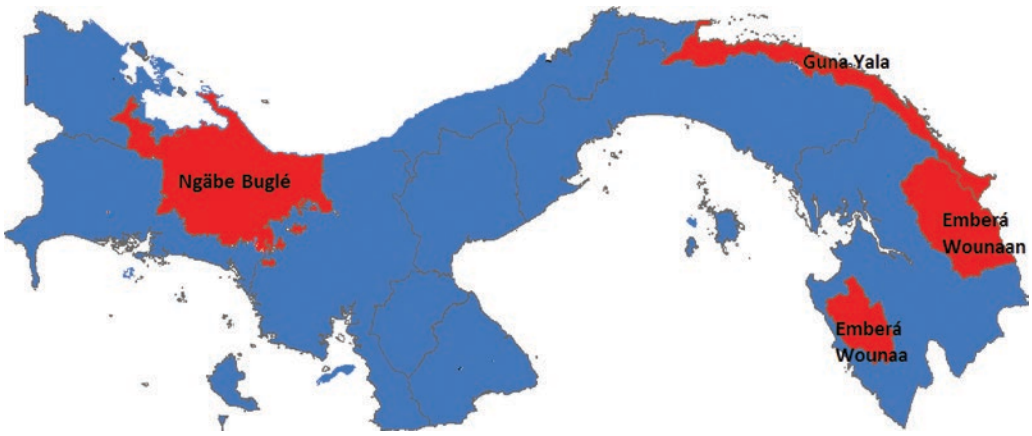
The study takes advantage of the data set collected to evaluate the RdO program at the national level. And, given the concentration of poverty and lack of access to basic services that have

Figure 3.4: Logic Model for the Connections between Health Outcomes and Access to WASH for RdO Participants



Source: Arteaga 2016.

Map 3.1: Location of Indigenous Comarcas Included in the RdO-WASH Study



Source: Arteaga 2016.

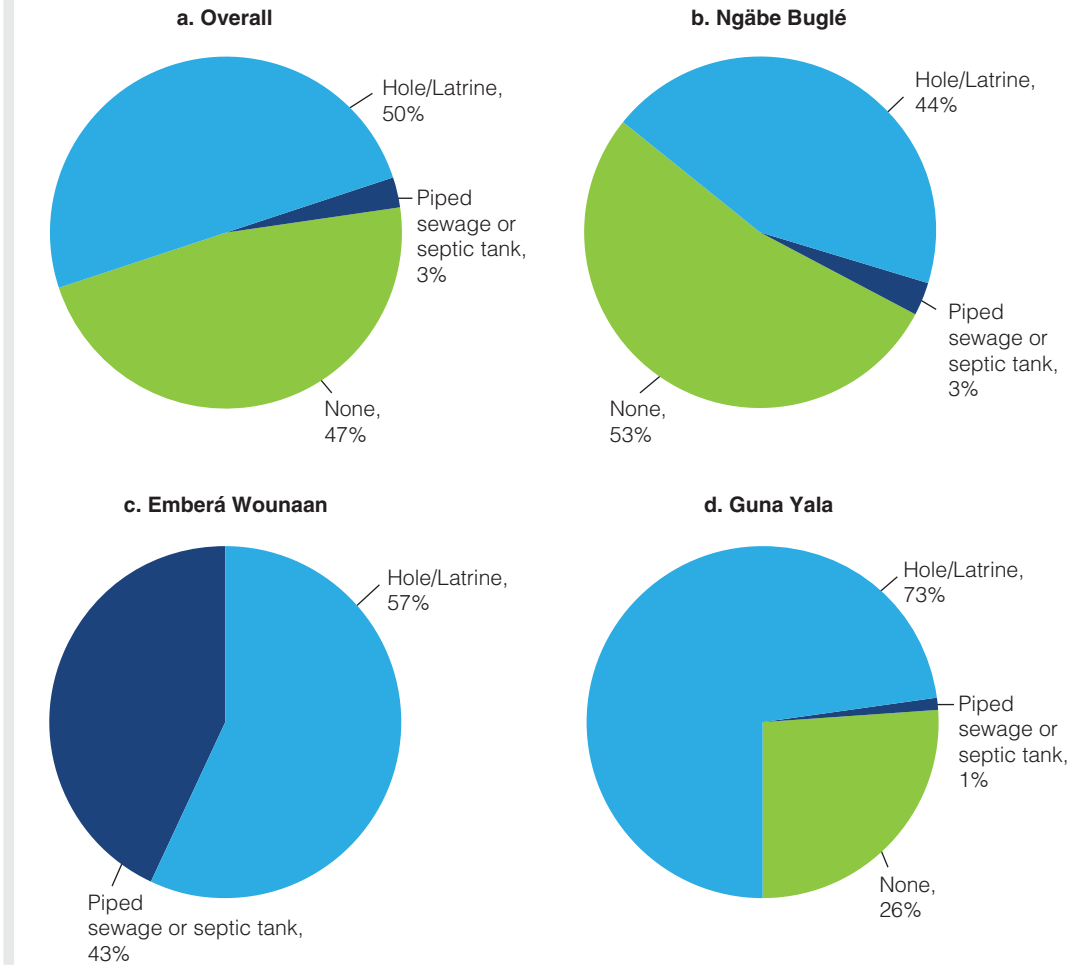
been found in the comarcas, the analysis was focused on the sample of indigenous households. A set of national data representative of urban and rural households and indigenous households for the evaluation of the RdO program by the Ministry of Social Development (MoSD) was compiled in 2014. In the sample, there are indigenous beneficiary households living in the three largest counties (as highlighted in map 3.1). This sample contains a sample of approximately 1,700 indigenous children between 6 and 60 months of age living in 1,197 households.

Descriptive statistics show that precarious access to sanitation infrastructure is prevalent among the RdO beneficiaries in the sampled households. There is also evidence of low uptake of hygiene and sanitation practices. In the sample, about 47 percent of households have no sanitation infrastructure or toilet, and about 50 percent use a "hole" or latrine. Only a very small percentage have access to piped sewage or a septic tank. The majority of households with piped sewage or using a septic tank are located in the Ngäbe Buglé comarca (figure 3.5).

The treatment that households give to water is quite limited. The majority of households do not report treating their water in any fashion. As households in these areas are not connected to the public water utility, their water is then completely untreated.[6] The percentage of households that do not treat their water is especially high in Ngäbe Buglé comarca at 69 percent (figure 3.6). The most common water treatment is chlorine, although this varies by comarca. Households in the Ngäbe Buglé and Emberá Wounaan comarcas are more likely to use chlorine while households in Guna Yala are more likely to boil water. It should be noted that these results may overestimate actual treatment, as self-reported measures tend to suffer from validity and reliability issues, and may better represent knowledge of treatment methods than actual behavior.

The interaction of WASH and participation in the program is more than a simple correlation. In order to determine causality, we used a statistical technique of instrumental variables and a propensity score matching (PSM) approach to control the bias of potential selection, due to the fact that participation in the RdO program is not random. The effect of participation in RdO and WASH infrastructure was estimated jointly. Three models of PSM were estimated: nearest neighbor or individual, kernel algorithm, and inverse probability weighting.

Figure 3.5: Sanitation Infrastructure, Percent

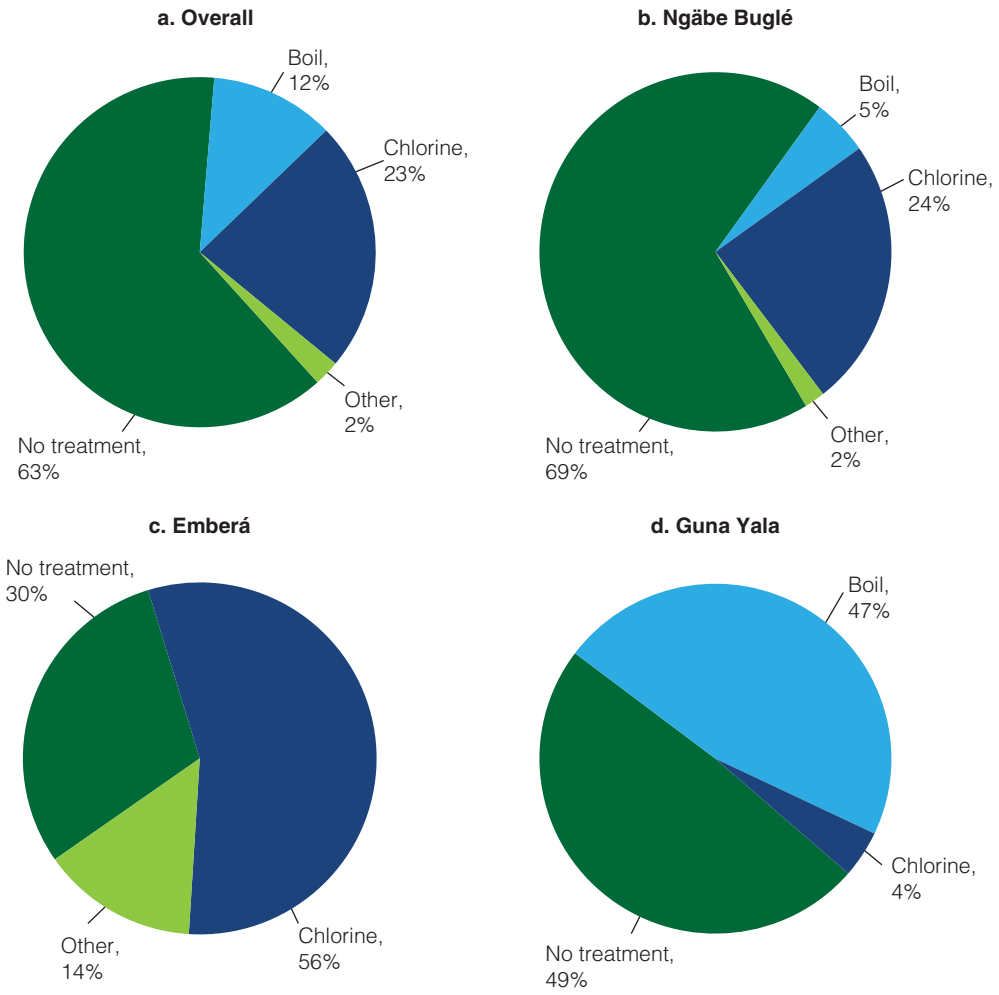


Source: Arteaga 2016.

In Panama, there are some synergies between WASH services and participation in the RdO program of indigenous households (table 3.1). The study focused on six indicators of health-incidence of acute diarrhea and number of days each episode lasts, the same for acute respiratory infections, the prevalence of chronic malnutrition and acute malnutrition. Using the PSM methodology (with three different models), it was investigated whether there is an interaction between participation in the RdO program and access to chlorinated water, access to adequate sanitation (latrine or better), and finally, count on quality floor. The results show that children living in households that participate in RdO with sanitation services experience a greater reduction in the incidence of cases of acute diarrhea and acute respiratory infections compared to households that do not participate in RdO. In contrast, there is no interaction effect between participation in the program and having chlorinated water. There is an impact on malnutrition, but the results, although statistically significant, are so small that they are not very relevant.

These observed synergies between the RdO and the WASH infrastructure may be the result of the "family support" component of the RdO program. The RdO program, through its *promotores,* or

Figure 3.6: Type of Water Treatment, Percent, by Location



Source: Arteaga 2016.

Table 3.1: Synergies between WASH and RdO

	Water treatment	Toilet/latrine	High-quality floors
Prevalence of chronic malnutrition			
6–60 months			
6–36 months	↓** (1)		↓***
36–60 months			
Prevalence of diarrheic illness			
6–60 months		↓*	
6–36 months			↓*(1)
36–60 months		↓*(1)	

table continues next page

Table 3.1: Continued

	Water treatment	Toilet/latrine	High-quality floors
Prevalence of respiratory illness			
6–60 months		↓**	
6–36 months			
36–60 months		↓**	
Days of acute diarrhea			
6–60 months		V(1)*	
6–36 months			
36–60 months			
Prevalence of acute respiratory illness			
6–60 months		↓**	
6–36 months			↓*
36–60 months		↓**	
Prevalence of acute malnutrition			
6–60 months	↓***		
6–36 months	↓*** (1)	↓**	
36–60 months		↓*(1)	

Source: Arteaga 2016.
Note: Based on two-stage instrumental variable approach.

para-professional community leaders, provides training to parents in participating households. One training module covers nutrition and health. Promotores also connect families with Ministry of Health staff who provide family support and help family members develop human capital through training in basic health education practices. Thus, households in the RdO program have additional knowledge on the importance of sanitation and water on health and may be more likely to use latrines correctly compared to non-RdO households. Anecdotal evidence, for instance, shows that some families use their latrine for storage instead of for waste disposal.

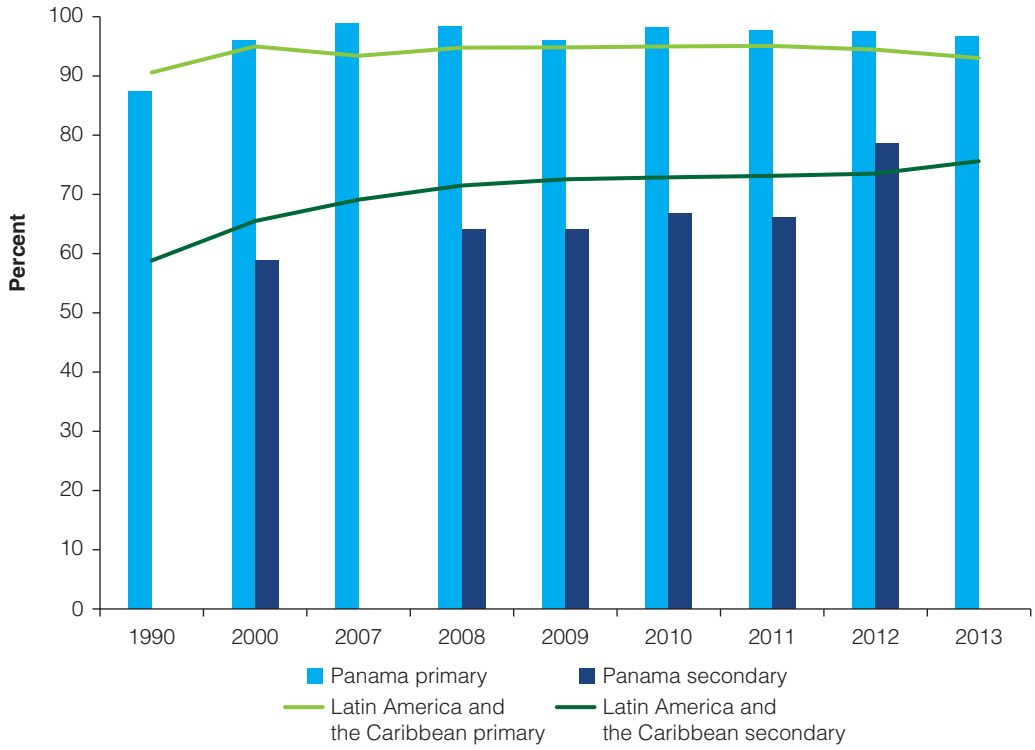
The results of the study suggest that health and nutrition outcomes in the population of interest could be improved if social infrastructure and non-infrastructure investments complemented each other.[7] Although the results are not significant for all diseases or ages, they do present evidence of significant synergies. Coordination between the different sectors involved could enhance the effectiveness of programs and help to maximize the benefits to the target populations. Together with cash transfers, education and health service provision, and family support, the RdO program includes geographical infrastructure as one of its main components. The first three components are typically mentioned by program representatives and the MoSD, which supervises the RdO, has monitoring data on these. For the supply of health and education services, MoSD coordinates with the Ministries of Health and Education. However, there does not seem to be direct coordination in the area of infrastructure development, which does not fall under MoSD mandate. In order to successfully achieve full coverage of basic infrastructure, the MoSD could, for instance, provide a list of the targeted communities and their needs to Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario [DISAPAS]), which invests in rural water and sanitation systems. In addition, and given the results of the study, it would be important to gather further information on the use of sanitation infrastructure in areas of extreme poverty.

WASH and Education in Panama

Education is a key component of welfare in which Panama has shown strong progress over time, paralleling the progress on reducing monetary poverty. Primary school enrollment has been high for years, and exceeds the Latin American and Caribbean region's average (figure 3.7). Secondary school enrollment levels have been lower, however, and below the Latin American and Caribbean region's average. Enrollment levels have improved over time, and completion rates at the lower secondary school level have been increasing. Overall, Panama appears to be catching up to the Latin American and Caribbean region as a whole.

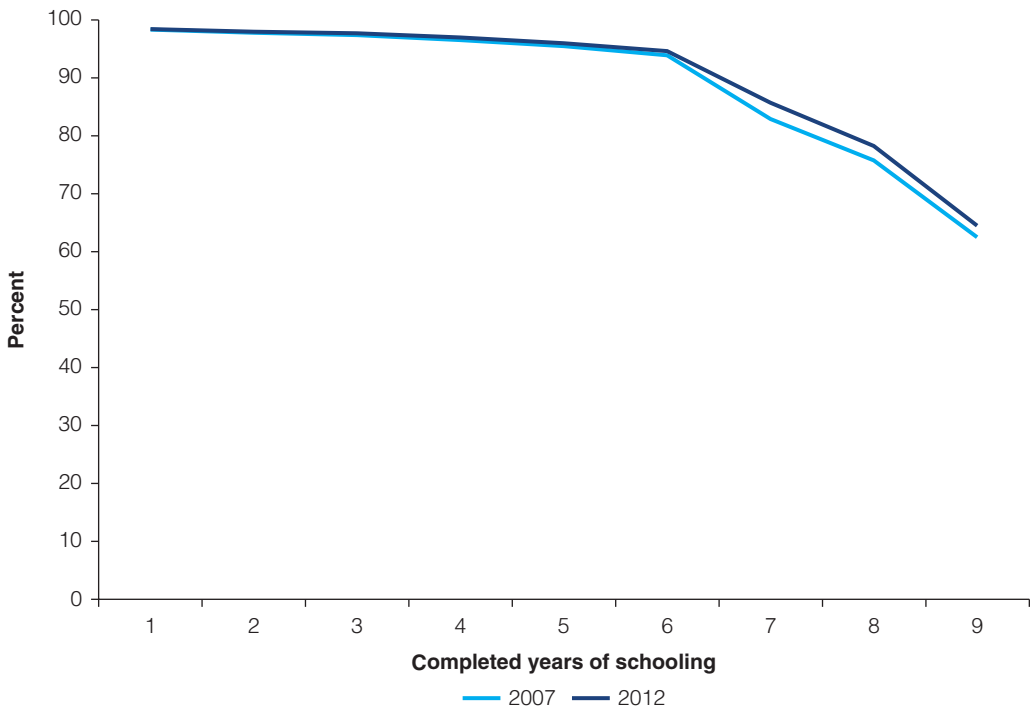
Dropout rates in Panama remain high despite the high returns to education (figure 3.8).[8] Panama's strong, positive returns to education are above those in Honduras, Costa Rica, and El Salvador. One factor affecting retention in the school system is the rising opportunity cost of staying in school as the growing economy has generated substantial job growth. Another factor affecting dropout rates is the quality of education. Panama scores badly on the Program for International Student Assessment (PSIA) tests, and based on these scores and overall spending levels, Panama's efficiency of public spending on education is low. In addition, there is evidence that education quality fell between 2000 and 2010 (Alfonso, Romero, and Monsalve 2013). Recent analytic work on Central America highlights the importance of quality, and the gaps that exist between various groups of children such as indigenous and nonindigenous children, poor and rich, and urban and rural (Adelman and Székely 2016).

Figure 3.7: Net Primary and Secondary Enrollment Rates, Panama and Latin America and the Caribbean, 1990–2013



Source: Authors' calculations based on World Development Indicators. http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators.

Figure 3.8: Educational Attainment among 15- to 19-Year-Olds in Panama, 2007–12



Source: Social Sector Institutional and Expenditure Review 2015.

In other countries, the availability of WASH services at the educational facility has been shown to be an additional factor affecting school dropout rates. There is a connection between educational outcomes and school WASH facilities: access to adequate water and sanitation services is associated with improved attendance and results. This is especially true for girls. A recent review of the literature by Cuesta, Glewwe, and Krause (2015) on the impact of various components of school infrastructure on educational outcomes concludes that the availability of toilets in school facilities can have significant implications for educational performance. In Kenya, for instance, a WASH initiative to provide water treatment and sanitation at the school appeared to have an impact on girls remaining in school (Freeman et al. 2012).

The hypothesis that WASH affects school outcomes was tested in Panama as part of this Wash Poverty Diagnostic (Almeida and Oosterbeek 2016). The study used the Third Regional Comparative and Explanatory Study (TERCE 2013) carried out by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) on the performance of third and sixth grade students in the fields of mathematics and language. In addition to test score the TERCE collected data on students' family background as well as the characteristics of teachers, principals, and schools. The analysis provided descriptive results, based on regressions of the binary indicators for the availability of various WASH services at school[9] on family characteristics, school/principal characteristics, and teacher characteristics, and also assessed statistical causality using regressions of student outcomes on a WASH index and different specifications per outcome.[10,11]

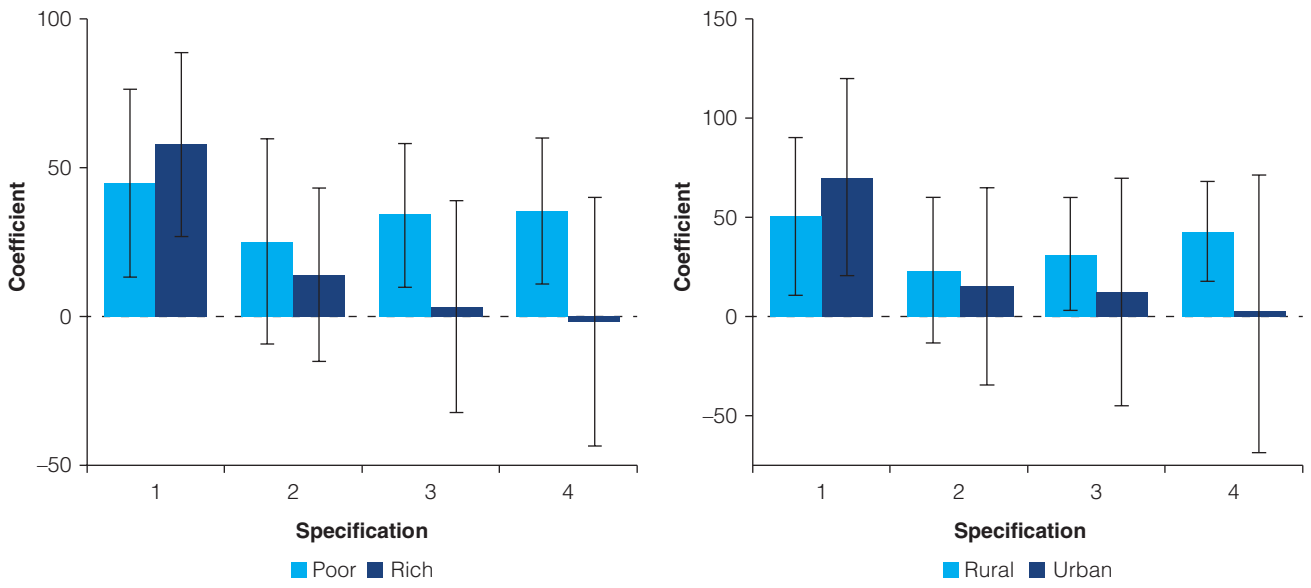
Overall, the study provided confirmation that the correlations found in other countries exist in Panama as well. In Panama, attending a school with more WASH services is positively correlated with socioeconomic background (parents' education and household income), living in an urban (instead of rural) area, and with school size. There exists a

positive association between schools' WASH services and students' math and reading scores, although it becomes weaker when controlling for family, school, and teacher characteristics, especially for some subgroups (figure 3.9). However, the fact that the associations between WASH services and student outcomes remain substantial and statistically significant for some subgroups (girls, rural inhabitants, children with low socioeconomic levels) suggests that, for these groups, there may be an effect of WASH services on school outcomes.

Adequate WASH facilities are linked to greater school participation of girls. The analysis finds support for the menstruation hypothesis and corroborates the findings of other studies. The menstruation hypothesis argues that a lack of sanitation facilities in schools affects pubescent girls in particular. The study done in Panama shows that girls in sixth grade are 6 to 10 percentage points (relative to a base of 0.65) more likely to have missed at least one day of school during the past six months in comparison to boys in sixth grade and girls in third grade (figure 3.10). In addition, with improved attendance, girls' learning outcomes also appear to be positively correlated with WASH facilities. These associations are strengthened when other characteristics of children and households are controlled for (figure 3.11). The coefficient of the relationship between grades and WASH facilities in school is consistently higher for menstruation-aged girls than for boys of a similar age.

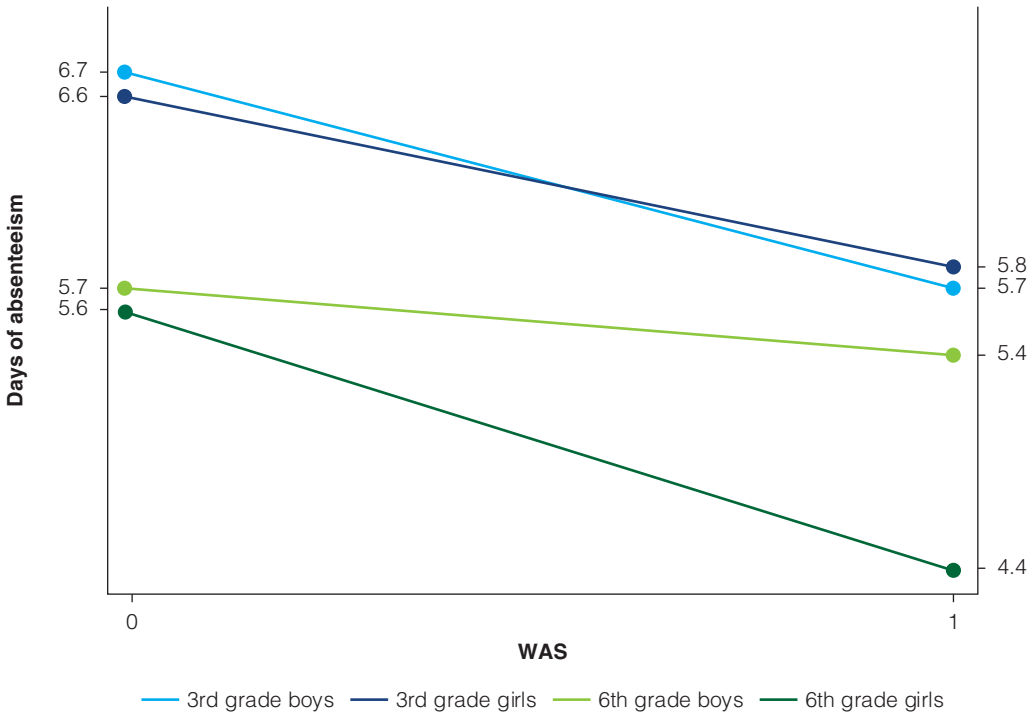
The findings from this study suggest that WASH services are linked to better outcomes for children and particularly for girls. It may be possible to improve the impact of education spending by jointly improving access to WASH facilities in schools. It should be noted, however, that the associations reported need to be interpreted with caution given potential deficiencies in the study design (e.g., endogeneity or reverse causality) that could be addressed using stronger research designs (such as a randomized control trial) in the future.

Figure 3.9: Association between WASH Index and 6th Grade Math Score, by Specification and Subgroup (Poor-Rich and Rural-Urban)



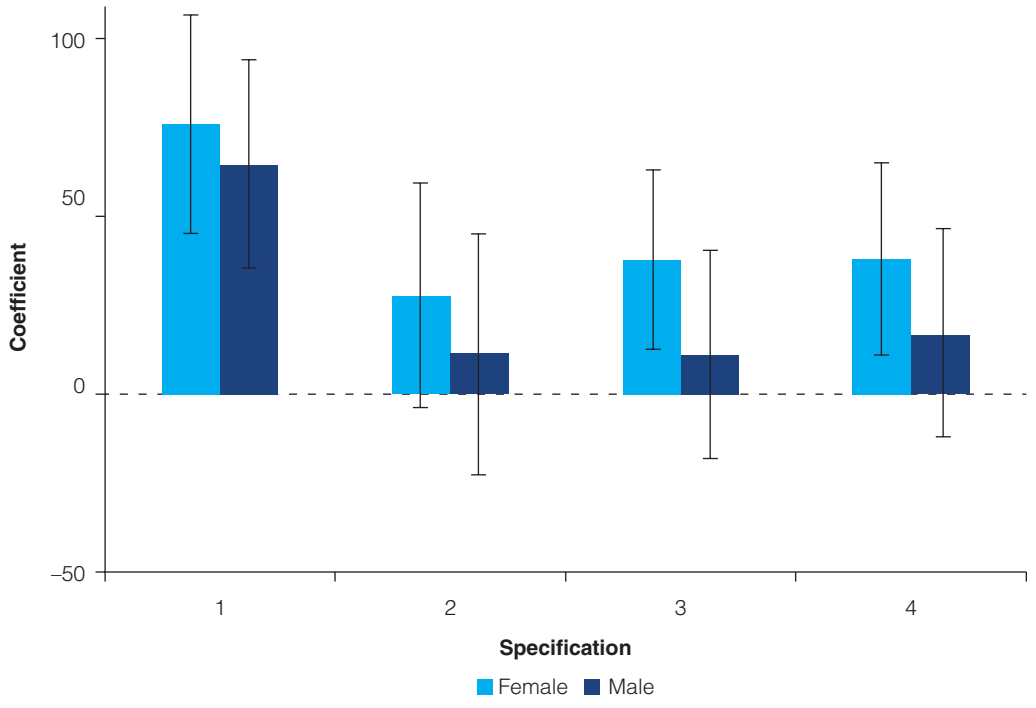
Source: Almeida and Oosterbeek 2016.
Note: The first specification did not include any control variable, the second controlled for family characteristics, the third specification added school characteristics, and the final specification included also the teacher characteristics.

Figure 3.10: Illustrating the Menstruation Hypothesis



Source: Almeida and Oosterbeek 2016.

Figure 3.11: Associations between WASH and 6th Grade Math Score, Females vis-à-vis Males



Source: Almeida and Oosterbeek 2016.

Notes

1. The analysis of the Systematic Country Diagnostic did a similar analysis for the 2007–12 period and found very similar results.
2. Poverty and Social Impact Analysis for First Fiscal Sustainability and Enhanced Competitiveness Development Policy Financing to the Republic of Panama.
3. Such as those related to diarrhea, malnutrition, malaria, trachoma, and lymphatic filariasis.
4. The SDG access definitions reflect the importance of these considerations. See box 2.2 for more details.
5. The purpose of this study was to conduct a systematic review of the effects of handwashing on respiratory infections. Several authoritative agencies, such as the CDC and UNICEF, routinely cite reductions in respiratory infections related to handwashing of 16 percent to 23 percent as reported in this study. However, by the authors' own admission the studies evaluated were of a poor quality and importantly to this report, not related to developing countries. Nevertheless, handwashing was found to be associated a reduction in respiratory illnesses, a general finding that is accepted as common knowledge.
6. See chapter 4 for a discussion of water service providers.
7. Some caveats must however be noted. First, while the data used is nationally representative of all indigenous regions (comarcas), it is not representative of each of the comarcas, and therefore, specific policy recommendations for these cannot be drawn from the analysis. Second, it is possible that WASH infrastructure is endogenous to the model (for instance, if the government provided monetary support in areas of extreme poverty for building latrines or installing high-quality floors in houses or provided chlorine pills for water treatment); if so, the results could be biased.
8. This discussion on dropout rates is based on Koehler-Geib et al. 2015.
9. The principals were asked whether the following services are available at the school: (i) drinking water, (ii) sewer and drain, (iii) toilet, and (iv) garbage collection. Each item could be answered by yes or no. From these, four binary indicators which take the value one if the facility is available and equals zero otherwise were constructed.
10. Average of the four binary variables on WASH.
11. The first specification did not include any control variable, the second controlled for family characteristics, the third specification added school characteristics and the final specification included also the teacher characteristics.

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Chapter 4
Service Providers, Quality, and the Link to Poverty

The apparent advantage of urban areas in terms of water provision lessens when the elements of safely managed services are considered. In more densely populated and wealthier regions, there are lower levels of residual chlorine and higher levels of turbidity. The Institute for the National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionales [IDAAN]) does not meet its own standards on responding to customers' complaints and there are frequent interruptions to service. However, sanitation is even more neglected. Of the 136 *corregimientos* that should be provided with sewerage service by IDAAN, 41 percent are not and, where service exists, disposal and treatment was often inadequate and a high number of complaints on spillages/breakages were reported. In rural areas, only 45 and 38 percent of the indigenous communities studied have access to an improved water source and improved sanitation, respectively, which is much lower than among nonindigenous communities. Many communities have no formal water provider and, among those that do, these systems are more likely to exhibit serious problems. The key aspect leading to the classification of communities as "failed" or "deficient" is the lack of sanitation infrastructure, followed by the insufficient coverage of water systems (almost 40 percent of the sample has no coverage).

To address the issues of access and link it to welfare two separate analytic pieces were undertaken for this Water Supply, Sanitation, and Hygiene (WASH) Poverty Diagnostic. The work provides fresh insights into how existing data sources, and new data sources, can be used to measure aspects of safely managed WASH services. The focus of this section is on (i) the types of service providers and how these are correlated with welfare levels, location, and ethnicity; (ii) the quality of water services in urban areas (served by IDAAN); and (iii) the quality of water service provision in rural and indigenous areas.

Water Service Provision IDAAN's Coverage Is Constrained to the Wealthier, Urban, and Nonindigenous Communities

The pattern of urban populations using IDAAN services, and rural areas using a mixture of providers, is a function of IDAAN's mandate (box 4.1). Founded in 1961, IDAAN is responsible for providing water services to all communities with a population greater than 1,500. The bulk of IDAAN's services benefit a few heavily populated urban areas. Today, IDAAN covers only 38 percent of the nation's 600-plus corregimientos, and 68 percent of the population. While the agency, overall, does a reasonable job of fulfilling its mandate, there are still errors of exclusion in its coverage. IDAAN fails to provide service in the districts of Boquete in Chiriqui and Changuinola and Chiriqui Grande in Bocas del Toro. Additionally, there are other communities with over 1,500 inhabitants that, despite being classified as rural, should receive IDAAN coverage and do not, such as those in Guna Yala and Bocas del Toro.

A study on the quality of service provision by the national utility IDAAN (see next section for further details) offered information on accessibility to these services that confirms and complements the findings presented previously. Indeed, the initial figures of improved water

Box 4.1: The Key Role of IDAAN

The inequities captured in the analyses that are presented in this chapter are the result of years of work in the WASH sector in Panama in which IDAAN has played a crucial role. IDAAN is responsible for the planning and execution of investments in water supply and sanitation and for the provision of these services primarily in urban areas of the country and in rural areas with higher population concentrations (over 1,500 inhabitants). Established in 1961, in the early decades IDAAN enjoyed wide financial capacity and qualified human resources. However, since the 1980s, its operational, management and financial capacity has substantially weakened (DISAPAS et al. 2014).

The inefficiencies in the functioning and financial unsustainability of the national facility have been highlighted in different studies (see, for instance, DISAPAS et al. 2014, 2016). These have been attributed to the lack of the appropriate resources and the necessary financial autonomy to operate efficiently (DISAPAS et al. 2014). The politically driven low tariffs applied by IDAAN, tariffs that have not been revised since 1982, are responsible for these financial difficulties. A series of governments have chosen to subsidize the operational deficits of the facility to avoid the political costs of raising tariffs. As a consequence, adverse incentives prevail, that impede management from increasing efficiency and that ensure that consumers will not pay higher tariffs for what they perceive to be deficient service (DISAPAS et al. 2014, 2016).

The current government has recently acknowledged this situation and is showing its commitment to address it. In January 2017, in his review of the first 30 months in office of his administration, the president of Panama has announced the government's decision to continue improving the system for water and sanitation in the country, and more specifically, to turn IDAAN into an efficient entity by (i) strengthening its management, (ii) creating a special construction unit within it, supported by the Public Infrastructure Coordinating Unit, and (iii) providing a new legal and operational structure that helps to ensure its efficient functioning. Implementation of these measures has yet to begin.

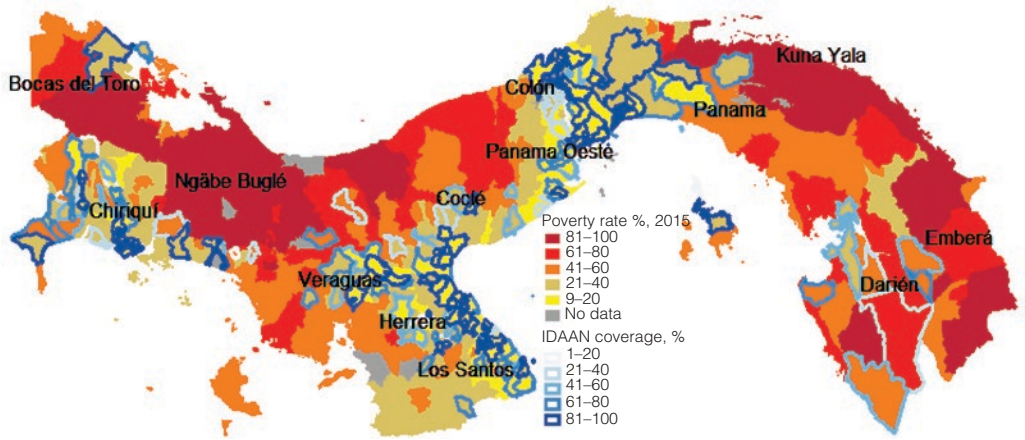
coverage from the Census, at 91 percent of the population nationwide, mask a highly skewed distribution of service provision by geographic area, poverty level, and ethnicity.

Largely due to its mandate, IDAAN does not reach the poorest populations of the country. Map 4.1 shows IDAAN coverage, with the areas that have coverage outlined in blue and the darkest blue lines showing over 80 percent of the population with IDAAN-supplied water. The poorest corregimientos (in dark red), many of which are located within the comaracas, have limited access to IDAAN services as these are areas with dispersed populations. Overlaying coverage on the map shows that corregimientos with positive and significant changes in poverty levels between 2011 and 2015 existed mainly in areas with IDAAN coverage (map 4.2)

Services Provided in Urban Areas Served by IDAAN: Elements of Safely Managed Sanitation

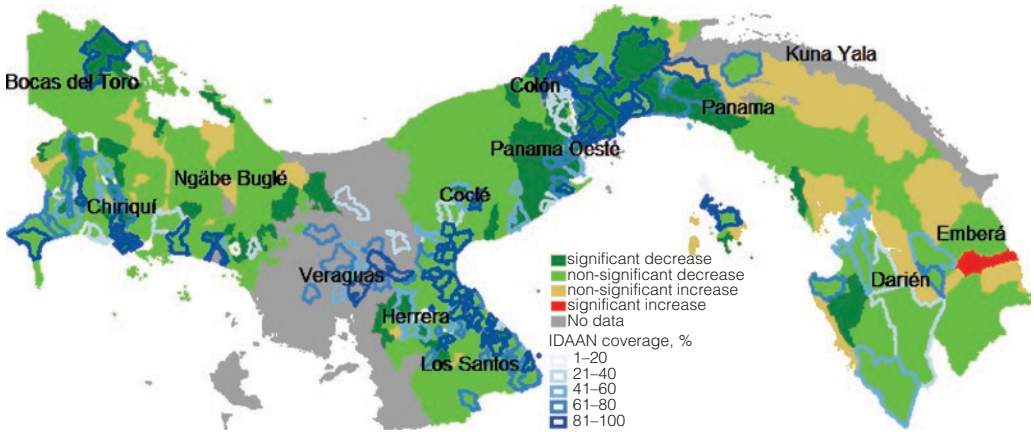
The apparent advantage of urban areas in terms of water provision lessens when the new elements of safely managed sanitation are considered. The analysis presented here is based

Map 4.1: Map of IDAAN Coverage by Overall Poverty Level



Source: Authors' calculations based on Ortiz 2017.

Map 4.2: Changes in Poverty and IDAAN Coverage, 2011–15



Source: Authors' calculations based on Ortiz 2017.

on information from the 2010 Census, IDAAN, the Public Service Authority (Autoridad de los Servicios [ASEP]) and the Multiple Indicator Cluster Survey (MICS) 2013, as well as the corregimiento-level poverty estimates developed by the Ministry of Economics and Finance and the World Bank (see chapter 2 for details on this last source). Box 4.2 provides a detailed account of the different sources used in the analysis. The study draws on the Sustainable Development Goals (SDG) 6 and Joint Monitoring Programme (JMP) definitions of water and sanitation and the nationally defined set of indicators produced by the regulator ASEP.[1] For drinking water, the existing data on components of safely managed sanitation are examined. These include whether the source is of a Millennium Development Goals (MDG) improved type, water quality based on tests of residual chlorine and turbidity levels, continuity of service and, finally, the location of the water source.[2] For sanitation, the only available information on safely managed is on the treatment of wastewater from sewerage networks. Data of the behavioral indicators of hygiene households having a place of handwashing with soap and water present have not yet been collected for Panama.

Box 4.2: Data Sources Used

Data Sources for Water

Census 2010: Provided information on the source and continuity, through the following questions:

- Where do you primarily obtain your drinking water?
- How many hours of water do you receive per day?
- How many days per week?

The level of disaggregation was individual.

IDAAN, Directorate of Planning: Provided information on service provider by population, in particular:

- Where water service is deficient
- Where sanitation service exists but is non-sewerage

The level of disaggregation was populated area or urban neighborhood.

IDAAN, Directorate of Commercialization: Provided information on time to install and time to reconnect customers (indicators 6.7 from ASEP).

The level of disaggregation was populated area or urban neighborhood.

IDAAN, Direction of Operations: Provided information on:

- Reported complaints of all types (311), including any sewer pipe breakages
- Time taken to respond

The level of disaggregation was individual

Regulator ASEP: Provided information on:

- Percent scored in the chlorination indicator
- Percent scored in the turbidity indicator
- length of unplanned interruptions to the service

The level of disaggregation was by WSS system, which can be matched at the corregimiento level.

Data Sources for Sanitation

IDAAN, Directorate of Operations: Provided information on reported complaints of all types (311), including any sewer pipe breakages and time taken to respond.

The level of disaggregation was individual.

Regulator ASEP: Provided information on the number of breakages in the network.

box continues next page

Box 4.2: Continued

The level of disaggregation was by WSS system, which can be matched at corregimiento level.

Data Sources for Poverty

Collaboration between the Ministry of Economics and Finance and the World Bank on the 2010 Census and March 2015 Household surveys: Provided information on calculations of a poverty index were reached using small area estimation techniques to generate head count estimates of poverty at corregimiento level and the Gini inequality index plus significant and non-significant increases and decreases between 2010 and 2015.

The level of disaggregation was the corregimiento.

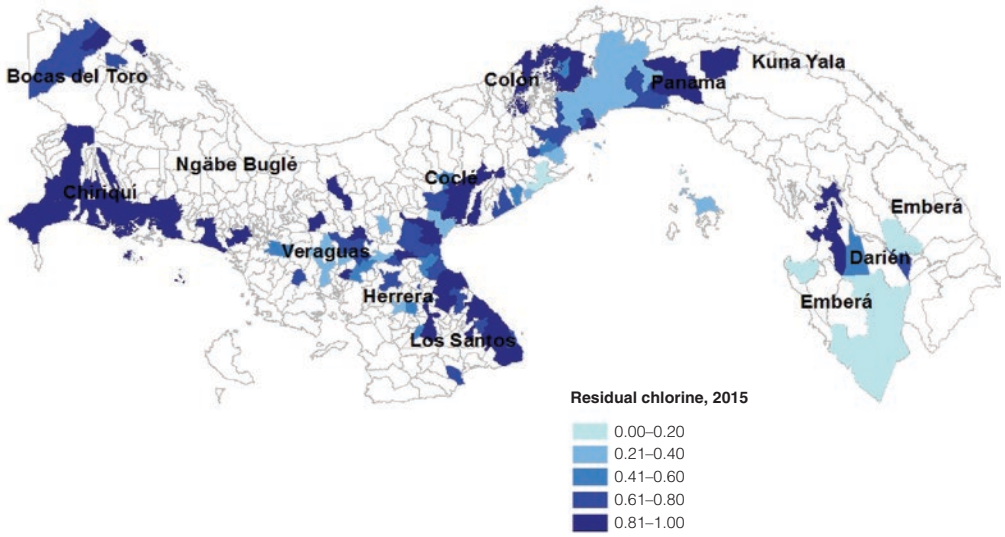
Source: Perochena, Ayling, and Laca 2016.

The Quality of Water Is Lower in the Most Densely Populated and Wealthier Areas: The Example of Panama City

Drinking water quality is assessed on two main indicators: residual chlorine levels and turbidity. Residual chlorine levels show how much chlorine is lost between injection at the treatment plant and water arriving at the taps of households. This provides an indication of the state of the network's pipes. The lower the loss of chlorine, the better the quality of the network and of the water consumed. Turbidity tests are carried out by examining the lack of transparency in the water due to the presence of suspended particles. This is an indicator that is directly related to the perception of those receiving the service, also an important variable to examine.

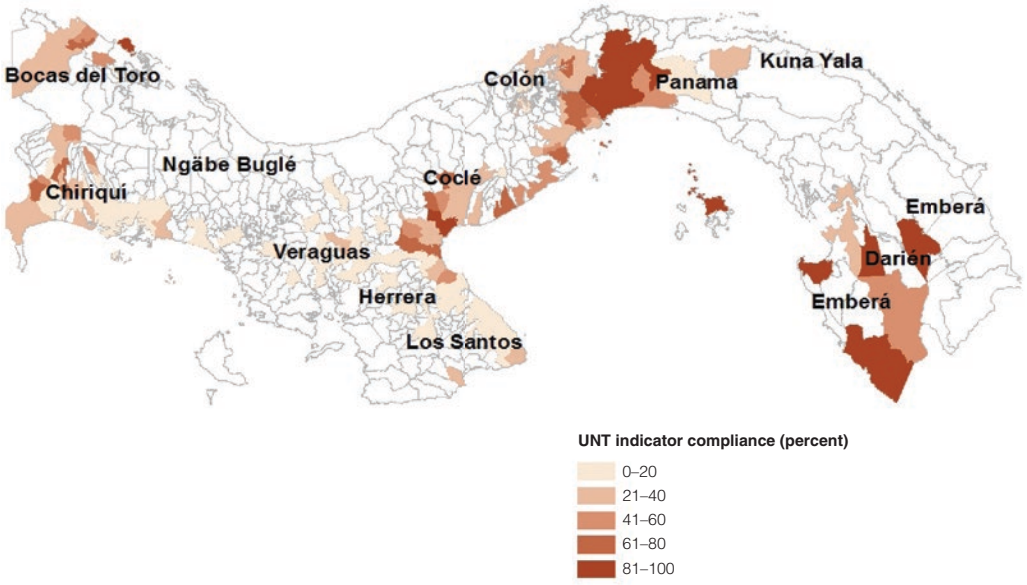
There are lower levels of residual chlorine and higher levels of turbidity in more densely populated and wealthier regions. Map 4.3 shows the identified levels of residual chlorine in the areas served by IDAAN. The areas in dark blue are where, according to the regulatory agency ASEP, the water from IDAAN meets the national standards. In such areas, the residual chlorine levels are high, implying that the network is in good condition. Meanwhile, areas marked in light blue on the map have much lower levels of residual chlorine levels at the household point of use. This implies that much of the chlorination at the treatment plant is being lost along the way due to leaking pipes or water being exposed to the elements between the treatment plant and arrival at its destination. Residual chlorine levels are lower in the systems of Panama City, despite the higher poverty rates registered in Colón district, and generally assumed higher water quality for Panama City. Higher water turbidity[3] is detected in the systems of Chepigana in Darien, parts of Coclé, and, interestingly, also in areas in and around Panama City (map 4.4). This somewhat surprising result may be due to a higher population stress on the network.[4] Darien water systems also show lower levels of chlorine residue, perhaps less surprisingly. No correlations were found between poverty and water quality, however. This is most likely due to the fact that the available indicators are an average for the whole system, which often spreads over several corregimientos with varying poverty rates. Overall, however, Panama's levels are below those of its peer countries for this test (box 4.3).

Map 4.3: Residual Chlorine Levels in Water, 2015



Source: Authors' calculations based on data from IDAAN.

Map 4.4: Water Turbidity Levels, 2015



Source: Authors' calculations based on data from IDAAN.

Customer Service Could Be Improved in Densely Population and Richer Areas Where Most Complaints about Leaking Pipes Occur

While not strictly a measure of water quality, customer service complaints highlight important issues in quality. A very useful, albeit partial indicator of IDAAN's service performance also comes from customer complaint hotlines (311), which show, by corregimiento, where most

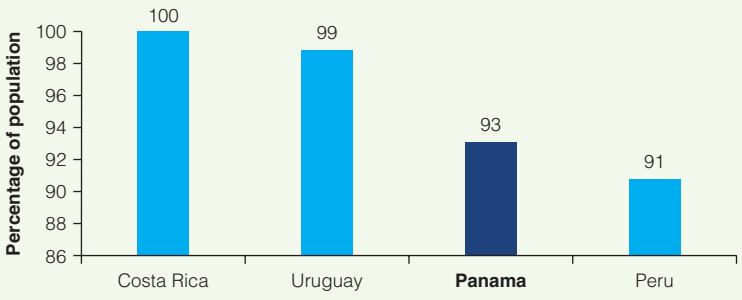
Box 4.3: Panama Urban WSS Performance Benchmarking at a Glance

Additional insights on the adequacy of Panama's performance in WASH comes from benchmarking. Here Panama is compared to two of its structural peers in the region that have similar structural characteristics—Uruguay and Costa Rica—and Peru, a country with similar characteristics but with a much higher population than Panama.[5] The focus is on the coverage and quality of urban service provision from IDAAN under its current capacity without any prospective reform. The indicators used are: i) c***overage***: percentage of population served by utilities; ii) ***continuity***: number of hours of water supply service provided to customers in a day; and iii) ***residual chlorine compliance***: percentage of samples passing the required chlorine residual tests.

The results of the benchmarking exercise are mixed. Although Panama's coverage is high for water—more than 90 percent—other countries like Costa Rica and Uruguay perform better with almost universal coverage of their urban population. In terms of sanitation coverage, Panama trails other countries. While it seems to match that of Costa Rica, Costa Rica's data is from 2010 and coverage may have improved since then. Continuity of service, a measure of quality, is seen, based on the Census data from 2010, to be relatively high: the reported hours of service from IDAAN was 20.4 hours in the dry season, which is quite high considering that Peru averages between 17–18 hours per day. However, both Costa Rica and Uruguay are able to provide almost 24 hours of service in the same period. The other measure of quality where there is comparable information across the countries is on residual chlorine. The number of samples passing residual chlorine tests in Panama was 78 percent in 2014, which decreased to 73 percent in 2015. This is low compared to that in Uruguay and Peru, where this value was consistently above 95 percent, and showed a positive trend. This last measure is of concern and further work is needed to assess why levels are so low and falling in Panama.

Changes over time would be valuable. The performance of Panama's urban water and sanitation sector based on these indicators is to be lower than its peers—with a few exceptions where it does reasonably well, that is, urban water coverage. However, it might also be useful to compare its performance over time, since the information in

Figure B4.3.1: Benchmarking Urban Water Coverage, 2015

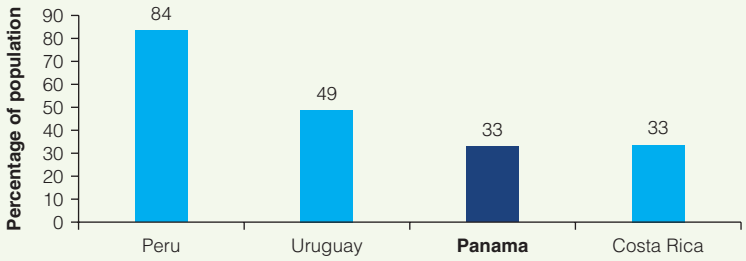


Source: IBNET, Sunass 2015, Encuesta de Propósitos Múltiples 2015, and OSE 2015 reports.
Note: The average for Costa Rica is based on two utilities, and is from 2010. Uruguay has one utility—OSE. Peru's data is from SUNASS. IBNET = Water and Sanitation International Benchmarking Network; OSE = Obras Sanitarias del Estado - Republica Oriental del Uruguay; SUNASS = Superintendencia Nacional de Servicios de Saneamiento, Perú.

box continues next page

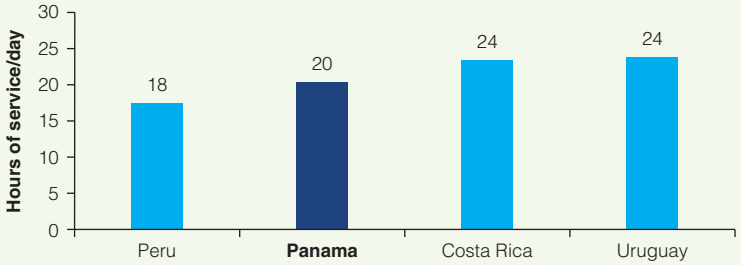
Box 4.3: Continued

Figure B4.3.2: Benchmarking Urban Sewerage Coverage, 2015



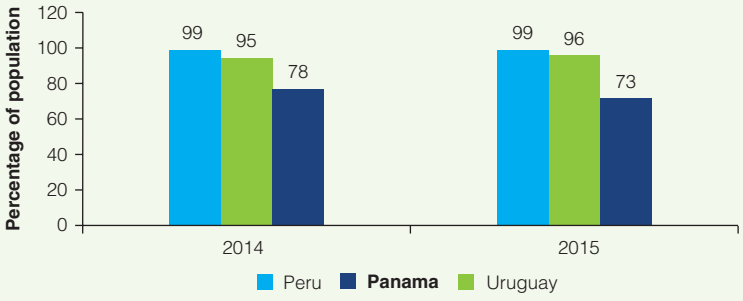
Source: IBNET, Sunass 2015, Encuesta de Propósitos Múltiples 2015, and OSE 2015 reports.
Note: The average for Costa Rica is based on two utilities, and is from 2010. Uruguay has one utility—OSE. Peru's data is from SUNASS. IBNET = Water and Sanitation International Benchmarking Network; OSE = Obras Sanitarias del Estado - Republica Oriental del Uruguay; SUNASS = Superintendencia Nacional de Servicios de Saneamiento, Perú.

Figure B4.3.3: Water Continuity (Number of Hours), 2010



Source: IBNET, Panama Census 2010
Note: The average for Costa Rica is based on two utilities, Peru is based on 50 utilities, and Uruguay has one utility—OSE. IBNET = Water and Sanitation International Benchmarking Network; OSE = Obras Sanitarias del Estado - Republica Oriental del Uruguay; SUNASS = Superintendencia Nacional de Servicios de Saneamiento, Perú.

Figure B4.3.4: Residual Chlorine (Number of Samples Passing Residual Chlorine Tests)



Source: Uruguay OSE report 2015 Panama Census 2010, Sunass report 2015.
Note: OSE = Obras Sanitarias del Estado - Republica Oriental del Uruguay.

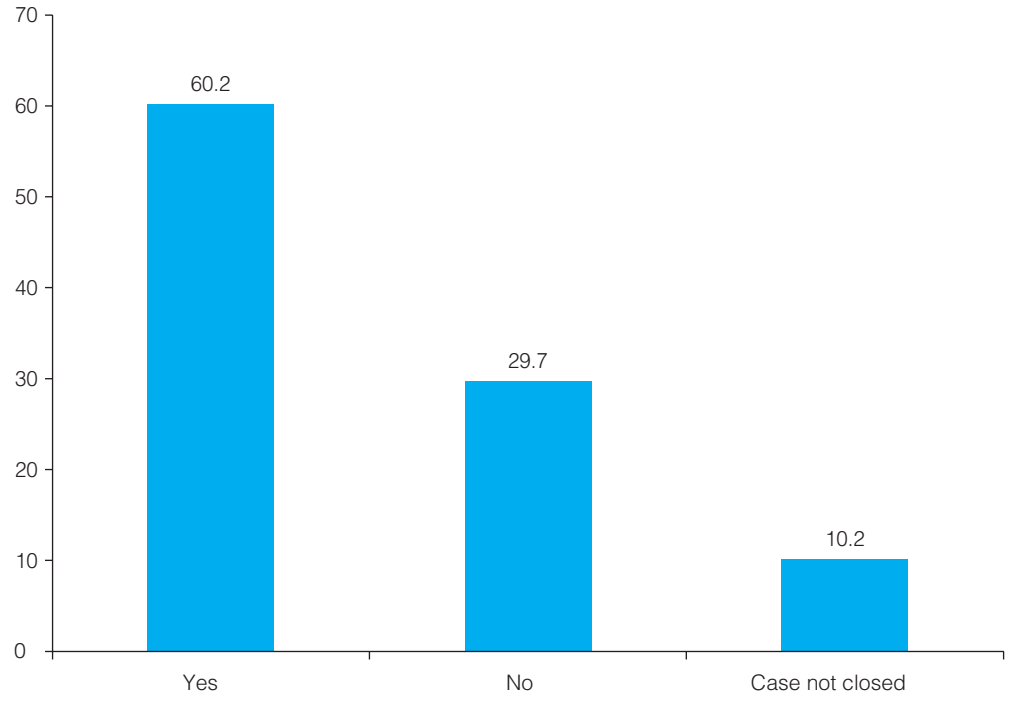
this section is only for a point in time. Time-series data might shed more light on the direction of its performance. No recent time-series data for IDAAN were available to ADERASA—an Association of Regulators in the region, and thus in IBNET. Since these indicators are routinely collected and measured by utilities, there is scope for improvement in data reporting by IDAAN.

issues were reported and what these issues were. The 311 service is available to all IDAAN service areas but reports mostly have information from Panama and Colón. Other service areas has fewer complaints, in part due to a lack of awareness of the service in these areas. IDAAN has a 30-day response to complaints standard. In comparison to other countries, this is considered a long-time frame. Peru's standard, for example, is that complaints to the national utility must be addressed in half this time period. Yet, even within this generous time frame in Panama, IDAAN is not meeting its own standards as only 60 percent of complaints are addressed in a timely fashion (figure 4.1).

The three most important issues for customers are leaking water pipes, service interruptions and sewer pipe breaks (table 4.1). Of these complaints 82.6 percent came from Panama City, with 6.7 percent from Colón and 2.7 percent from Herrera (map 4.5). Interestingly, the pattern of leakages corroborates those of residual chlorine. Performance tends to be worse in Panama City, according to the regulator's standards, and does not correlate with poverty levels.

Interruptions to service are common. Given that the most frequent complaints are around leaking pipes and service interruptions; it is useful to take a closer look at the information available on the continuity of service that IDAAN provides. Overall, continuity of services figures are fairly good although below regional peers (box 4.3). At first sight, IDAAN's continuity of service compares favorably to other private service provider options in Panama. According to the 2010 Population and Housing Census, those who report having IDAAN service have, on average, 5 hours more of service than those who receive their water from other sources.[6] However, IDAAN customers who have 24-hour service may also experience unplanned interruptions. This is particularly the case in urban areas. The areas in orange and red on map 4.6 have the highest reported number of interruptions in service. The highest reported number of interruptions in service per person per year is registered in Coclé, Arraijan, around the city of David, and in La Chorrera, all reasonably well-off areas of the country (ASEP 2015).

Figure 4.1: Response to Complaint within 30 Days



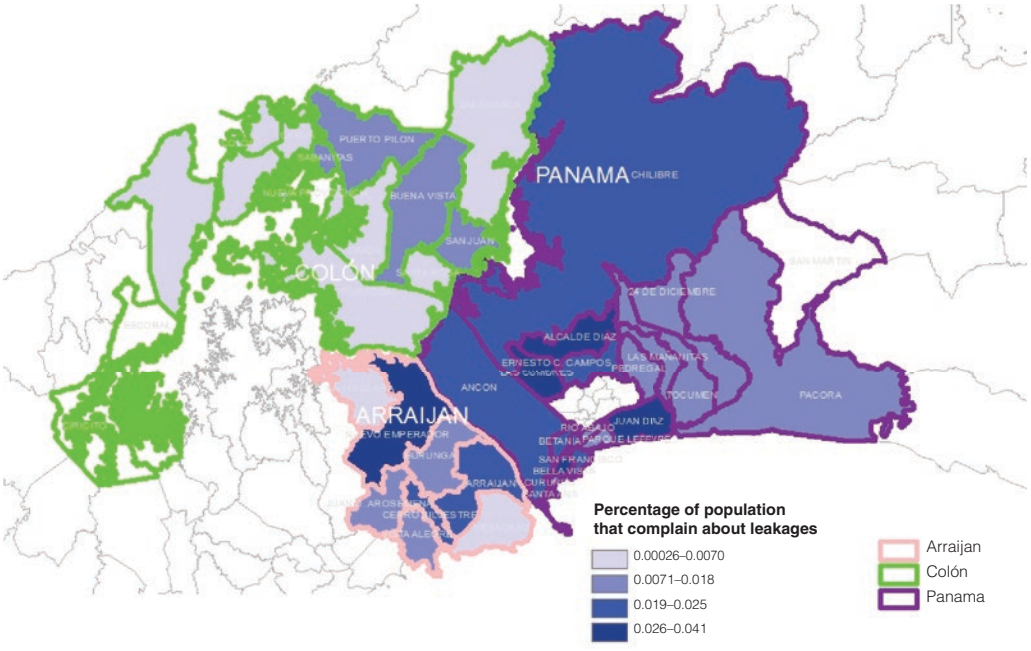
Source: Authors' calculations based on IDAAN data.

Table 4.1: Most Common Complaints to 311 (Removing General Inquiries), 2015

Service	Frequency	Percent
Drinking water – pipe leakages	36,479	40.97
Drinking water – interruptions to service provision	32,759	36.8
Sewerage – pipe breakages	15,368	17.26
Drinking water – low pressure	1,345	1.51
Drinking water – damage to the water source	908	1.02
Drinking water – pavement repair	864	0.97
Drinking water – water tanker did not arrive	574	0.64
Drinking water – problems with water quality	474	0.53
Sewerage – uncovered manhole	258	0.29
Total	89,029	100

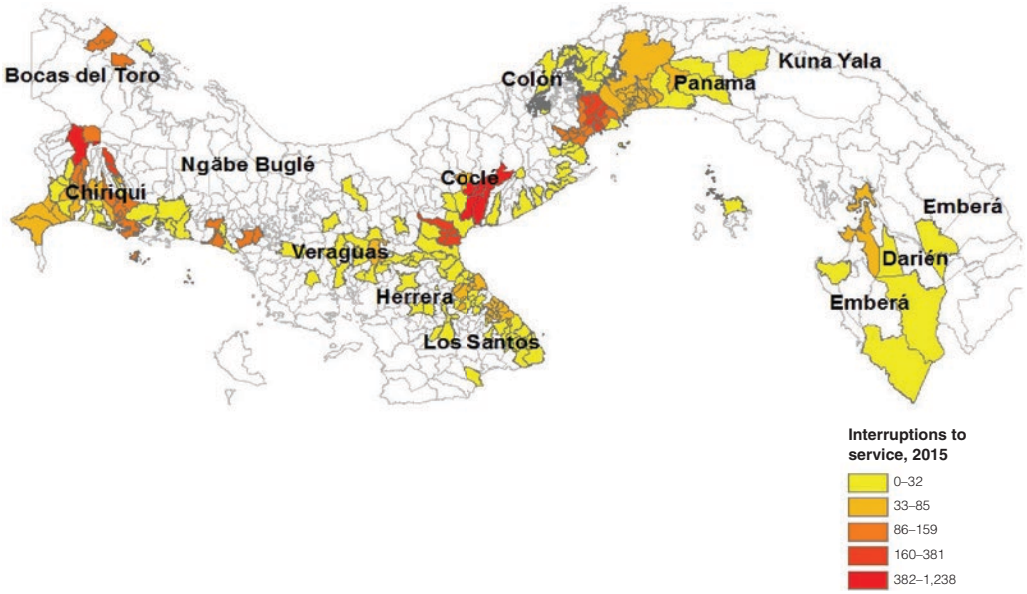
Source*:* Authors' calculations based on IDAAN data.

Map 4.5: Complaints about Leakages, by Percent of Population and by District



Source: Authors' calculations based on IDAAN data.

Map 4.6: Interruptions to Service, 2015



Source: Authors' calculations based on IDAAN data.

A more detailed look within the city of Colón, for example, shows a correlation between less service continuity and higher rates of poverty. Indeed, out of three districts that in urban areas of Panama, Colón compares most unfavorably to the national average. This coincides with the fact that Colón also contains some of the poorest corregimientos. Only 38 percent of the corregimientos of Colón have 18–24 hours of service per day, well below the national average of 70 percent (figure 4.2).

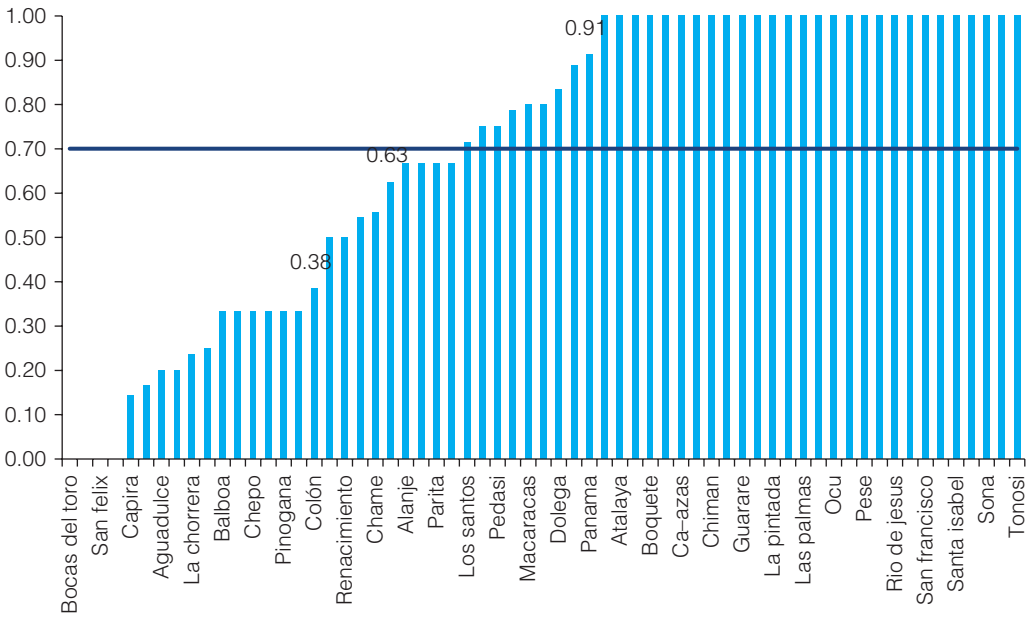
In as many as 5 of the 12 corregimientos of Colón at least 30 percent of the population receives less than six hours of continuous water service per day. The situation is particularly bad in Nueva Providencia, where 81 percent of respondents stated that they received fewer than six hours of service per day, and in Santa Rosa and Buena Vista, where 58 and 50 percent of respondents, respectively, reported receiving this level of service (figure 4.3). Households are not considered to have safely managed drinking water if their drinking water source is available for less than 12 hours per day.

Safely Managed Sanitation Reaches Less than Half of the Population IDAAN Meant to Cover

Sanitation is the more neglected service in Panama. Of the 136 corregimientos that have at least one community of over 1,500 inhabitants, and thus should be provided with sewerage services by IDAAN, 41 percent do not (areas in purple without green borders are lacking sewerage in map 4.6). Additionally, there are 477 communities with a total population of over 816,000 across Panama, Colón, and San Miguelito districts where IDAAN cannot confirm whether waste water is being discharged directly into the Panama Bay without treatment (see map 4.7). This data suggest that access to safely managed and treated sanitation services in Panama is still very low and concentrated in a few wealthier areas of the country. Panama's level of coverage is below that of Peru and Uruguay, although on par with Costa Rica.

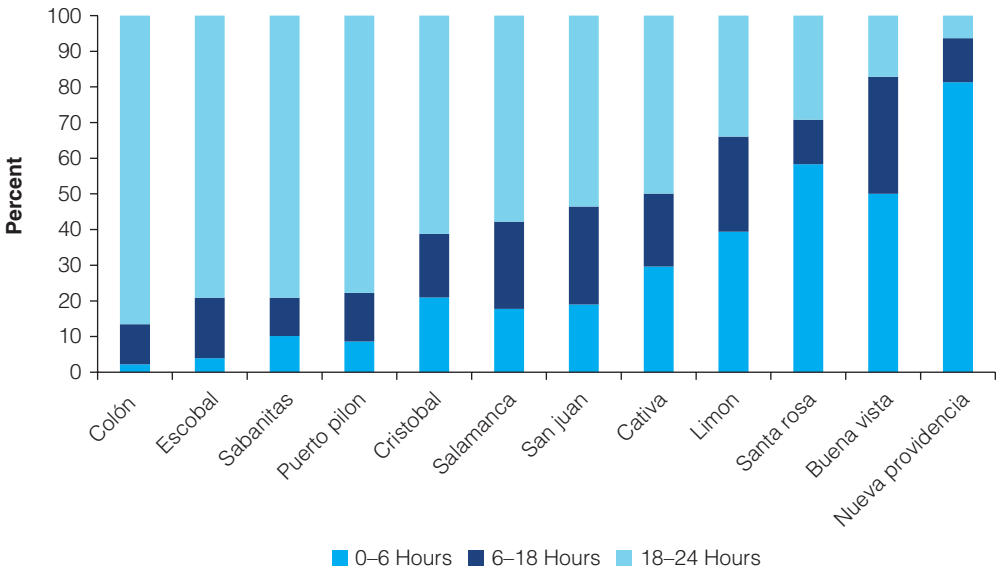
Where sewer service was provided, it was found often to be without safe disposal. Integrating IDAAN information with the MICS 2013 data provides insights into the "safely managed"

Figure 4.2: Continuous Water Service (Percent of Corregimientos per District)



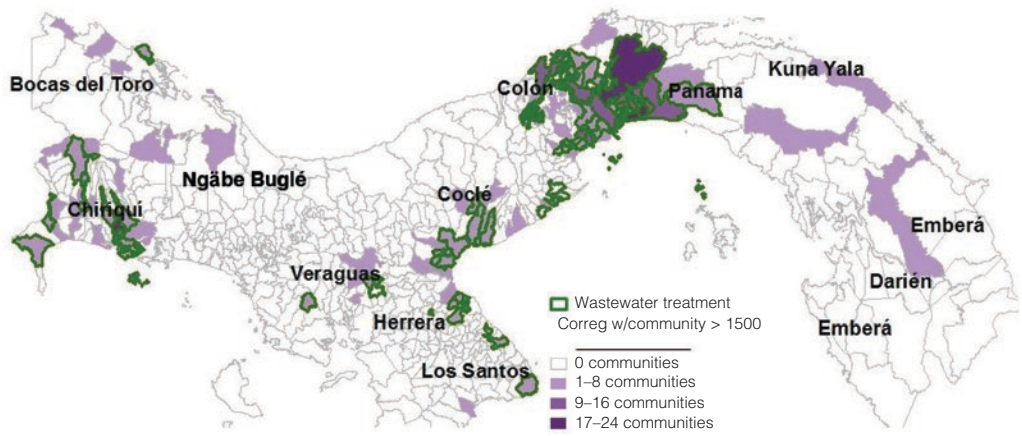
Source: Authors' calculations based on the 2010 Population and Housing Census.
Notes: Continuous water service is defined as having water 18-24 hours per day. Only includes those communities receiving IDAAN service.

Figure 4.3: Water Service Continuity in Corregimientos of Colón, 2010 (Percent of the Population)



Source: Authors' calculations based on IDAAN data.
Note: Includes only customers of IDAAN.

Map 4.7: Sewerage Network Coverage by IDAAN's Mandate



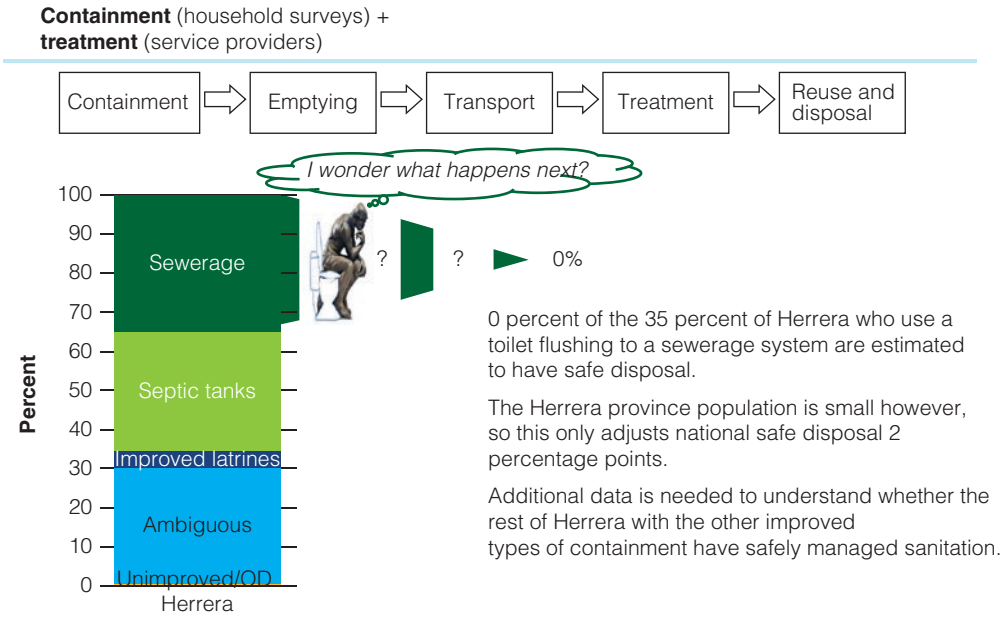
Source: Authors' calculations based on IDAAN data.

sanitation landscape, although more comprehensive data are needed to fully understand access to safely managed sanitation. The MICS 2013 measured the percentage of each province's population reporting using a sanitation system connected to a sewer system. At the same time, from IDAAN there is information on which provinces had some or sewage treatment in 2015. If a household uses a sewer system in a province where there is no sewage treatment in operation, it is assumed that none of this sewage is treated (unless the sewage is transported to treatment in other provinces). For example, as Herrera has no sewage treatment system, even though 35 percent of the population have a toilet flushing to a sewage system, none of these are estimated to have safe disposal (figure 4.4). Although the province has a small population this only adjusts national safe disposal by 2 percentage points. However, additional data are needed to understand whether the rest of Herrera with the other improved types of containment has safely managed sanitation and the extent to which other provinces also have safely-managed sanitation.[7]

Additionally, a high number of complaints on spillages/breakages were reported (map 4.8). As an example, in the densely populated urban corregimientos in and around Panama City where sewer service is provided by IDAAN, the system remains incomplete. Several corregimientos are still unconnected to the network. Around 11.4 percent of call-ins to the complaints hotline relate to sewer pipe breakages. Although these breaks are less common than water leakages and interruptions, they represent a greater environmental and health hazard. The most severe cases in 2015 were found in the districts of Chame and Chorrera in Panama Oeste and Santiago in Veraguas. For the smaller diameter sewerage systems, those in Puerto Armuelles and Bocas del Toro also had spillages. Considering the relative size of the population in these areas the fact that a large number of complaints were lodged may be indicative of a situation that needs addressing.

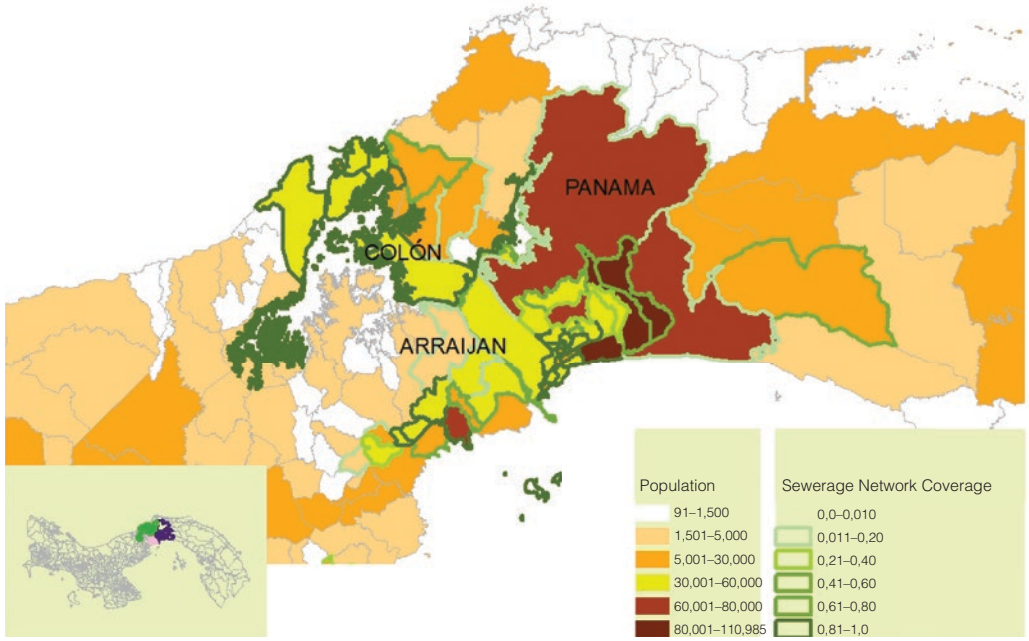
The analysis of quality data has highlighted important issues that undermine the urban population's access to adequate water and sanitation resources. First, it appears that the quality of WSS is lower in more densely populated areas of the country, including the province of Panama. The most common reported problems are pipe leakages, service interruptions and pipe breakages for sewerage, and are more concentrated in the Panama region. Service interruptions in water provision tend to be correlated with poverty: It is in poorer areas where

Figure 4.4: Containment and Treatment



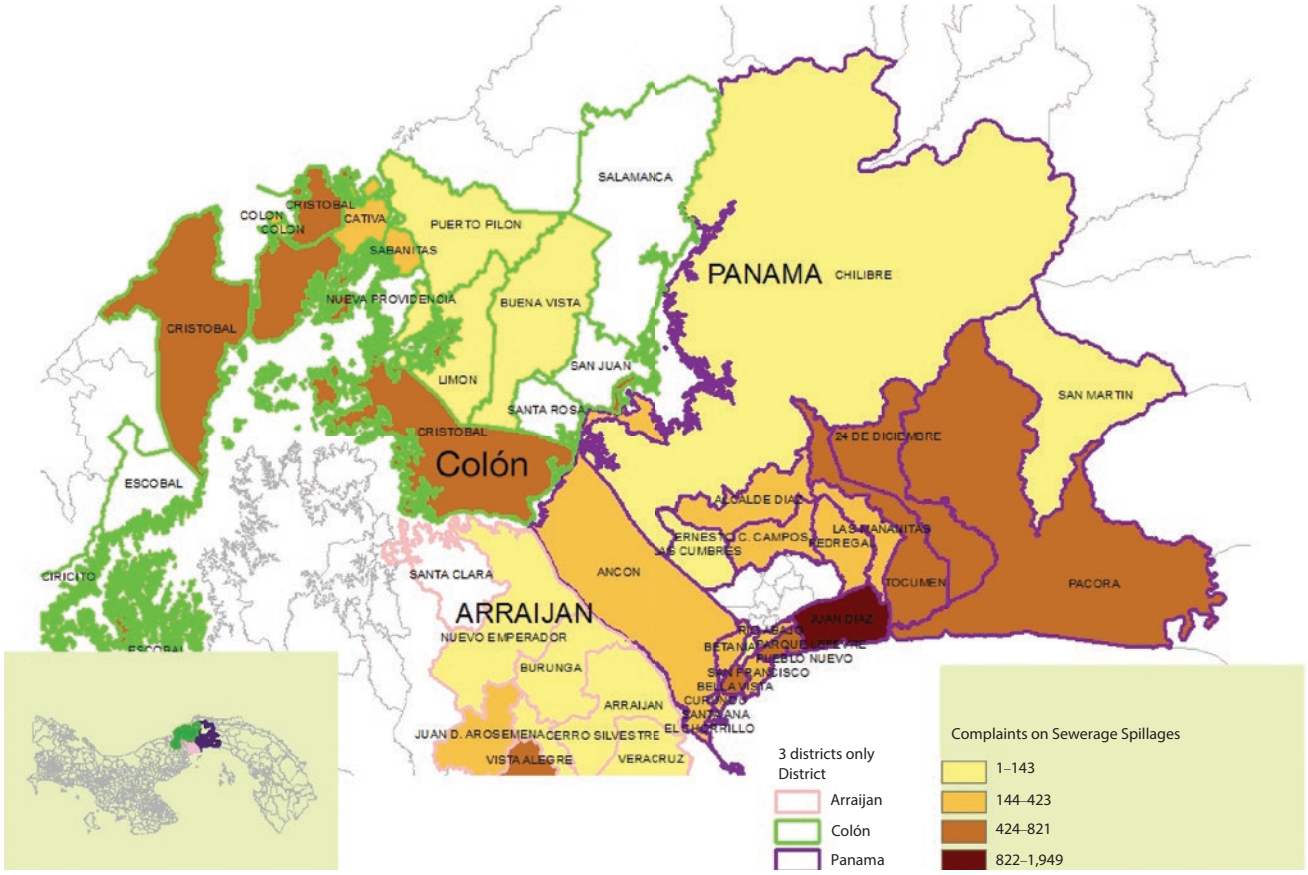
Note: OD = open-air defecation.

Map 4.8: Population Density and Access to Sewerage Network Coverage from IDAAN, by Corregimiento



Source: Authors' calculations based on IDAAN data.
Note: Corregimientos with darker orange and no green border have populations of 5,000-3,0000 with no sewerage network from IDAAN. Those in yellow with a light green border have less than 40 percent of their population with sewerage networks.

Map 4.9: Corregimientos with the Highest Number of Complaints of Sewerage Spillages per Population



Source: Authors' calculations based on IDAAN data.

interruptions seem to be more frequent. The situation with regards to sewerage is of greater concern (map 4.9). In the densely populated, urban corregimientos in and around Panama City where sewerage service is provided the system remains incomplete, which represents serious health and environmental risks. In general, the analysis of urban systems demonstrates that the quality of service provided by IDAAN in urban areas could be substantially improved.

New Data on Rural Water and Sanitation Systems

Rural water quality issues are also prevalent and gaps exist between indigenous and nonindigenous communities. As shown in chapter 2, major equality issues persist in terms of access to, and the level of, service, among rural inhabitants, and especially indigenous peoples, who are most often not served by IDAAN but by community systems. As rural, indigenous communities are those with the lowest reported access to WASH services and the highest poverty levels, a key focus of the WASH Poverty Diagnostic exercise has been to assess the characteristics of the actual services available to this population to understand bottlenecks and solutions to service delivery.

As part of the activities under the WASH Poverty Diagnostic, new data were collected to address the sustainability of rural, in particular indigenous, peoples' water and sanitation services.

The Directorate for Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitari [DISAPAS]) in Panama is in the process of creating a new database, the Rural Water and Sanitation Information System (Sistema de Información de Agua y Saneamiento Rural [SIASAR]).[8] By community, SIASAR collects data on the community environment, the physical characteristics of the water and sanitation systems in the community, and the management of each system. These data are used to address issues of sustainability of the rural water service provision. It should be kept in mind, however, that the findings from this data base today will overstate the quality and coverage of water and sanitation systems. While the SIASAR database is expected to cover the entire rural segments of Panama eventually, at present data collection is incomplete. The project started with communities that were easier to reach. For this reason, the communities in the dataset are not a representative sample of all rural communities but are, it is expected, biased toward better-off communities. Thus, at present, the data set overstates the access and quality of water and sanitation services in the rural areas.[9]

To fully understand the water and sanitation situation of indigenous communities, many of these very remote, a new primary data collection effort was undertaken. Based on population weights in the 2010 Population and Housing Census, a probability sample of 138 indigenous communities was designed to provide a basic overview of water and sanitation systems in indigenous territories and *comarcas*.[10] The sample was stratified by ethnic group and is expected to provide a reasonable facsimile of characteristics of basic infrastructure.

Overall Rural Analysis

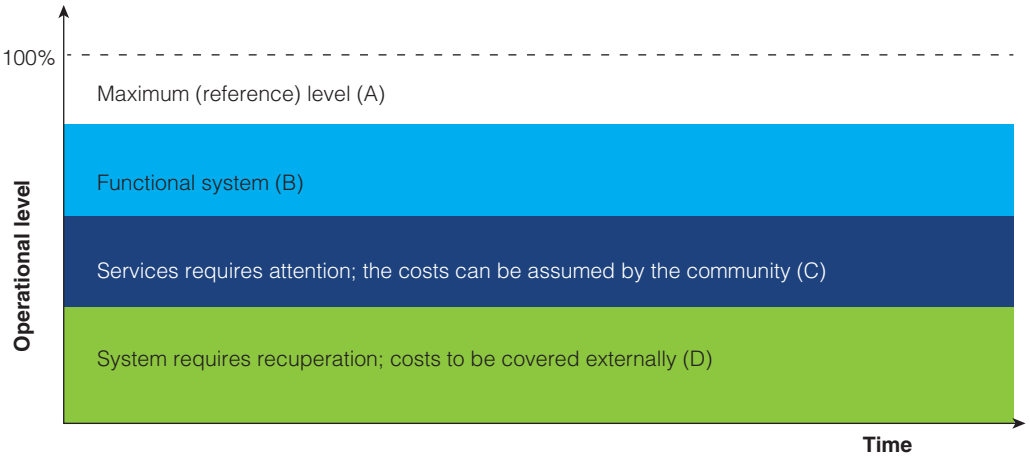
SIASAR data from rural communities were used to classify services into different categories depending on quality. At the time of the report the available information in SIASAR's data covered more than 1,000 rural communities of which 633 are nonindigenous communities and 491 are indigenous communities. As data collection started in the most accessible communities in rural areas, and to the extent that better road access translates to more resources in the community and better systems, the sample may be biased towards a more positive view of the rural systems. The comparisons between indigenous and nonindigenous areas may still be valid, however. Although, until the full SIASAR database is constructed, there is no way to test this hypothesis.

The SIASAR study provides data on critical characteristics of water and sanitation services. The three domains assessed are: (i) communities (general environment), (ii) system (infrastructure), and (iii) providers (figure 4.5). The community element includes: coverage of potable water and sanitation and features of a healthy and hygienic environment; the system component looks at all infrastructure characteristics, including the water flow, gathering, distribution network and storage; finally, the provider aspect assesses: organization, institutional and financial management, fees, provision of sources, and operation and maintenance (O&M). The data are collapsed into a simple A, B, C, D classification system. A classification of "A" for quality corresponds to an optimal service level, and a classification of "D" to system failure.

Primary Data Collection in 138 Indigenous Communities to Inform Comprehensive WASH Investments

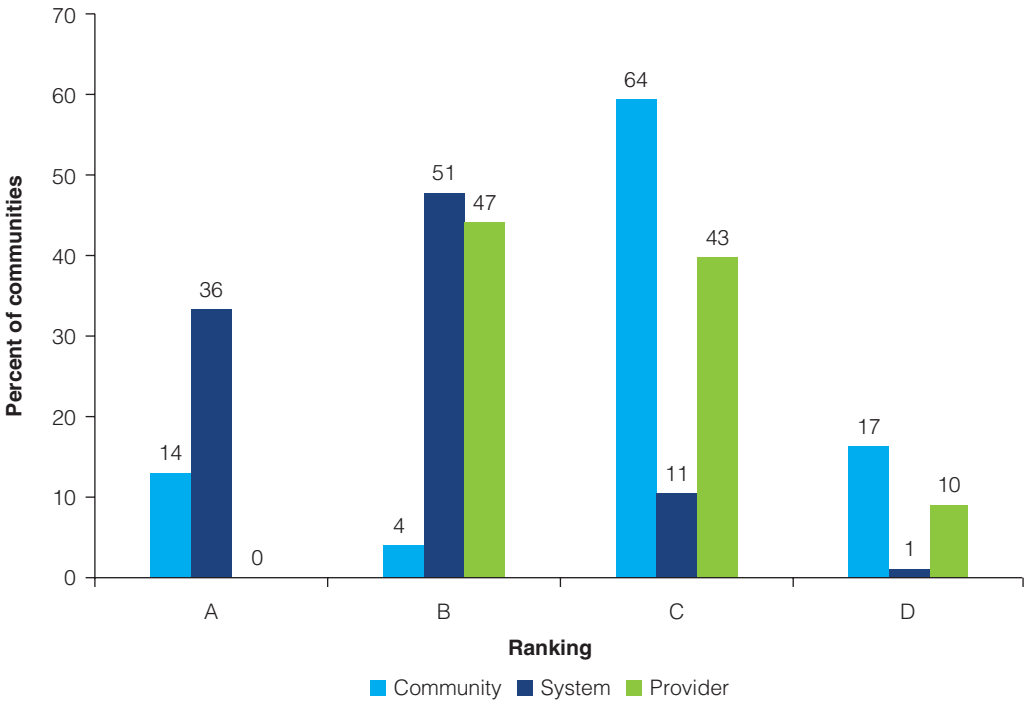
The study assessed the specific situation of a subsample of 138 selected indigenous communities, mostly from Ngäbe Buglé (97), Bocas del Toro (12), and Guna Yala (10). The goal here was to attempt to extrapolate to the full sample of indigenous communities in Panama (living in indigenous territories or comarcas). As this sample includes communities that are remote and of difficult access, it was expected that the overview this would provide would be more negative than that provided by a sample selected by ease of access.[11] For those communities that have water systems (83 of the 138), the category where communities appear to perform the worst is in terms of the community environment, as over 80 percent fall into the

Figure 4.5: Different Quality Levels



Source: Ayling 2016. Using SIASAR database, October 2016.

Figure 4.6: Quality of Service Provision in Subsample of Indigenous Communities



Source: Authors' calculations based on weighted SIASAR data base, October 2016.
Note: This subsample of indigenous communities was selected to be representative of the full set of communities in comarcas and indigenous territories. The value of the community variable differs from the original SIASAR database due to revisions done by UPC.

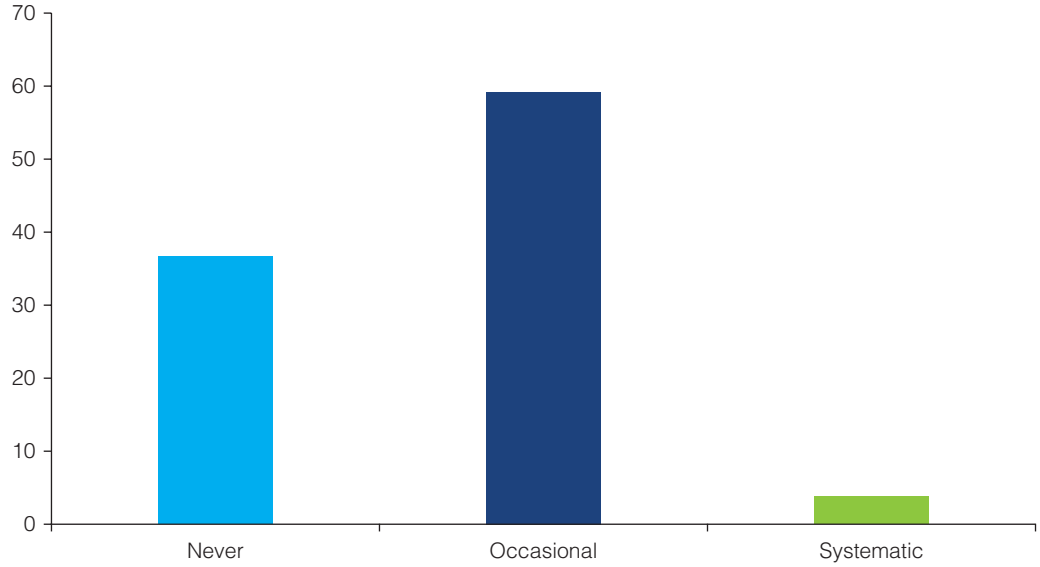
poor categories of C and D for this domain (figure 4.6). Although a majority of systems fall under category B, and thus are considered acceptable, most providers fall under C, and thus would require some kind of technical assistance.

Deficiencies are found across all the subindictors of the domain measuring the environment of the community. Only 45 percent of the communities have access to an improved water source, and 38 percent have access to improved sanitation; these percentages are much lower than those observed among nonindigenous communities: 72 and 86 percent respectively. Handwashing is not regular in a majority of communities (59.3 percent), and as many as 37 percent of communities report that this is never practiced (figure 4.7). Similarly, only 13 percent of the communities report the usage of latrines systematically; most of them use them sporadically (51 percent) or do not use them at all (36 percent) (figure 4.8). Moreover, among those communities where latrine coverage is above 90 percent, only half report using them systematically (figure 4.9). This combination of limited services and inadequate WASH behaviors are affecting the sanitary and hygienic conditions that prevail.

The most deficient component of water systems is related to the quality of water. The availability of improved water sources remains limited. Out of the 138 communities, only 83, around 61 percent of them, have access to improved water systems. The rest are covered by unimproved water sources. A full 93 percent of water systems (77 communities) are classified as failing ("D"), and they are located across all provinces.

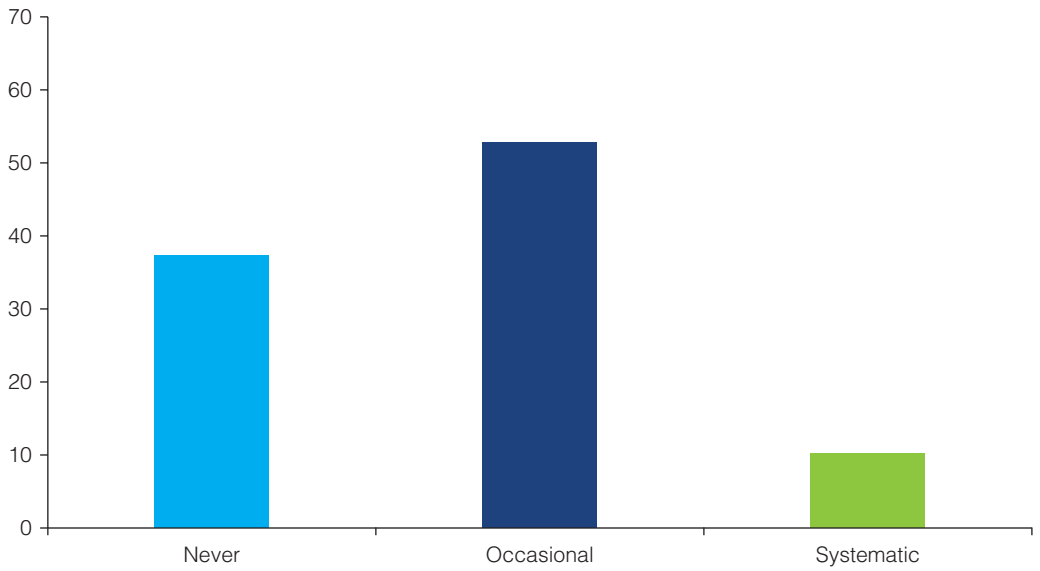
In contrast to the community domain, the majority of waters systems, when they exist, have an acceptable rating (figure 4.16). However, the low scores and overall rankings of the infrastructure and water treatment subcomponents indicate the presence of problems in this domain as well (figure 4.10 and figure 4.11). For infrastructure and water treatment, 22 and 50 communities, respectively, received a failing score (D) and a relatively large number of systems require some improvements (C). Interestingly, there is not a complete correlation between the age of the system and its classification, although all of the systems 30 years and older were ranked as failing (figure 4.12). Within the system, it is the collection aspect

Figure 4.7: Handwashing and Use of Latrines



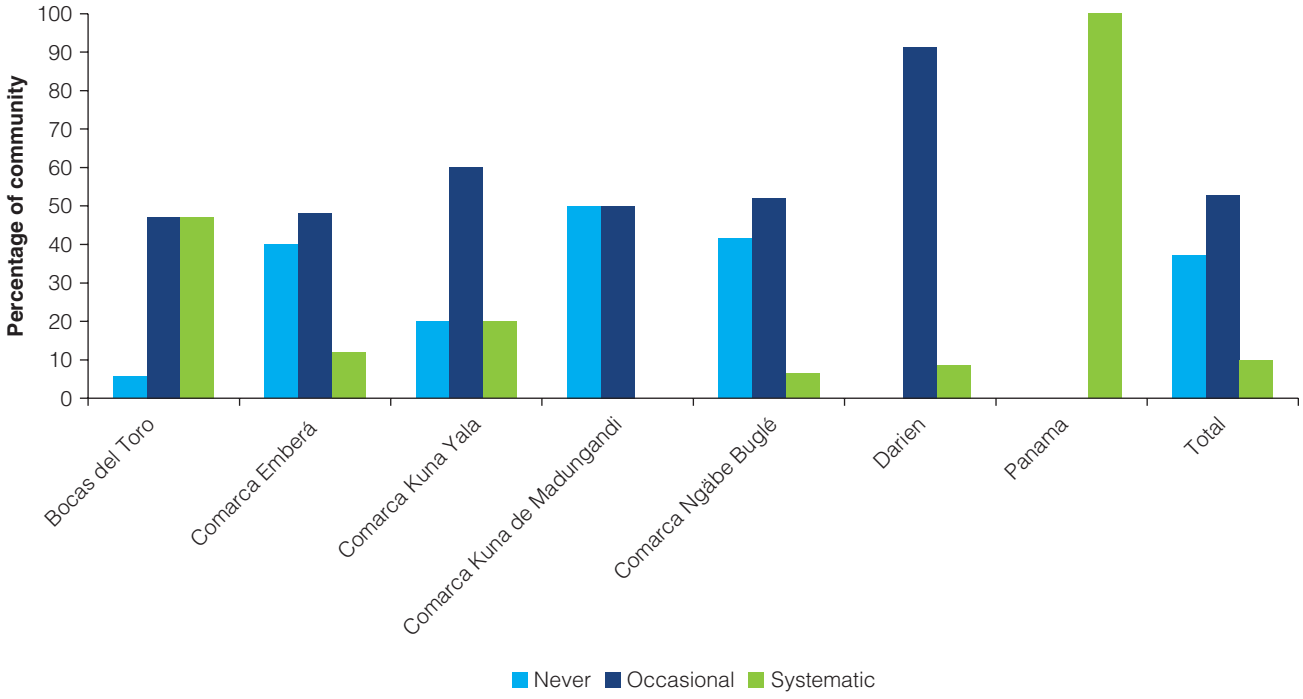
Source: Authors' calculations based on weighted SIASAR data base, October 2016: revised by UPC.
Note: Based on sample of indigenous communities.

Figure 4.8: Use of Latrines



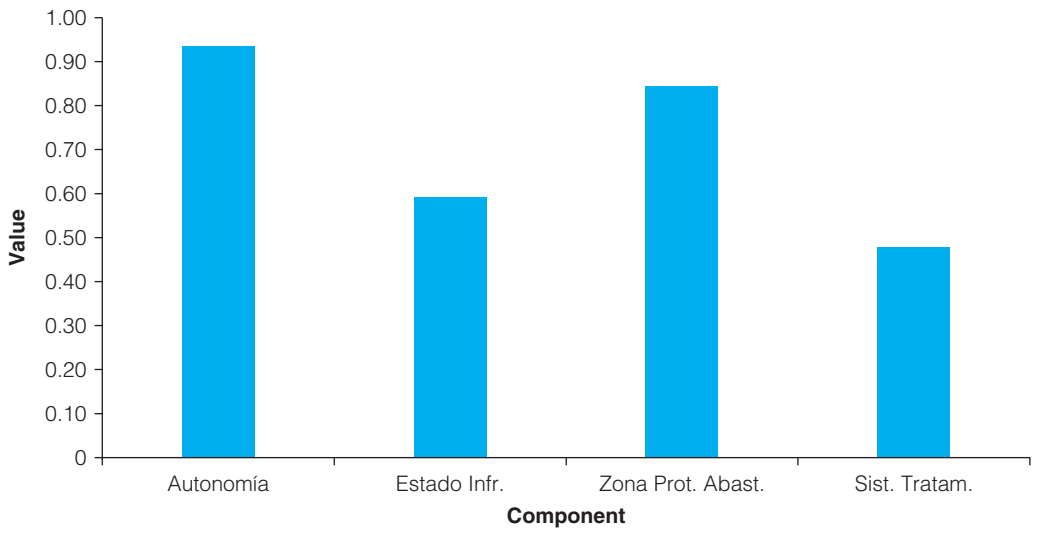
Source: Authors' calculations based on weighted SIASAR database, October 2017: revised by UPC.
Note: Based on sample of indigenous communities.

Figure 4.9: Use of Latrines, by Location



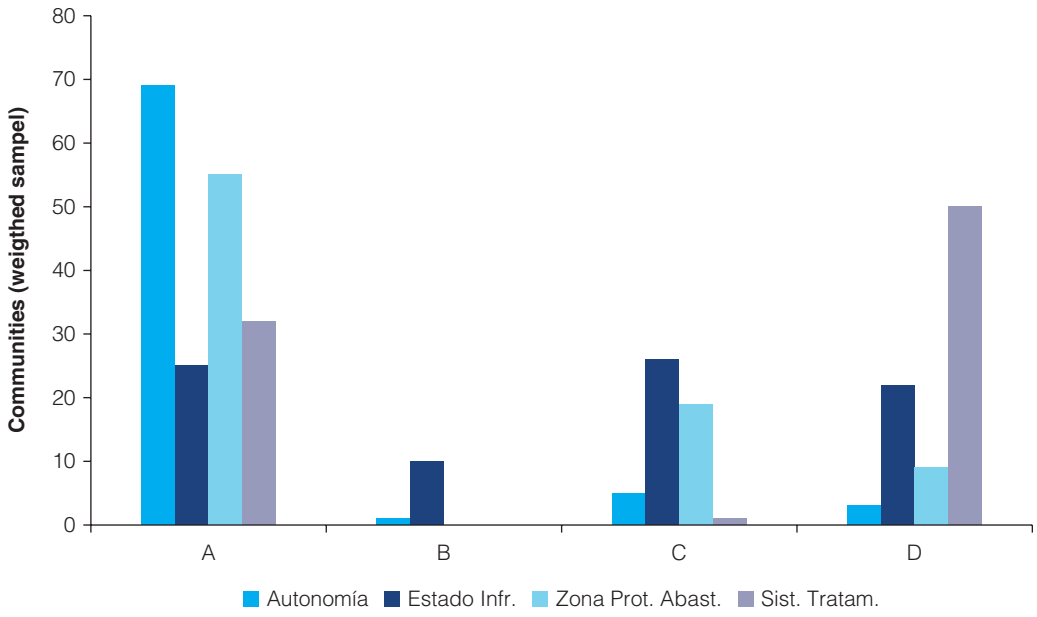
Source: Authors' calculations based on weighted SIASAR database, October 2017: revised by UPC.
Note: Based on sample of indigenous communities.

Figure 4.10: Value of Water System Score by Component, Average



Source: SIASAR 2017.

Figure 4.11: Share of Communities by Water System Component

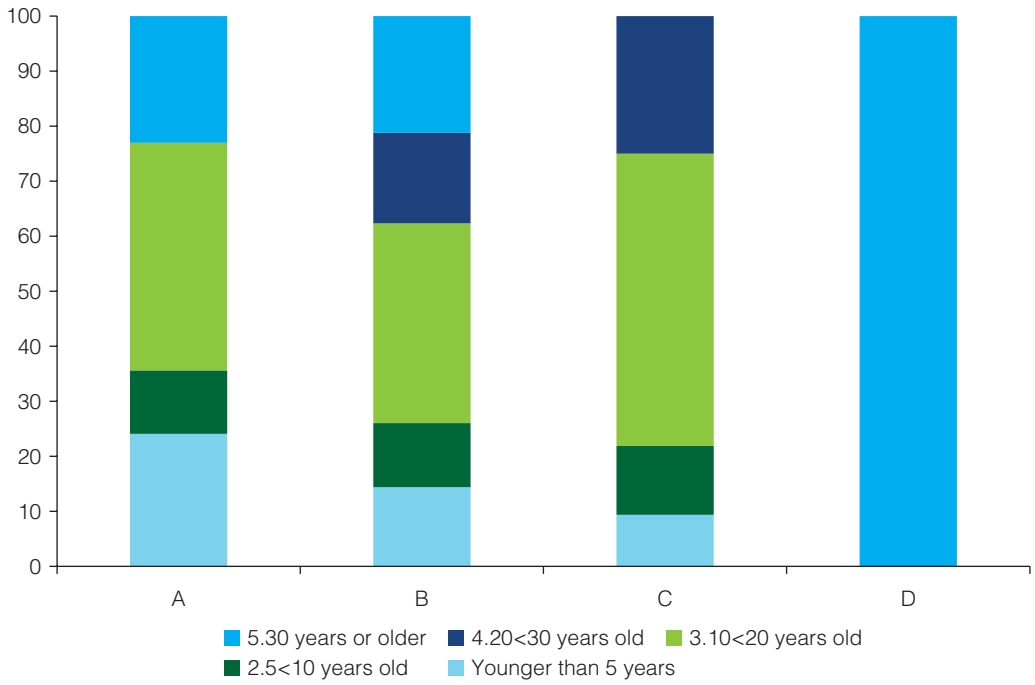


Source: SIASAR 2017.

that seems to be the one that most often experiences problems or does not work properly (figure 4.13).

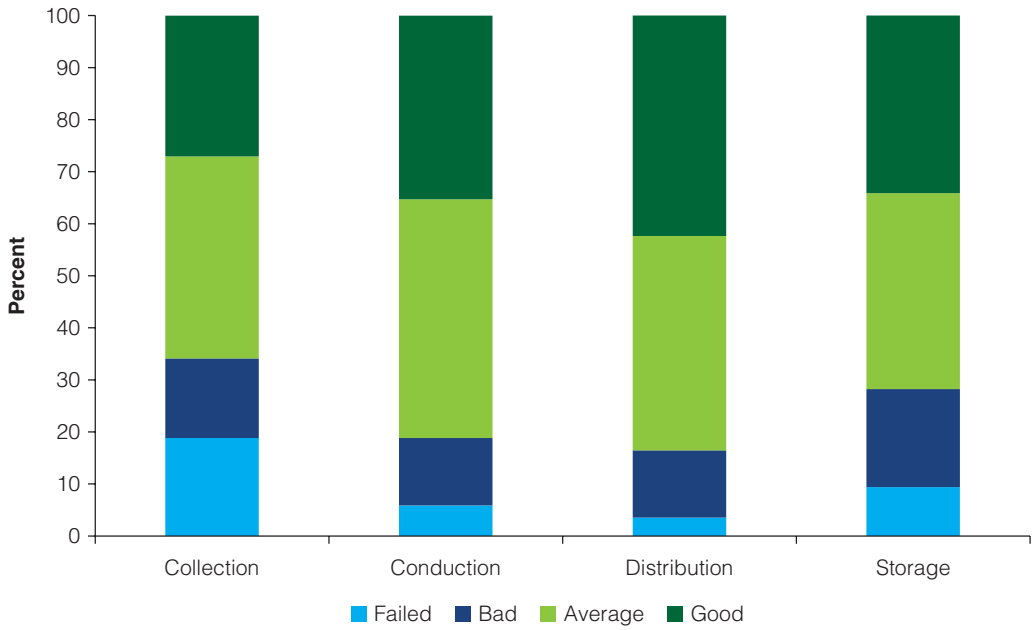
The service provider domain (water community associations [JAARs]) is most frequently considered in need of improvement. Slightly less than two-thirds (62 percent) of the communities have a service provider. For those that have a provider, 75 percent of these have legal status (figure 4.14).[12] Average tariffs are higher among the providers that

Figure 4.12: Distribution of Systems by Ranking and Age



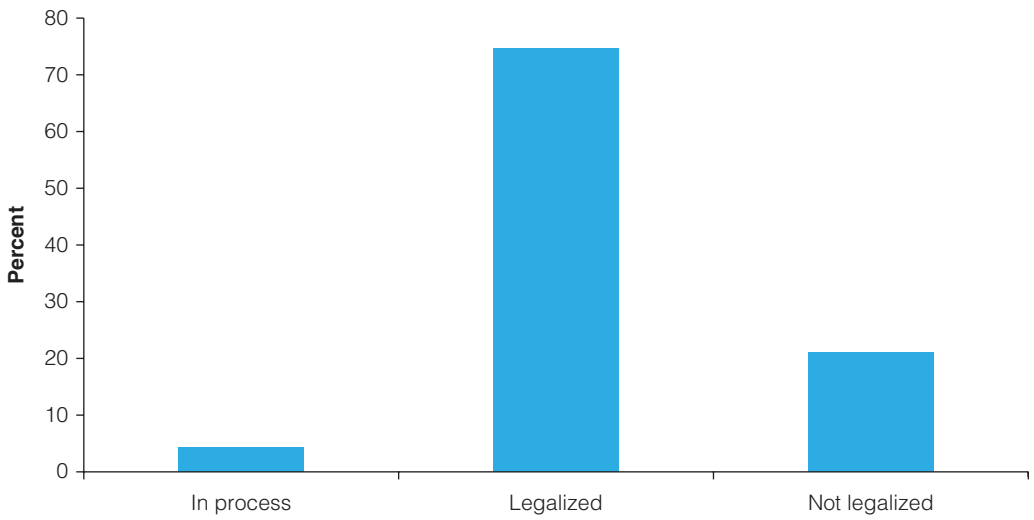
Source: Ayling 2016. SIASAR data base, October 2016.

Figure 4.13: Components that Are Most Frequently Failed



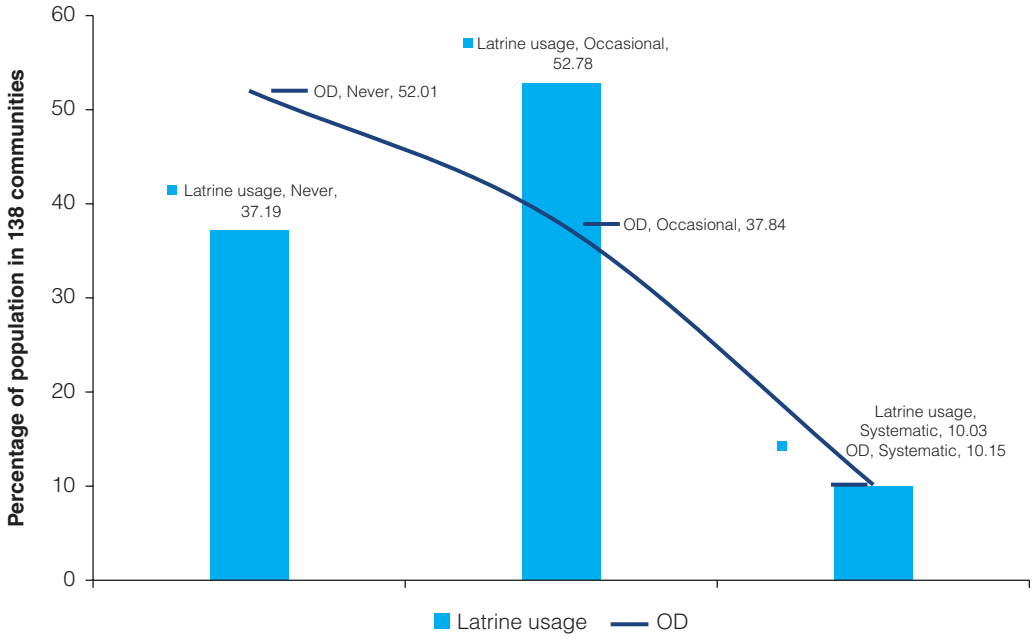
Source: Ayling 2016. Using SIASAR data base, October 2016.

Figure 4.14: Legal Status of Providers



Source: Ayling 2016. Using SIASAR data base, October 2016.

Figure 4.15: Latrine Usage Compared to Open-Air Defecation Reported in a 138-Community Sample (Based on Provider)



Source: Authors' calculations based on SIASAR data base, October 2016.
Note: OD = open-air defecation.

have a better ranking: 1.2 USD among those classified as B, 0.8 USD for those classified as C and 0.43 USD for D level providers. The main issue appears to be the low cost recovery rate of providers: only 50 percent of costs are covered by tariffs. Another deficiency is identified in the area of preventive maintenance: only 61 percent of the providers practice preventive maintenance and as many as 46 percent do not have an operator (which is required by law).

Table 4.2: Organizational Roles to Tackle Identified Challenges

Infrastructure & Equipment	Area	Pubic and Community Based Organisations that Need to Operate to Tackle the Result of the Findings From Primary Data Collection Using Siasar			
		Area/Organization	Government		Indigenous Counterpart
		Infrastructure	DISAPAS-Obras	CONADES	Comarca Committee
Public Works Bathrooms /Basic Sanitation Units	Sanitation & Hygiene	Hygiene & handwashing	Health Promotion Directorate	Minister of Education Sanitation Directorate	Indigenous Health Committee
		Community Hygiene / Environment	Environment Deputy Directorate	Minister of Education Sanitation Directorate	Comarca Committee & Indigenous Health Committee
		Solid Waste	Environment Deputy Directorate	Minister of Education Sanitation Directorate	Comarca Committee & Indigenous Health Committee
Water System (Acueductos)	Water Infrastructure Quality & Treatment	Infraestructure	DISAPAS	CONADES	Water Community Board Organization
Chlorination Inputs, Kits for Measurement Test Results		Water Treatment Plant	Disapas-UCP	Conades/Idaan	Comarca Committee
	Water Infrastructure Quality &Treatment	Disinfection	Disapas & Quality area of Potable Water Directorate in Province-Health Regional Office		JAAR (Water Community Board Organization)
		Chlorination	DISAPAS & DAPOS—Area of Public Works of Dapos-Health Regional Office		JAAR (Water Community Board Organization)
	Technical	O&M	DISAPAS Y DAPOS—Health Regional Office		JAAR
	Assistance to Jaars	Legal	Disapas	Ministry of Environment	JAAR
		Tariffs	Disapas		JAAR

Note: CONADES = National Council for Sustainable Development (*Consejo Nacional de Desarrollo Sostenible*); DAPOS = Department for Potable Water and Sanitation (*Departamento de Agua Potable y Saneamiento*); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (*Dirección del Subsector de Agua Potable y Alcantarillado Sanitari*); JARR = Administrative Board for Rural Aqueduct (*Junta Administradora de Acueducto Rural*).

The SIASAR data base and new data collection have shown that service provision is poor in indigenous communities. The analysis is based on a very small sample of communities and the results should be used with caution. However, there do appear to be substantial lacunae in these communities. More communities have no formal water provider and, among those that do, these systems are more likely to exhibit serious problems. The key aspect leading to the classification of communities into C and D is the lack of sanitation infrastructure, followed by the insufficient coverage of water systems (almost 40 percent of the sample has no coverage).

Another important finding is that even in those communities where latrines exist, they are not properly used (figure 4.15). This underscores the relevance of carrying out capacity building and awareness campaigns with communities in order to ensure that they fully understand the potential benefits, how to utilize new infrastructure and feel ownership and pride in the investments.

The findings of this study suggest that the emphasis of the government's investments in indigenous communities should be first placed on providing access to water in those communities that lack this service. However, in those communities that already have water service provision, the emphasis should be placed on sanitation investments and improved hygiene practices. In addition, the results show that it is not the water systems but the providers who operate them that are most often rated poorly and should thus be a priority of the government in terms of technical assistance to build capacities moving forward. Providers often lack the necessary technical capacity (below half of them include a specialist) and between 42 and 29 percent do not provide any maintenance. Therefore, the second priority should be to build the capacities of operators (JAARs) mainly in O&M management and organization roles and functions. Lastly, investments in water systems should be directed towards distribution rather than other aspects.

The institutional arrangement needed to operate to tackle these priorities is, however, complex. Several public sector and community-driven organizations need to be engaged (as can be seen in table 4.2). At least five ministries (Health for DISAPAS, Presidency for National Council for Sustainable Development [Consejo Nacional de Desarrollo Sostenible [CONADES]], Education, Government, and Environment) together with at least three indigenous organizations (Comité Comarcal, Comite de Salud, and JAAR) need to work together to coordinate both infrastructure and non-infrastructure investments such as technical assistance, sanitary education, handwashing, water chlorination, etc.). For the provision of infrastructure both DISAPAS from the Ministry of Health (the governing entity in charge regulating public works and one source of funding for implementation) and the CONADES (an entity in charge of financing implementation of emblematic Plan 100/0 that reports to the Ministry of the Presidency) are responsible. The indigenous counterpart agencies are the Comité Comarcal and the community-led rural water boards (JAARs).

Notes

1. A technical breakdown of this indicator system can be found in appendix B.
2. The official SDG indicator for water quality requires verification of zero *E.coli* in a 100 ml sample of household drinking water. This information was not available in Panama.
3. Panama's standard for turbidity is very stringent as compared to international standards. The indicator is calculated as the level of compliance with the norm (1.0 UNT) over the numbers of test taken. 1.0 UNT is higher than other countries standards. In Peru for examples is 0.5 UNT (nephelometric turbidity units in English).
4. However, and due to a lack of a clear validation process on the part of the national utility in ensuring the quality or consistency of the information passed from the regions to the main office in Panama City, these results need to be regarded with caution.
5. The Systematic Country Diagnostic (Koehler-Geib et al. 2015) selected peer countries with similar characteristics to Panama to carry out benchmarking exercises. In this study the same criteria were used: (i) population between 1.0 and 12.0 million; (ii) not land-locked; (iii) not a fragile state; (iv) GDP per capita between US$4,000 and US$13,000

(2001–13); (v) direct investment as a share of GDP higher than 3.5 percent; and (vi) credit rating above BBB—. The data comes from the International Benchmarking Network for Water Supply and Sanitation Utilities (IBNET) database, Peru's Superintendencia Nacional de Servicios de Saneamiento (Sunass) "Reporte de los Indicadores de gestión de las EPS a marzo de 2015," "Obras Sanitarias del Estado (OSE - Uruguay) Informe de Gestión 2015," and "Encuesta del Mercado Laboral, 2015 (Panama), and the Population and Housing Census of Panama 2010. The data coverage varies for the three countries depending on the indicator of interest.

6. There is no more recent source of data on the continuity of service than the Population and Housing Census of 2010.
7. World Bank WASH Poverty Diagnostic Initiative (2016) analysis of Panama MICS 2013 and IDAAN service provider data (2015).
8. DISAPAS is under the Ministry of Health and is legally responsible for guaranteeing WASH providing in rural areas.
9. It is expected that installing and maintaining water and sanitation systems will be cheaper in less remote communities and thus that these communities will have more and better systems than the average community, let alone, the very remote ones.
10. This sample included all the indigenous territories and comarcas, not just the three largest comarcas that are usually studied using the household survey data.
11. This was indeed the case.
12. This refers to a process whereby the service provider declares its accounts to the communities it serves in a community meeting.

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Chapter 5
Barriers to Sustainable Service Delivery in Rural Areas

The institutional arrangements for water supply, sanitation, and hygiene (WASH) services in rural areas of Panama represent a challenge to service provision. The government has increased investments in rural areas with ambitious new programs such as the Basic Sanitation Plan 100–0. However, an assessment of the institutional framework suggests both de jure and de facto problems of coordination, overlapping functions and planning creating barriers to sustainable service delivery in rural and indigenous areas. Several national authorities, including Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitari [DISAPAS]), National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible [CONADES]), and National Secretariat for Decentralization (Secretaría Nacional de Descentralización [SENADE]) share in the functions of policy, regulation and planning, and these functions are poorly coordinated. DISAPAS, charged with training the Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural [JAAR]) and operating and maintenance activities, lacks resources, while JAARs often are unable to properly maintain and operate the infrastructure that are delivered to them, partly due to the existing low tariffs. Consultation and coordination mechanisms with Indigenous peoples and final users are also not always effective resulting in the specific needs of these populations not being captured thus undermining the sustainability of the government's ambitious investments.

There is a need to understand the institutional factors affecting service delivery in rural and indigenous areas. The previous chapters have highlighted the severity of the WASH problems facing these populations. Additionally, while a previous national institutional assessment (MAPAS II; World Bank 2016) showed the macro-institutional framework for the country and the structures for service delivery to be adequate, it also found key problem areas linked to equity and the sustainability of rural systems (table 5.1).

A lack of proper coordination and planning around investments may play a large role in explaining the persistence of inequities in WASH provision. Rural, and especially indigenous

Table 5.1: MAPAS II Results

	Panama 2015									
		Institutional Framework			Development			Sustainability		
Subsector	Score	Policy	Planning	Budget	Execution	Equity	Results	Maintenance	Expansion	Users
Rural water	1.32	1.5	1	1.5	1.5	1.5	1.3	1.1	1	1.5
Urban water	1.66	2	1	2.5	1.5	0.5	2.3	1.7	1.5	2
Rural sanitation and hygiene	1.04	2	1	2	1.5	0	1.2	0.4	0.5	0.8
Urban sanitation and hygiene	1.48	1.5	1	2.5	1.5	1	1.2	0.9	1.5	2.3
Average score	1.38	1.75	1.00	2.13	1.5	0.75	1.5	1.0	1.1	1.6
				Institutional	1.63		Development	1.24		Sustainability	1.26

Source: World Bank 2016.

populations, in Panama appear to be weak to collectively mobilize in protection of their interests and to influence policy. The persistence of this "low contestability" is likely to contribute to the lack of credible commitment on the side of national regulatory authorities, and to the existing mismatch between the de jure objective of targeting indigenous communities as national priorities, and the de facto reality of the fragmented and inefficient institutional architecture characterizing service delivery in these areas.

To address this issue of institutional barriers an assessment of the de jure and de facto water and sanitation structures in the country was undertaken to explore the factors affecting service provision in rural indigenous areas. A qualitative (mostly desk based) study was designed to understand what lies behind the observed gaps in services and to help evaluate whether actual government programs are adequate to address these gaps. The first phase of the study entailed a desk review of previous assessments, legislation and regulations. The second stage encompassed in-depth interviews with key stakeholders involved in the provision of WASH services rural indigenous communities in the country.

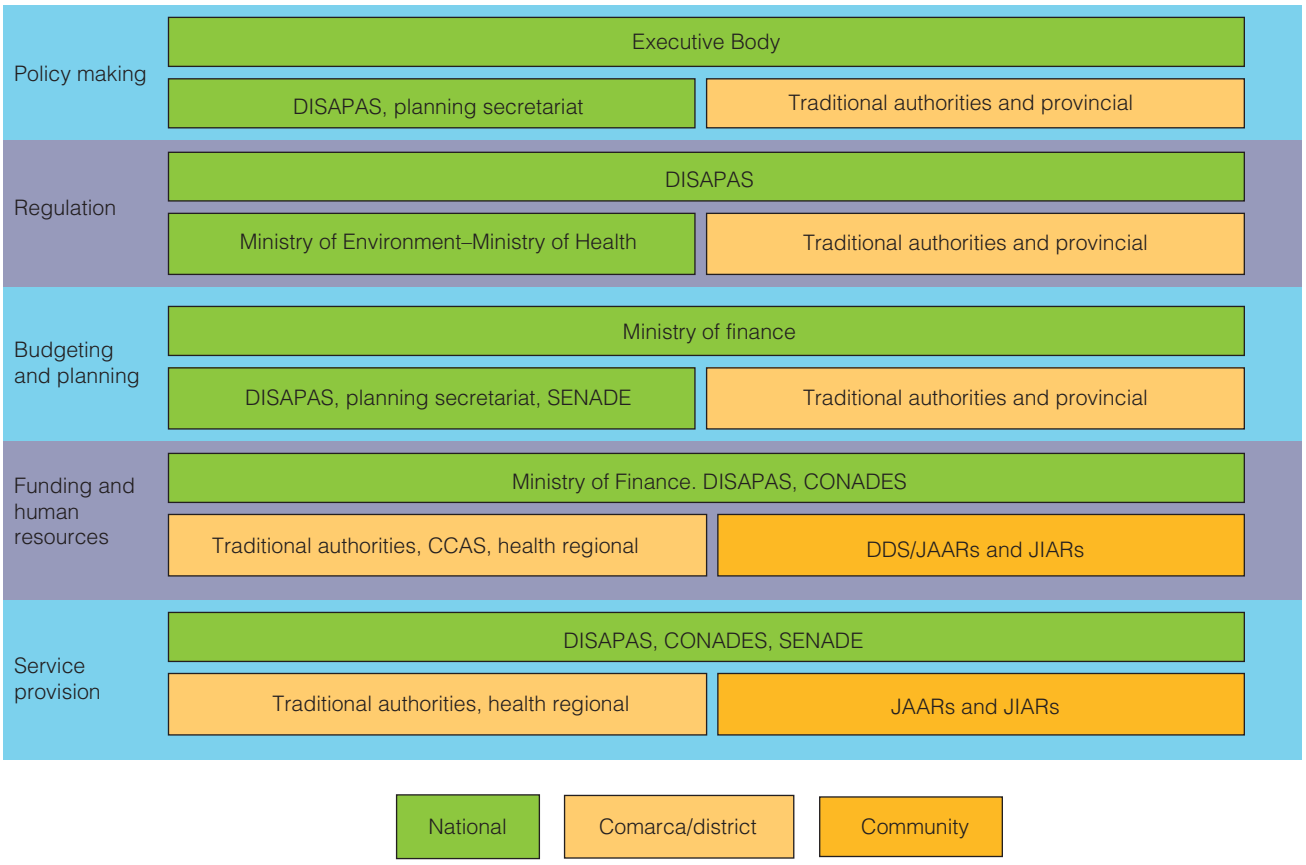
This chapter looks in detail at the gap between the de jure institutional and legal framework and the de facto situation on the ground with regards to the rural provision of WASH. The following section presents the governance and institutional arrangements for the water and sanitation sector in Panama. The focus is on the functions associated with policy and regulation (5.1.1); planning, financing, and human resources (5.1.2); provision and production of services; and monitoring and supervision (5.1.3). In section 5.2 the central factors explaining the failures and gaps in the quality and coverage of services are identified, including financial resources (5.2.1); institutional fragmentation and lack of coordination (5.2.2); capacity issues (5.2.3); and the need to improve the participation of local authorities in planning, prioritization, and monitoring for the sector.

The De Jure Architecture for Wash Service Provision in Rural Areas

The de jure system of WASH service provision in rural areas in Panama involves four different levels (national, provincial/comarca, district and community), including traditional indigenous authorities (figure 5.1). Different agencies across sectors and under different ministries are also involved. While urban service provision is fairly straightforward—Institute for National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionales [IDAAN]) has concentrated its operations in the most populous and urban areas of the country as it has no mandate to serve smaller communities—rural provision is more complex. Currently, in most of the rural communities in Panama, the infrastructure is built by CONADES, under the Basic Sanitation Plan 100–0, and DISAPAS—under the Ministry of Health—which has the mandate for service provision in rural areas. Once new infrastructure is in place, it is overseen, operated and managed by Rural Water Management Boards (JAARs/JIARs). JAARs are voluntary organizations comprised of members of the community served, including an "operator,"[1] which receive support and technical assistance from DISAPAS. Funding for the development of infrastructure comes mainly from the Ministry of Economy and Finance (MoEF) and donors. However, since 2016, the Secretariat for Decentralization (Secretaría Nacional de Descentralización [SENADE]) has also been involved in the selection and financing of WASH projects in rural indigenous areas, as mandated by the 2015 Decentralization Law. Operational and maintenance costs are to be covered through tariffs paid by users collected by JAARs/JIARs.

The rural WASH sector includes additional actors at the *comarca*, district and community levels. At the provincial level, WASH service provision is under the responsibility of MoH Regional Offices, and in particular, the Departments for Water Supply and Sanitation Works (Departamento de Agua Potable y Saneamiento [DAPOS]), which set sector priorities and investment plans. DAPOS are also involved in monitoring performance and capacity building activities. In indigenous territories and *comarcas,* traditional authorities (at all levels) liaise

Figure 5.1: The De Jure Institutional Architecture for Rural Indigenous WASH Services



Source: Mujica and Azcárate 2017, DISAPAS et al. 2016.
Note: CCAS = WAS Indigenous Provincial Commissions (Comisiones Comarcales de Agua y Saneamiento); DDS = District Health Directorates; DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario); JAARs = Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural); JIARs = Integrated Board for Rural Aqueduct (Junta Integrada de Acueducto Rural); SENADE = National Secretariat for Decentralization (Secretaría Nacional de Descentralización).

with government/official authorities to ensure the adequate provision of WASH services, including coordination with development partners and community members, and planning. Provincial and district authorities will play a bigger role as the decentralization process deepens and full authority and responsibilities for service provision are devolved to lower levels of government.

The de jure arrangements have increased in complexity in recent years. This is largely a result of the efforts made by the present Administration to provide national coverage to the most vulnerable populations through the Basic Sanitation Plan 100–0.[2] This plan calls for a national investment of US$2.9 billion to achieve universal and continuous, 24-hour-a-day, access to drinking water and to eliminate the use of latrines.[3] The implementation of this flagship plan has been assigned primarily to CONADES, under the Ministry of the Presidency (MoP). Together with the increased participation of SENADE in the provision of WASH services, the capacity and authority of DISAPAS in rural WASH has been weakened.

Coordination mechanisms are of special concern given the distribution of functions across different governmental levels and sectoral bodies. Of particular importance is the communication between traditional or indigenous authorities (at provincial, district, and community levels) and central level authorities, represented mainly by the DAPOS at the province level or

the District Health Directorates (at the district level). Additional coordination is needed among the main actors CONADES and DISAPAS and, increasingly, SENADE, as well as other relevant ministries and government agencies (e.g., Ministry of Environment). Although there is a coordination mechanism in place—the Inter-Institutional Water Supply and Sanitation Committee (Comite Interinstitucional para Agua y Sanamiento [CIAPAS])—increased efforts are needed to ensure its effectiveness and the inclusion of indigenous authorities.

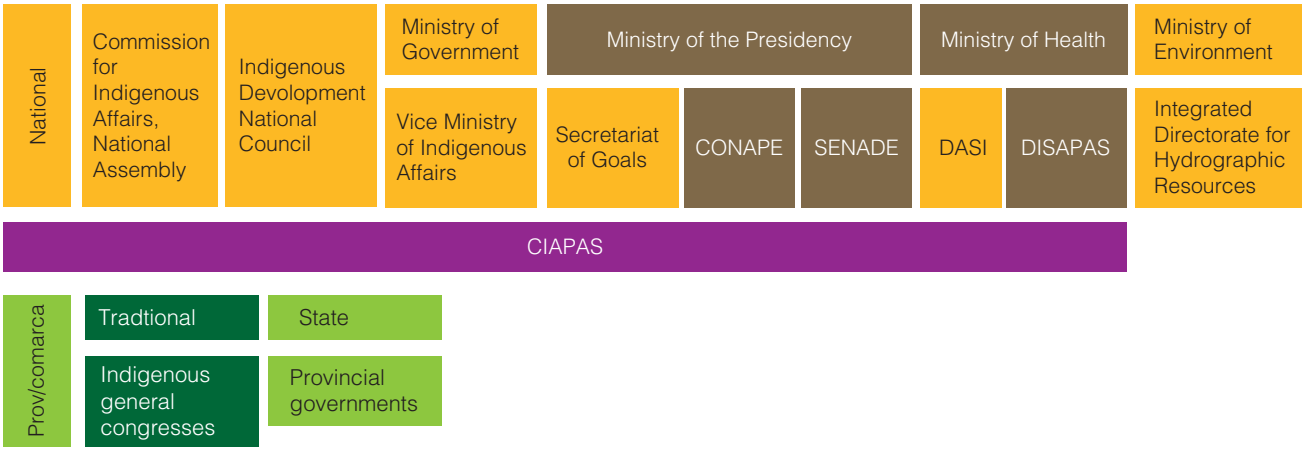
Policy and Regulation Is Mainly Distributed between the Ministry of Health and the Ministry of Presidency

At the national level, the water and sanitation sector in Panama has historically been subsumed within the health sector (figure 5.2). This arrangement was made explicit in the Health Code of 1947 and subsequently by the law that established the Ministry of Health (MoH) in 1969. MoH is responsible for the formulation and coordination of policies in both urban and rural areas. In urban areas, services are provided by IDAAN and regulated by the Public Services Authority (Autoridad de los Servicios Público [ASEP]). In rural areas, services are provided and regulated by DISAPAS, created in 2001. In addition, the Ministry of Environment (MoE), through the Directorate for the Integrated Management of Hydrographic Resources, is responsible for ensuring compliance of environmental regulations and also granting permission for usage of water resources by JAARs/JIAR.

In parallel, however, national priorities in the sector are defined by the Ministry of the Presidency (MoP), as defined in government national development or strategic plans. Furthermore, in recent years, the Planning Secretariat and CONADES have been tasked with the coordination and implementation of the Basic Sanitation Plan 100–0. Also under MoP, SENADE has the responsibility for decentralization policies and plans, including those addressing the improvement of public service provision such as water and sanitation.

Effective means to ensure that Indigenous communities have a say in water and sanitation services are being established. Indigenous peoples in Panama subscribe to their traditional authorities and forms of governance, organized into 10 congresses and 2 councils. In theory,

Figure 5.2: Institutions in Charge of Policy and Regulation in Rural Indigenous Areas



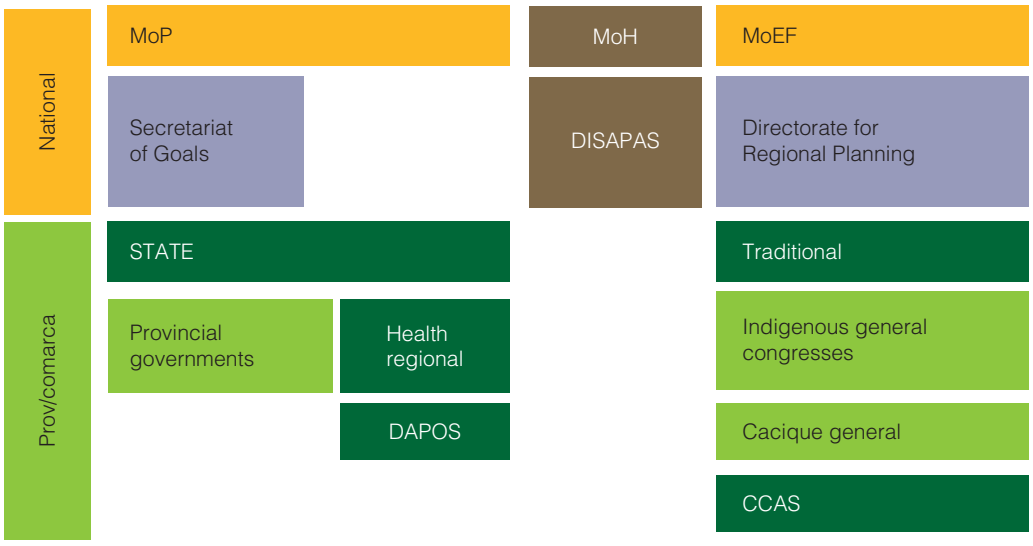
Source: Mujica and Azcárate 2017, DISAPAS et al. 2016.
Note: CIAPAS = Inter-Institutional Committee for Water and Sanitary Sewerage (Comite Interinstitucional para Agua y Sanamiento); CONAPE = National Association of Journalists (Colegio Nacional de Periodistas); SENADE = National Secretariat for Decentralization (Secretaría Nacional de Descentralización); DASI = Directorare for Indigenous Affairs (Dirección de Asuntos Indígenas); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario).

the comarcas should have development plans that capture specific needs and potential areas for investment in WASH services—these priorities are then to be reflected and incorporated in national strategic plans by the Vice-Ministry for Indigenous Affairs within the Ministry of Government (MINGOB). As part of the two-year process to develop an Integrated Development Plan for Indigenous Peoples, the 12 indigenous authorities carried out extensive consultations around needs in their communities.[4] The resulting plan does not provide specific details, however, a recent round of consultation effort has begun to identify and prioritize WASH investments in each territory. In parallel, the Commission for Indigenous Affairs within the National Assembly enforces compliance with indigenous rights, while the National Council for Indigenous Development promotes relationships with bilateral and multilateral organizations for technical cooperation, and oversees the implementation of international commitments. The latter, however, is not yet fully operational.

Planning, Financing, and Human Resources Responsibilities Are under Different Actors and Levels

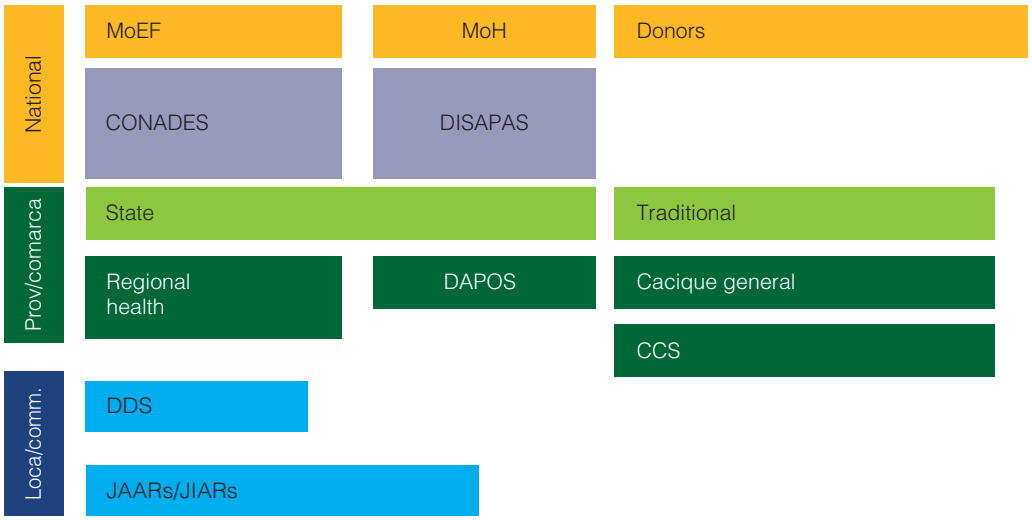
There is substantial overlap in mandates related to the planning and financing of rural water and sanitation. At the national level, both MoH and MoP have conflicting mandates with regards to planning and implementation, while at the subnational level, the DAPOS and the Comarcal Water and Sanitation Commissions (Comisiones Comarcales de Agua y Saneamiento [CCAS]) also have overlapping functions.[5] MoH is in charge of assessing the financing needs and coordinating with MoEF for the allocation of funds. However, today under the Basic Sanitation Plan 100-0, the Planning Secretariat is also required to assess different projects and guarantee their funding through MoEF. At the provincial or comarcal level, DAPOS, in consultation with traditional authorities, also define priorities and plans for the construction, rehabilitation and improvement of WASH infrastructure.[6] In particular, CCAS are responsible for communicating to MoH (through the DAPOS and DISAPAS) about WASH needs in their communities (figure 5.3). However, CCAS are yet to be fully created

Figure 5.3: Institutions in Charge of Budgeting and Planning in Rural Indigenous Areas



Source: Mujica and Azcarete 2017.
Note: CCAS = WAS Indigenous Provincial Commissions (Comisiones Comarcales de Agua y Saneamiento); DAPOS = Department for Potable Water and Sanitation (Departamento de Agua Potable y Saneamiento); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario); MoEF = Ministry of Economy and Financ; MoH = Ministry of Health; MoP = Ministry of the Presidency.

Figure 5.4: Institutions in Charge of Funding and Human Resources in Rural Indigenous Areas



Source: Mujica and Azcarete 2017.
Note: CCAS = WAS Indigenous Provincial Commissions (Comisiones Comarcales de Agua y Saneamiento); CONADES = National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible); DAPOS = Department for Potable Water and Sanitation (Departamento de Agua Potable y Saneamiento); DDS = District Health Directorates; DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario); JAARs = Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural); JIARs = Integrated Board for Rural Aqueduct (Junta Integrada de Acueducto Rural); MoEF = Ministry of Economy and Finance; MoH = Ministry of Health; MoP = Ministry of the Presidency.

across all comarcas and currently only play a minor role in communicating and setting indigenous peoples' priorities.

Funding for rural infrastructure development, operation, and maintenance comes from a variety of sources. The design and construction of systems for water supply and basic sanitation are financed by state resources, allocated by MoEF, and funding from international development agencies and donors (figure 5.4). Communities and households finance operation and maintenance activities through tariffs, which are collected and managed by JAARs or JIARs.

JAARs/JIARs play a central role in the operation and maintenance (O&M) of community infrastructure and in raising revenues to fulfill these functions. JAARs/JIARs are voluntary organizations composed by representatives of beneficiary families. The JAAR/JIAR Boards of Directors are elected by the Community Assembly for a period of four years. In the comarcas, the traditional authority (Cacique, Sáhila, or Noko) is usually a member of the Board of Directors. JAARs/JIARs define monthly user tariffs, which are used to finance the operation, maintenance and rehabilitation of water supply systems. According to the Law, tariffs must be based on feasibility studies and adjusted to ensure the attainment of health and social objectives. It is recommended that the basic maintenance tariff in rural disperse areas should be US$3.00 per dwelling per month, and that tariffs be revised every five years with MoH support.[7]

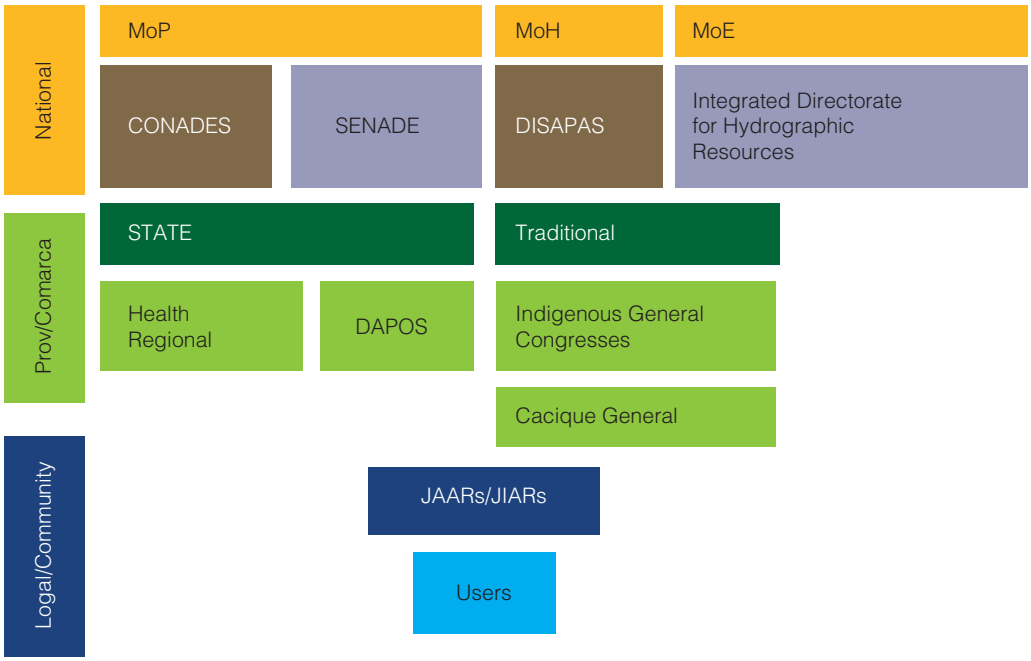
The management and training of human resources for JAARs/JIARs is carried out by MoH through DISAPAS, DAPOS, and District Health Directorates (DDS). The CCAS are responsible for the coordination of training and technical assistance activities delivered by MoH. During project execution, DISAPAS and CONADES are also required to build capacity among beneficiary communities regarding adequate O&M of water supply systems, as well as on the importance of water quality and treatment. JAAR operators are also trained by MoH, either directly or

through DAPOS. In some comarcas, as in Guna Yala, operators receive a monetary or in-kind compensation from the community. MoH is also tasked with verifying JAARs/JIARs performance and ensuring the adequate use of funds and provision of services.

Infrastructure Development and Provision Are Separate Functions, under Different Institutions, and at Different Levels, as Are Monitoring and Supervision

Different national and subnational entities are responsible for rural WASH service provision (figure 5.5). On the one hand, MoH is responsible for guaranteeing that WASH services are adequately provided in all rural areas, including indigenous comarcas. In the comarcas, the General Congresses and other traditional authorities are also tasked with ensuring the provision of WASH services. On the other hand, under the Basic Sanitation Plan, CONADES sets up public bids for the design and construction of the WASH infrastructure. SENADE will also join in this endeavor until authority and responsibilities are fully devolved to subnational governments. However, CONADES and SENADE, as implementation and coordination entities, have no responsibilities over the O&M of water and sanitation systems. Once the infrastructure is in place, they are handed over to JAARs/JIARs for water supply systems or individual households for sanitation. JAARs/JIARs, in turn, receive some support by MoH's regional offices for long-term technical assistance.

Figure 5.5: Institutions in Charge of Service Provision



Source: Mujica and Azcarete 2017.
Note: CONADES = National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible); DAPOS = Department for Potable Water and Sanitation (Departamento de Agua Potable y Saneamiento); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario); JAARs = Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural); JIARs = Integrated Board for Rural Aqueduct (Junta Integrada de Acueducto Rural); MoEF = Ministry of Economy and Financ; MoH = Ministry of Health; MoP = Ministry of the Presidency.

Both DISAPAS and CONADES are required to undertake community participation and awareness activities in the community before, during and after project execution, and especially when they intervene in comarcas. This process ensures that the community has a good understanding of system requirements, especially O&M activities. In particular, DISAPAS requires 10 percent of project costs to be financed by the communities through the provision of unpaid labor, which promotes ownership. Projects executed by CONADES, on the contrary, are fully financed and have no formal participatory mechanism to engage with beneficiary communities—although these activities are carried out, evidence suggests these are not comprehensive and are only undertaken for a short-period of time. The lack of adequate participatory mechanisms has been controversial among indigenous communities.

MoH also supervises systems through DISAPAS and DAPOS to ensure the performance and O&M of water supply systems. DAPOS are required to undertake periodic revisions and report to DISAPAS in order to keep an up-to-date registry of systems. Currently, regular monitoring is complemented by the Information System for Rural Water and Sanitation (Sistema de Información de Agua y Saneamiento Rural [SIASAR]). In addition, the MoE authorizes JAARs to collect and use groundwater and surface water resources (Law No. 8 2015), while the Directorate for Territorial Planning within the MoEF is charged with ensuring that resources allocated to comarcas are used effectively and efficiently.

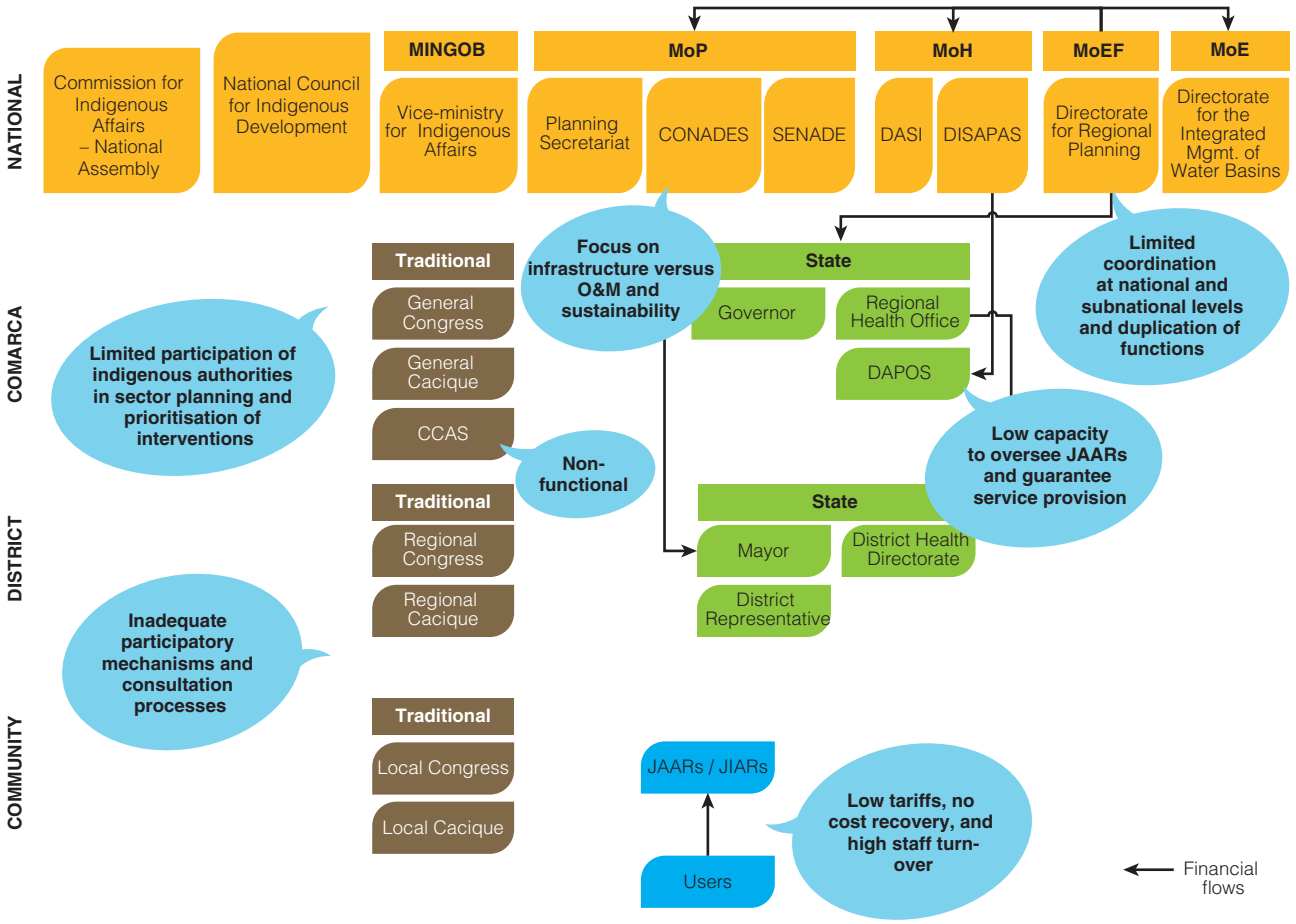
Supply and Demand Factors that Are Barriers to WASH Service Delivery to Indigenous Peoples

Limited service provision in rural areas is not just a function of the overly complex de jure architecture, but also a reflection of implementation or de facto issues. The functioning of the institutional structures for WASH provision in indigenous areas of Panama is inadequate to address the needs of this population. The analysis of the de facto institutional architecture in the country indicates that, in practice, the de jure system described in the previous section does not work as expected (figure 5.6). Indeed, existing evidence indicates that the rural WSS problem is not so much related to the lack of funds or infrastructure, but rather to the institutional architecture, and management or business model that prevails in the sector.

In recent years the complexity of the institutional set-up for the sector has increased. This has created confusion among indigenous communities and inefficiencies in planning and service provision. Partly as a result of this process (brought about in large part by the implementation through CONADES of the Basic Sanitation Plan 100–0), the authority of DISAPAS, the central actor in the sector, has been diluted. In addition, the funding allocated to the agency seems to be insufficient, and is equivalent to only 26 percent of that assigned to CONADES. Similarly, the capacity of JAARs to maintain and operate their systems is seriously limited by the maintenance of very low tariffs, which increases their dependence on DISAPAS to undertake O&M activities, especially in what concerns large repairs or system rehabilitation. Based on World Bank projects' experience, the tariffs set are not high enough possibly because the benefits and long-term needs are not properly understood, and the resource and the service are not separated. This is likely the result of poor consultation and awareness building processes.

Cultural and specific geographical characteristics of indigenous communities give raise to special needs with regards to WASH. A critical component of interactions with indigenous communities is the notion of free and informed consent. This requires that the planning and implementation process of WASH projects be based on in-depth engagement and participation. However, indigenous authorities do not have a national platform through which they can be directly involved in national policy decisions on these issues. Their traditional authorities (congresses and councils) are not engaged systematically in the prioritization and planning of investments and community participation in the design of infrastructure systems and solutions is weak at best.[8]

Figure 5.6: The De Facto Institutional Architecture for WASH



Source: Mujica and Azcarete, 2017.
Note: CONADES = National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible); CCAS = WAS Indigenous Provincial Commissions (Comisiones Comarcales de Agua y Saneamiento); DAPOS = Department for Potable Water and Sanitation (Departamento de Agua Potable y Saneamiento); DASI = Directorare for Indigenous Affairs (Dirección de Asuntos Indígenas); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (Dirección del Subsector de Agua Potable y Alcantarillado Sanitario); JAARs = Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural); JIARs = Integrated Board for Rural Aqueduct (Junta Integrada de Acueducto Rural); MINGOB = Vice-Ministry for Indigenous Affairs within the Ministry of Government; MoE = Ministry of Education; MoEF = Ministry of Economy and Finance; MoH = Ministry of Health; MoP = Ministry of the Presidency; O&M = operation and maintenance; SENADE = National Secretariat for Decentralization (Secretaría Nacional de Descentralización).

Financial Resources Have Increased Recently although They Remain Low and Uneven in Rural Areas

The funding dedicated to investments in WASH has significantly increased under the current General Budget. Although the required annual investments per subsector are higher than the planned financial allocations under the General Budget 2015–19 (GB), there has been a substantial increase in the resources allocated to WASH investments in recent years. Resources allocated to the sector have grown from 1 to 3 percent of the gross domestic product (GDP) between 2010 and 2015. The GB indeed allocates US$2.1 billion to potable water—11 percent of all planned investments—and US$1.5 billion to sanitation—8 percent of all planned investments. The overall amount (US$3.9billion) is almost four times that allocated in the previous GB (US$0.98 billion). Around 79 percent of total WASH resources have been designated for the implementation of Basic Sanitation Plan 100–0 (US$2.9 billion). Information from the GB also indicates that more resources

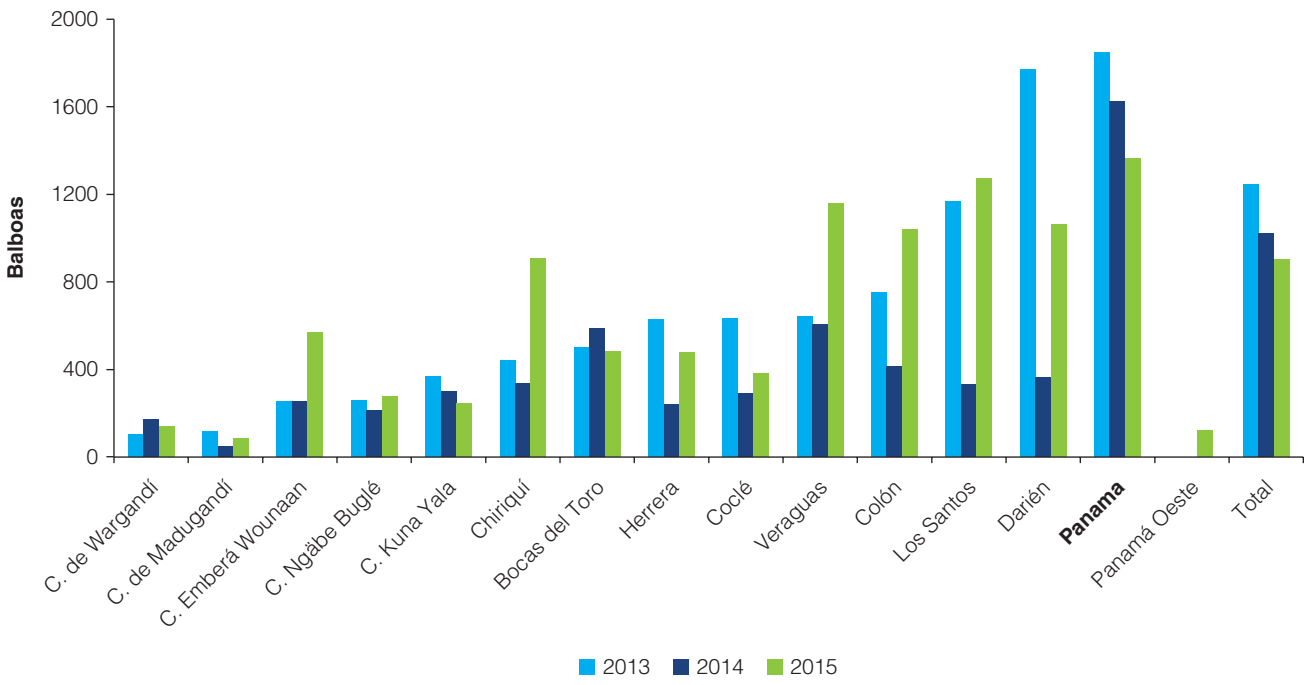
have been devoted to rural areas to carry out projects in the area of sanitation as compared to water, which is aligned with observed needs.

Comarcas tend to receive fewer resources across the board. This partly explains their poorer outcomes and lack of overall progress in socioeconomic indicators, including WASH. There are wide disparities in budget execution of non-financial investments between comarcas and other provinces (figure 5.7). The embryonic decentralization process, designed to devolve power to subnational governments, is expected to redistribute resources more equitably between comarcas and nonindigenous provinces. However, while some indigenous territories are formally recognized as comarcas, others are yet to gain full political recognition; the latter will have no mandate in decision and policy-making processes.

The Government invested close to US$73 million in the rural indigenous water sector between 2009 and 2014. Investments were mostly focused in Bocas del Toro and the Ngäbe Buglé comarca (the largest comarca). Funds were mainly directed through PROINLO (a government agency that has now been merged with CONADES) and CONADES. MoH, the main actor in the rural sector in de jure terms, came in third place in terms of funds allocated for water investments in indigenous territories (figure 5.8 and figure 5.9). However, this represents close to 78 percent of total water investments in the rural sector.

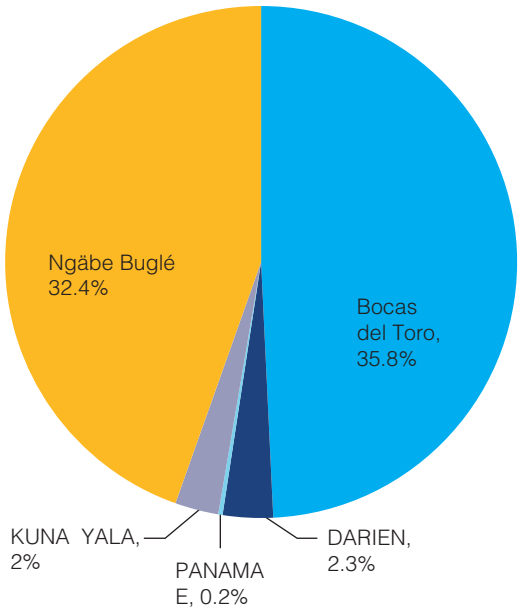
Sanitation expenditures were very low and less equitable as compared to spending in water. In indigenous areas, sanitation investments between 2009 and 2014 were largely carried out by DISAPAS. Total sanitation investment amounted to US$4.2 million, of which rural sanitation investments accounted for only US$102 million. Considering the population to be served, this implies that indigenous areas remain underserved. Overall, while the three main comarcas represent approximately 15 percent of the rural population, they received only a bit more than 4 percent of total rural WASH spending.

Figure 5.7: Non-Financial Investments, Execution of Allocated Funds



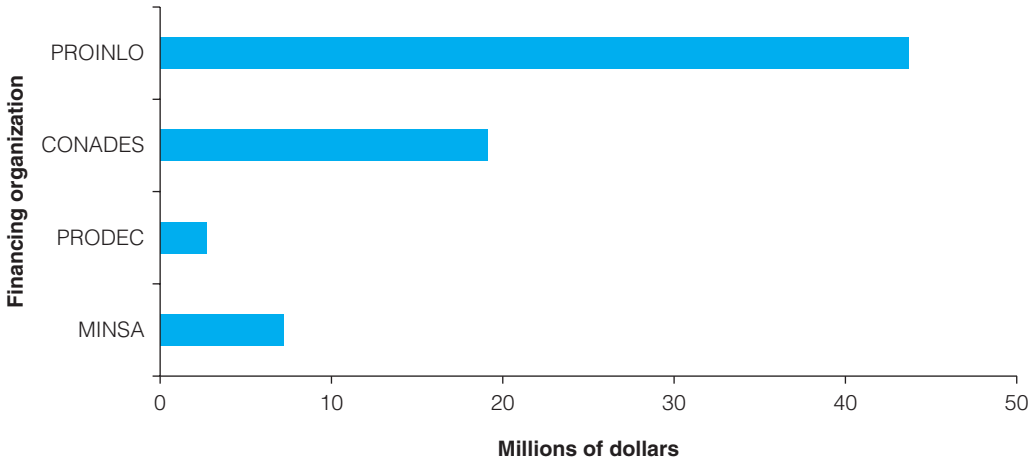
Source: Mujica and Azcárate 2017.
Note: The province of Panama was divided into Panama and Panama Oeste in 2015, which explains the lack of spending in the earlier years.

Figure 5.8: Water Investments in Rural Indigenous Territories, 2009–14



Source: Author's calculation based on DISAPAS data.
Note: The total investment by government is US$72.7 million.

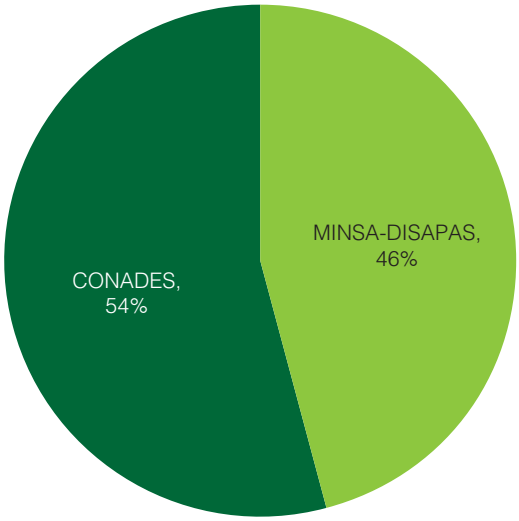
Figure 5.9: Water Investments in Rural Indigenous Territories by Source, 2009–14



Source: Author's calculation based on DISAPAS data.
Note: The total investment by government is US$72.7 million.

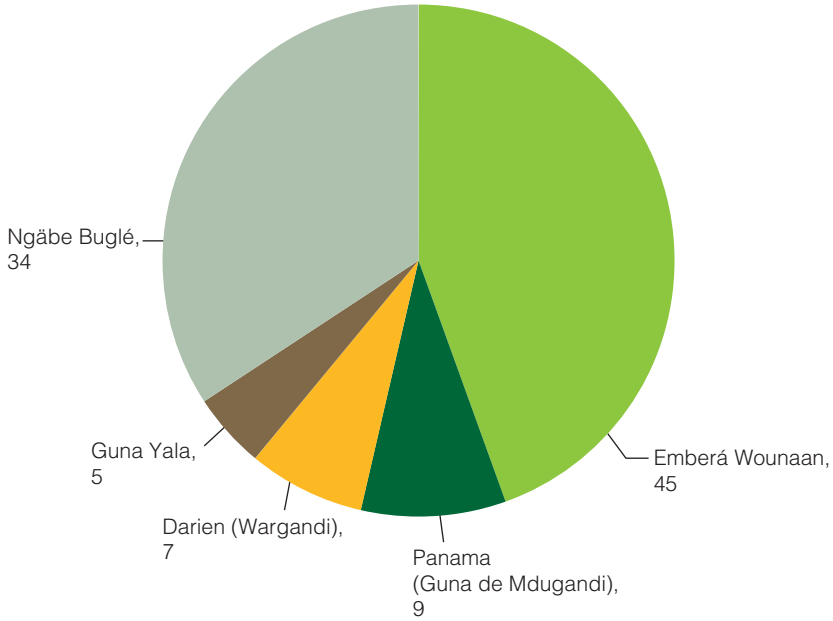
There has been a six-fold increase in the budget allocated and executed in rural areas since 2014, and particularly in 2015. This reflects the government's commitment to the Basic Sanitation Plan 100–0. For the 2016–17 period CONADES will invest at least US$85 million in new water systems and sanitation infrastructure. In the same period, it is expected that DISAPAS will at least invest US$16 million. Out of this budget more than 5,000 bathrooms or sanitation units will be constructed, split almost evenly between both institutions (figure 5.10). As per how these sanitation units are planned to be distributed among different ethnic groups according to MINGOB mapping of public investment (2016–17) the Ngäbe Buglé and Emberá Wounnan ethnic groups will get most of the investment (figure 5.11).[9]

Figure 5.10: 2016–17 Public Sanitation Investment Spending (5,193 Sanitation Units)



Source: MINGOB 2016 data collection.
Note: CONADES = National Council for Sustainable Development (*Consejo Nacional de Desarrollo Sostenible*); DISAPAS = Directorate for the Potable Water and Sanitary Sewerage Subsector (*Dirección del Subsector de Agua Potable y Alcantarillado Sanitario*); MINGOB = Vice-Ministry for Indigenous Affairs within the Ministry of Government; MINSA = Ministry of Health of the Republic of Panama (Ministerio de Salud de la República de Panama).

Figure 5.11: Mapped Public Baths/Sanitation Units Investments, by Indigenous Communities, 2016–17



Source: Vice-Ministry for Indigenous Affairs within the Ministry of Government (MINGOB) 2016 data collection.

Institutional Fragmentation and Lack of Coordination Prevail in the System and Create Confusion and Inefficiencies

The institutional fragmentation that characterizes the sector has grown in recent years. The legal attribution of functions with regards to the provision of WASH services is not fully consistent with the functions carried out in practice by sector stakeholders. Although Law 2 of 1997 makes a clear distinction between the functions of policy and coordination (MoH), service provision (IDAAN and municipalities), and regulation (ASEP), the creation of institutions such as CONADES and SENADE, both under the Ministry of the Presidency and with no specific sectoral function, has led to a de facto duplication of some key functions. In particular, the designation of CONADES as the management unit for the Basic Sanitation Plan 100–0 duplicates the implementation and oversight functions attributed to DISAPAS by law.

Moreover, coordination mechanisms between the main actors are not working properly. Although the Basic Sanitation Plan allowed for the reestablishment of CIAPAS as the main coordination mechanism at the national level, the frequency of meetings has not been formalized nor does this institution have the power to make key sector decisions. This is partly due to that fact that CIAPAS is generally comprised of mid-level technical officials, who do not have the authority to make commitments on behalf of the institutions they represent. In addition, the participation of traditional leaders or indigenous government authorities remains unclear. Many of the actors involved in the sector believe that a unique national authority to coordinate and oversee all functions for WASH service provision needs to be created. Such a proposal was formalized a few years ago in the Law 573 of 2013. However, this was not approved.

The coexistence of DISAPAS, CONADES, and SENADE creates confusion for comarcas and fragments the relationships between indigenous communities and national-level authorities. Although the system for project execution is similar in both DISAPAS and CONADES, the requirements and oversight of the implementation process followed by these institutions differs widely, especially regarding participatory processes.

Fragmentation in the sector has led to inefficiencies in service provision, an excess of bureaucracy and deficiencies in planning and the administration of resources (World Bank 2016). Given the duplication of functions and the lack of coordination, there is a lack of planning and clear long-term goals for the WASH sector, and in particular, for WASH in rural areas and comarcas. Sectoral plans are ruled by the policies of the incumbent government, such as the Basic Sanitation Plan 100–0. This is worsened by the limited sector leadership (by MoH) and, at subnational levels, the lack of community ownership, awareness, and participation in the design of their water supply and sanitation systems.

DISAPAS and JAARs Lack the Capacity to Fulfill Their Responsibilities

DISAPAS lacks the capacity to take on new WASH systems and adequately train and support JAARs. Indeed, CONADES has been allocated more resources (US$160 million) than DISAPAS (US$42 million) in the last General Budget (2015–19), despite the fact that DISAPAS has more responsibilities and legal functions to guarantee service provision. This is related to the emphasis of the Government on “demonstrating results” and the prioritization of construction and rehabilitation of WASH infrastructure, which are very visible investments, over management and O&M activities (less visible) (World Bank 2016; Mason et al. 2013).

When JAARS are constituted, they rarely have the necessary capacity to fulfill their mandate. JAARs/JIARs are required to follow the quality requirements, collect tariffs and oversee the management of resources. However, JAARs’ have insufficient financial resources to maintain water supply systems in comarcas, mainly due to the low monthly fees collected for service

provision. Although the regulation recommends (Decreto Ejecutivo No. 1839) a monthly fee of US$3.00 for rural aqueducts in sparsely populated areas, data from communities in Ngäbe Buglé and Guna Yala indicate that households pay between US$0.25 and US$2.00 per month for their water supply (World Bank 2016). Recent information from SIASAR also indicates that only 50 percent of the monthly O&M costs are being recovered.

Low tariffs in comarcas are partly explained by the reticence to pay for water (a behavior that is not exclusive to indigenous areas) but also by limited financial planning on behalf of JAARs. According to a study in Ailigandí, Ustupu, and Narganá (Guna Yala) in 2006, JAARs do carry out activities such as cleaning filters and conducting monthly financial reporting. However, their performance deteriorates due to staff turnover rates (every 6 months) and limited community engagement (Brown and Kuna 2006). Collected funds are sometimes inadequately used; for example, they are used to cover community needs that are not related to WASH. The insufficiency of resources to cover the basic O&M costs makes JAARs/JIARs fully dependent on DISAPAS for major repairs or system rehabilitation.

The role of the CCAS and DAPOS, which should act as the main communication channels between DISAPAS and JAARs, remains unclear. Although all official documents refer to these bodies, there is scant evidence of their existence on the ground. Interviews with Guna indigenous peoples suggest that, in practice, CCAS do not exist. It is also not clear whether these are still active or operational in the Ngäbe Buglé and Emberá Wounaan comarcas. Similarly, most DAPOS are yet to be established due to financial and human capacity constraints.

Lack of Voice in Planning and Investment

Sectoral planning and investments do not respond to the cultural and geographical specificities and preferences of indigenous communities. There is a need to find solutions that build on traditional cultural norms and the geographical characteristics of indigenous territories. The weak levels of adoption and use of improved systems suggest a need for extra efforts and technical assistance to build awareness around the health benefits of water quality and treatment and adequate sanitation practices.

Institutional deficiencies are likely to be endogenous to the power dynamics that shape the patterns of indigenous exclusion to a certain extent. Indigenous populations lack the capacity to intervene in policy decisions regarding WASH systems. Although diverse government institutions hold the mandate to promote policies and programs for the inclusion of indigenous peoples, such as the Vice-ministry for Indigenous Affairs and the Council for Indigenous Development, these institutions rarely participate in sectoral planning. Overall coordination and planning is weak within and among different governmental agencies, as well as between the Government and the Indigenous Congresses and Councils.

In addition, final users often do not have a say on how services are provided. JAAR membership (with staff being responsible for service provision but also being beneficiaries themselves) dilutes the "client power" required to ensure the adequate provision of services. In particular, JAARs in indigenous territories are sometimes composed by elder members of the community (given the hierarchical structure of indigenous communities) or are used as a "punishment mechanism" (when community members misbehave). Thus, JAARs are not always set-up to respond to user/client needs and thus, do not always ensure system performance.

As a result of the lack of voice of indigenous communities, infrastructure developments are not adapted to their specific needs. For instance, the Basic Sanitation Plan 100–0 requires building flush toilets with zinc ceilings and tiling, which require reliable access to water for their operation as well as increased financial resources for their maintenance – these may not always be consistent neither with indigenous peoples' willingness to pay nor with the geography of their territories and water availability.

The lack of proper consultation and awareness activities limits acceptance of government interventions and undermines the sustainability of WASH services. Although CONADES is required to conduct technical and socioeconomic studies in intervention areas before proceeding with new projects, these do not appear to allow for a clear identification of the services needed in indigenous communities. There is anecdotal evidence that improved services exist in some locations that remain unused due to limited behavior change amongst indigenous communities. In addition, given the absence of the DAPOS and CCAS, it is not possible to determine capacity needs and thus, provide the required support to JAARs in indigenous areas. There is also limited oversight of JAAR performance.

Notes

1. The JAAR "operator" is in charge of the operation and maintenance (O&M) of water supply infrastructure, as well as liaising with the JAAR's Board of Directors and community members.
2. The present government began in 2014.
3. As of January 2017, around 80,000 families had received basic bathroom units at a unit cost of US$2,000. The goal is to build 300,000 of these units (to cover one million people).
4. "Integrated Development Plan of Panama's Indigenous Peoples" 2014.
5. Although these institutions may omit some territories and communities that are do not have legal comarca status.
6. Resolution No. 012, 2014.
7. Decreto Ejecutivo No. 1839, 2014.
8. The Mesa, or indigenous roundtable, in which all 12 congresses and councils participate, created the beginnings of such a structure but it remains to be seen how effective this will be. The Mesa was responsible for the Integrated Development Plan for Indigenous Peoples.
9. Numbers for DISAPAS for both the Emberá Wounaan and Ngäbe Buglé ethnic groups may be underestimated as the data elaborated by MINGOB in some cases did not come with specific investments in sanitation units but rather a general label of investment in sanitation infrastructure.

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Chapter 6
Conclusions and Policy Recommendations

Conclusions

On many fronts Panama has shown substantial progress in recent years. The country has enjoyed exceptional economic performance, well above that of its neighbors and the Latin American average. Economic growth has translated into substantial reductions in poverty largely through job growth, particularly in the low or unskilled sectors. Social spending has been an additional boon for low-income populations as several programs have been seen to reduce poverty, especially extreme poverty. In addition, non-monetary measures of welfare have improved and access to the basic services required for health and prosperity has increased.

However, progress has not been even across the country or across different population groups: universal access to services remains an aspiration, not a reality. Poverty has become more concentrated in rural indigenous communities in the country. These areas both started with significantly higher levels of poverty and have experiences lower levels of poverty reduction. Access to basic water and sanitation services or the lack thereof is clearly linked to living in a rural area or a comarca even when controlling for a variety of other characteristics. To the lack of access must be summed the poor quality of the services that are provided. Quality is often inadequate in both urban and rural areas; however, it is the rural and in particular, indigenous communities, that experience the most serious deficiencies with regards to the overall environment and the quality of service providers. This situation does not correspond to the income levels and poverty incidence of a middle-to-high income country such as Panama.

Access to water supply, sanitation, and hygiene (WASH) services is important not only per se, but also because of its implications for overall poverty and its synergies with specific development outcomes—especially in the areas of health and education. It has been demonstrated that the lack of adequate WASH services can have an impact on the health status and educational outcomes of children in Panama. Access and quality gaps, if not addressed, can compromise the future economic development of the subgroups in the country and the country as a whole. The prevalence of stunting, respiratory disease or diarrhea in children 6 to 60 months of age can be reduced if social spending in the form of cash transfers (Red de Oportunidades [RdO] program) is combined with adequate access to WASH services. In addition, math and reading scores and school attendance seem to be associated with access to adequate WASH services in school facilities, especially among lower income children, children living in rural areas, and girls.

The main findings of the report can be summarized as follows:

1. In alignment with the new Sustainable Development Goals (SDGs) definitions, it is not only WASH service coverage that matters, but also the quality of the services provided. Although urban and more densely populated areas in Panama have high water service coverage, they also register poor service quality often, either in the form of discontinuity and service failure or inadequate response by customer services. In the case of sewerage, only a few wealthier areas of the country have access to safely managed and treated sanitation services. This is largely the result of the difficulties for Institute for National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionales [IDAAN]) in quality provision, and the lack of coverage in rural *corregimientos*.

2. Disparities in access to, and the quality of, WASH services are largely due to the fragmented institutional system, which leads to important duplications and gaps. Although the number of layers and institutions involved in urban WASH services provision is not as great as in rural areas, the lack of coordination among the institutional arrangements affects the performance of the national utility, IDAAN, operating in urban areas. This results in poor service provision and unpredictable quality. However, institutional confusion mostly leads to failures to ensure the adequate provision of water and, in particular, sanitation services, in rural areas of the country.

3. Indigenous populations are faced with particular issues that require adapted responses. Indigenous populations appear to be particularly excluded from adequate access to quality WASH in Panama. Institutional confusion is exacerbated in indigenous comarcas due to the need to articulate the official arrangements with the indigenous governance and leadership structures, and demand side cultural beliefs and behaviors towards water and sanitation usage. In addition, the special characteristics of their territories require the adjustment of overall technical standards. Consultation and engagement of indigenous communities, although required, is most often not properly included in project design and development.

Policy Recommendations

The snapshot of the WASH service delivery system up to 2016 in Panama presented in the report reflects a sector business model that has barely changed in recent decades. In order to improve the coverage and quality of services in favor of the excluded, and in particular the rural indigenous populations and the peri-urban poor, substantial reforms will be needed. The government has already acknowledged this need with regards to urban areas and the inadequate functioning of IDAAN (see box 4.1), although gaps in this regard remain largely unaddressed.

Although the government has acknowledged the need for reforms for services in urban areas, the response for the rural sector appears to be insufficient. It seems that the Plan 100/0 will remain the main policy instrument in this area together with the growing role of National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible [CONADES]) and the decentralization process. The effect of these developments on the coverage and sustainable quality of services in rural and indigenous areas remains to be seen in the years to come. However, if no effort is made to improve coordination among the various actors in the rural sector, and considering that the institutional and management framework is not working properly, it seems that the scaling up of investments (US$2.9 billion) through the Basic Sanitation Plan 100-0 may be a formula for bigger inefficiencies, as well as affect sustainability and the effectiveness of investments in delivering health and other welfare outcomes.

Moving forward and drawing from the findings from the different studies conducted under the initiative and summarized in this report, general recommendations include the following:

In rural areas

- Promote the enhancement of the institutional architecture for the sector, and in particular strengthen the role and capacity of Directorate for the Potable Water and Sanitary Sewerage Subsector (*Dirección del Subsector de Agua Potable y Alcantarillado Sanitario*; DISAPAS) as the main coordination and oversight entity in the sector, preventing duplications and inefficiencies in planning and policy decisions in rural areas.

- Continue raising investments in rural areas, and in particular in indigenous comarcas and territories, where gaps in access to services are prevalent. Investments should be based on the priorities identified in the analysis presented in section 4.3: water infrastructure in locations that currently lack service (e.g., 40 percent of indigenous territories); and in

locations where the water service is provided focus on: (i) improving sanitation and hygiene practices, (ii) providing strong technical assistance to build and sustain capacity of service providers/operators, and (iii) water infrastructure systems, improving the quality of the water quality treatment as a strong priority as well as collection and storage components of the systems.

- Build the capacity to coordinate and work between key institutions in the sector such as Inter-Institutional Committee for Water and Sanitary Sewerage (Comite Interinstitucional para Agua y Sanamiento [CIAPAS]), Department for Potable Water and Sanitation (Departamento de Agua Potable y Saneamiento [DAPOS]), and CCS are in place and that they have the authority, budget, and capacity to effectively fulfill their mandate.

- Build the capacity to work between government and indigenous institutions of water both at central and territorial levels.

- Improve the framework for the rural community-based service model of service maintenance and operation. Based on a successful and recent project in rural areas of Panama (see box 6.1), some of the key interventions will include: (i) strengthening the technical and financial capacity of the Administrative Board for Rural Aqueduct (Junta Administradora de Acueducto Rural [JAAR]), making sure that they report adequately to DISAPAS on the quality of systems and service provision; (ii) making use of adequate coordination

Box 6.1: Good Practices for the Provision of Adequate Access to Wash Services in Rural Areas

A recent World Bank-supported project[a] implemented by Ministerio de Salud de la República de Panama (MINSA) in Panama provides an example of successful intervention to effectively improve access to WASH services in rural areas of the country. The project aimed to enable participating households and communities in rural areas to access these services through innovative approaches geared to providing services on a sustainable basis, and to improve sanitation and hygiene practices, among other objectives. For that purpose, different activities were carried out. A first set of interventions focused on ensuring expanded coverage and quality of service to rural areas through the provision of enhanced support to the establishment and/or operation and management of the water boards, promoting their implementation of selected delegated operation models, and carrying out physical investments and infrastructure in water and sanitation for selected rural communities of various provinces. On the other hand, and in order to strengthen coordination and cooperation among key actors in the sector, support for the establishment and operationalization of an inter-institutional committee for water and sanitation matters was provided. In addition, a national campaign on handwashing was developed.

The project incorporated lessons learned from previous experiences, and thus included social accompaniment and sustainability measures, involved communities in the early stage to build ownership of the designs and provided capacity building to the entire community as opposed to just the members of the JAAR given periodic rotation of leadership. MINSA hired an international consulting firm to conduct field visits to analyze the needs of each community that had expressed interest in the project and to select the communities based on established criteria. Three key

box continues next page

Box 6.1: Continued

drivers of the project's successful implementation were the strong match between community needs and project activities, the reactivation of CIAPAS and the placement of the project coordination unit within DISAPAS. The Minister of Health appointed the project coordination unit (PCU), which was located within DISAPAS, to carry out the project. The design team envisioned the strengthening of DISAPAS' presence in regional offices through the establishment of DAPOS. The DAPOS were expected to provide regular technical and social supervision support to the communities and to promote the overall sustainability of the rural systems.

The project's inclusion of social accompaniment was a major step forward in Panama. However, and rather than accompany the communities for an extended period of time during and after construction, the firms implemented a three-day capacity building course that introduced JAAR and community members to the basics of how to use and care for the systems. The course was not customized based on educational and socioeconomic backgrounds levels and many communities did not receive the reinforcement necessary to integrate the lessons into their operating structures. Recognizing the weaknesses of this approach, the project financed additional social consultants and DISAPAS provided additional social support to the communities. This additional support, however, was not applied systematically; some communities received more support than others.

Overall, the results of the project have been very positive. First, it increased access to sustainable water systems to approximately 59 percent of beneficiaries, surpassing the 56 percent target.[b] Second, it achieved its outcome indicator to increase the use of basic sanitation systems to 15,900 or more beneficiaries through extending access to sanitation solutions to 25,564 beneficiaries. The implementation completion report team's field visits revealed a high level of satisfaction among beneficiaries, who reported that the project had a transformative effect on their lives. It supported 160 JAARs, surpassing the target of 150, and helped nearly 26 percent of the JAARs establish tariffs that covered operation and maintenance (O&M) costs, exceeding the target of 20 percent, and 59 percent of the JAARs achieve sustainable service. The project also paved the way for the formation of water board associations as well as JIARs, supported the creation of the first water board association, successfully reactivated CIAPAS, and supported the passage of key pieces of legislation for the sector, including the legal establishment of DAPOS and the Integrated Board for Rural Aqueduct (Junta Integrada de Acueducto Rural; [JIAR]) as well as clear norms on the proper use of rural aqueducts and JAARs, JIARs, operators and users' responsibilities. In addition, the project successfully supported a handwashing campaign that reached 266,397 people. Post-intervention surveys showed that a large majority of the beneficiaries correctly remembered the messages from it.

Source: World Bank 2015.
a. Water supply and sanitation in low-income communities, see World Bank 2015.
b. The project defined systems as sustainable when: (i) the systems were functioning, delivered services regularly, and were designed to ensure long-term supply; and (ii) the JAARs met on a regular basis and collected tariffs that covered O&M costs.

mechanisms, that should be in place (e.g., CIAPAS, DAPOS); (iii) ensuring the community´s involvement from the earliest stages of project preparation; (iv) including accompaniment and sustainability measures; and (v) incorporating adequate campaigns to help users improve their understanding of the benefits of using infrastructures effectively.

- Enhance the institutional architecture for service delivery specifically in indigenous communities along the lines of some good practices identified for the Latin American and Caribbean region (see box 6.2). In particular:

  a. Ensure the adequate participation of indigenous peoples in the planning, prioritization, and design of investments to ensure that they meet their needs and preferences while building ownership, which is critical for sustainability.

  b. Traditional authorities and communities should thus be given a role in strategic policy decisions, planning, design, and implementation processes. At the community level, further investments and time needs to be dedicated to

Box 6.2: Good Practices in WASH Service Provision to Indigenous Peoples

Local service providers in indigenous communities have historically been more likely to "slip" into failed service provision than in nonindigenous communities. The adoption and use of water and sanitation systems tends to be lower and slower in indigenous communities largely because of investors' and service providers' lack of knowledge and limited attention to indigenous peoples' unique social and cultural characteristics. Oftentimes, indigenous communities are avoided by project planners and proponents due to their lack of understanding of how to carry out projects in collective or semiautonomous Indigenous territories, the remoteness of these areas, and the high associated per capita cost of a potential operation, among other reasons. In general, the sector has lacked a participatory framework tailored to indigenous peoples with specific principles to guide stakeholder engagement processes, participatory strategies, and the selection and implementation of investments to promote sustainable outcomes for water supply and sanitation (WSS) projects with Indigenous peoples. Drawing on the findings of interviews, consultations, and field visits carried out in 37 indigenous communities in seven Latin American countries including Panama and on a desk review, interviews with WSS, nongovernmental organizations (NGOs) and indigenous experts and representatives outside of the countries chosen for the field visits, a Toolkit for Indigenous Peoples Water and Sanitation services has been recently put together. Some of the main findings and recommendations highlighted include the following.

1. **Respect**

- Sector institutions need to build a meaningful dialogue with indigenous organizations, traditional structures, and authorities to ensure that indigenous priorities are effectively integrated in the sector.
- Sector institutions need to specifically target investments to indigenous territories and tailor approaches for engagement, intervention design, and operation and maintenance support to these territories in order to close current regional coverage gaps.

box continues next page

Box 6.2: Continued

- Women are strong behavior change agents and keepers of traditional knowledge. Women should be engaged from project onset so that their views and local know-how and influence can be incorporated throughout the project.

2. **Ownership**

- At the community level, indigenous beneficiaries and their local traditional authorities must be involved in all key decision-making processes throughout the development and implementation of projects to ensure that the intervention meets community needs and respects their world vision and cultural practices.
- A demand-responsive approach is essential for building ownership; however, it should be tailored to indigenous contexts by providing technological options based on traditional knowledge, practices, and local capacity, and developing culturally appropriate community contribution schemes to foster ownership.

3. **Sustainability**

- To avoid the failure of WASH services over the long term, adequate time and resources have to be invested in the "soft" side of these interventions to promote a respectful approach and the development of ownership by indigenous beneficiaries. Consultations and knowledge of local traditional structures should inform the design of sound management structures.
- Though there is a general perception that indigenous peoples should not and do not want to pay for services, findings reveal that indigenous beneficiaries recognize the importance of WASH services and are willing to provide a meaningful contribution to sustain them, through either monetary or "alternative" payment models (such as in-kind work or locally produced materials).
- The sustainability of decentralized services requires the establishment of technical assistance and institutional support mechanisms in particular for the O&M phase, involving periodic site visits, just-in-time professional support, and the mobilization of external parties, as necessary.

Source: World Bank 2016.

participation, capacity and awareness building, and the participation of leaders in the design of investments.

c. Allow for responses that are technically adapted to the specific needs, traditional knowledge, and cultural values of indigenous communities, for instance in the implementation of the Plan for Basic Health 100-0.

In urban areas

The work under this Diagnostic focused heavily on the rural and indigenous areas. Urban issues were addressed but in less depth, focusing on trends in IDAAN coverage and issues of water quality. No attempt was made to carry out a thorough institutional review. The recommendations here should thus be considered partial. As substantial previous work has focused on the institutional issues, all with a broad range of recommendations, this report focuses on a small set of concrete recommendations based on the limited urban analysis undertaken.

- IDAAN needs to rethink its approach to service provision to expand coverage to eligible areas presently omitted, largely in peri-urban areas of the country that remain underserved, and collect sound data on whether, when provided, sewerage includes safe disposal.

- Improve data systems to allow for monitoring of investment and progress on the SDGs (zero *E. coli* test, safe disposal of sewage including treatment and pipe breakages, and continuity of service, at a minimum).

- Further investigate the reasons for the lower quality of water provision observed in high density and wealthier areas of the country.

Improve data to build the country's capacity to monitor the new safely managed water and sanitation SDGs

- Although the WASH Poverty Diagnostic worked to build and integrate SDG monitoring elements where possible, most analyses are based on Millennium Development Goal (MDG) style definitions of access, largely due to the limited data availability. Lack of data that capture all aspects of safely managed water and sanitation, consistent with the new SDG indicators, are still lacking in Panama. Work is needed to revise the Multipurpose Survey (Encuesta de Proósitos Múltiples [EPM]) carried out in March of each year to collect the key variables related to WASH. The EPM is the survey that, presently, has the greatest range of WASH variables and is also the survey that will be used to construct the Multi-Dimensional Poverty Index that Panama will publish for the first time this year. The new index contains WASH variables: It will be imperative that these reflect the full SDG definitions. To this end it is key that both the Bureau of Statistics and Water authorities (Ministry of Health [MoH]) from the country start a dialogue to make sure that the survey captures what is needed without losing comparability with respect to previous surveys so trend analysis can be done effectively. When and if it is possible to collect the full suite of data for the SDG baseline, the analyses in the present report can be supplemented to further fine-tune and raise efficiency in progress towards Panama's domestic goals as well as the MDGs and World Bank goals. Finally, MINSA should expand the coverage of the Rural Water and Sanitation Information System (Sistema de Información de Agua y Saneamiento Rural [SIASAR]) and mainstream its data and findings in other sector institutions such as National Council for Sustainable Development (Consejo Nacional de Desarrollo Sostenible [CONADES]) and the Decentralization Office.

References

World Bank. 2015. "Implementation, Completion and Results Report on a Loan in the Amount of US$32 million to the Republic of Panama for a Water Supply and Sanitation in Low-income Communities Project." World Bank, Washington DC.

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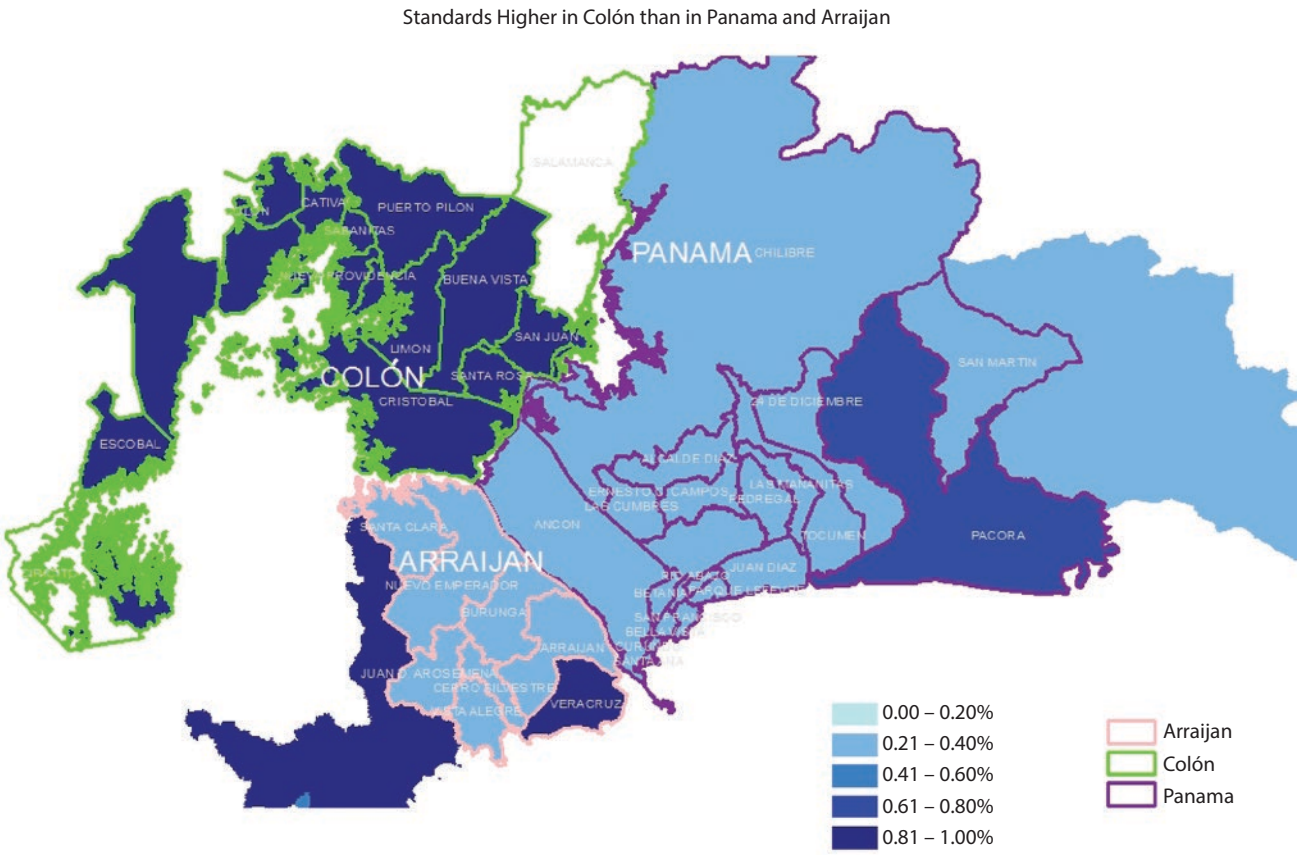
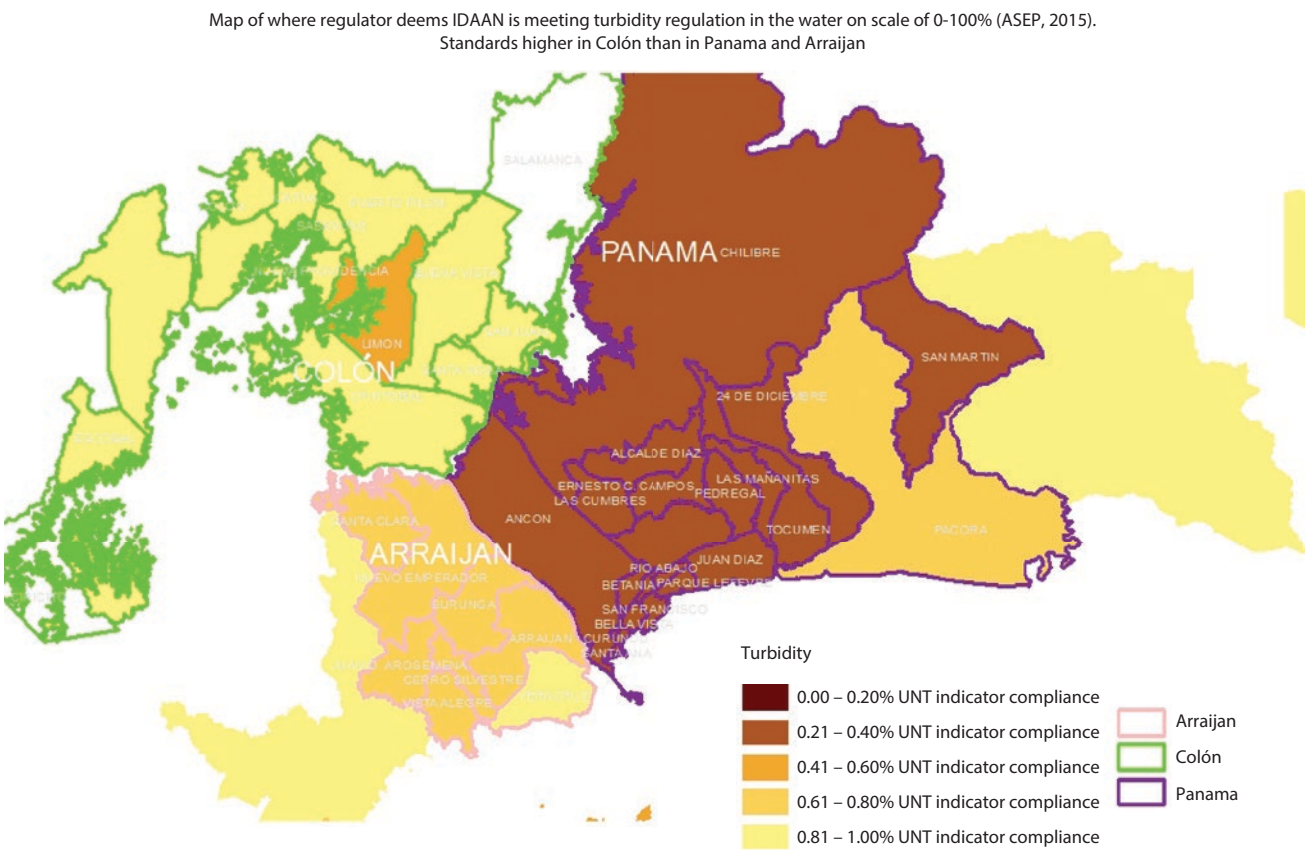
Appendix A
Contributions to World Bank Operations

Map A.1: Residual Chlorine in Water in Panama, Colón and Arraijan in 2015



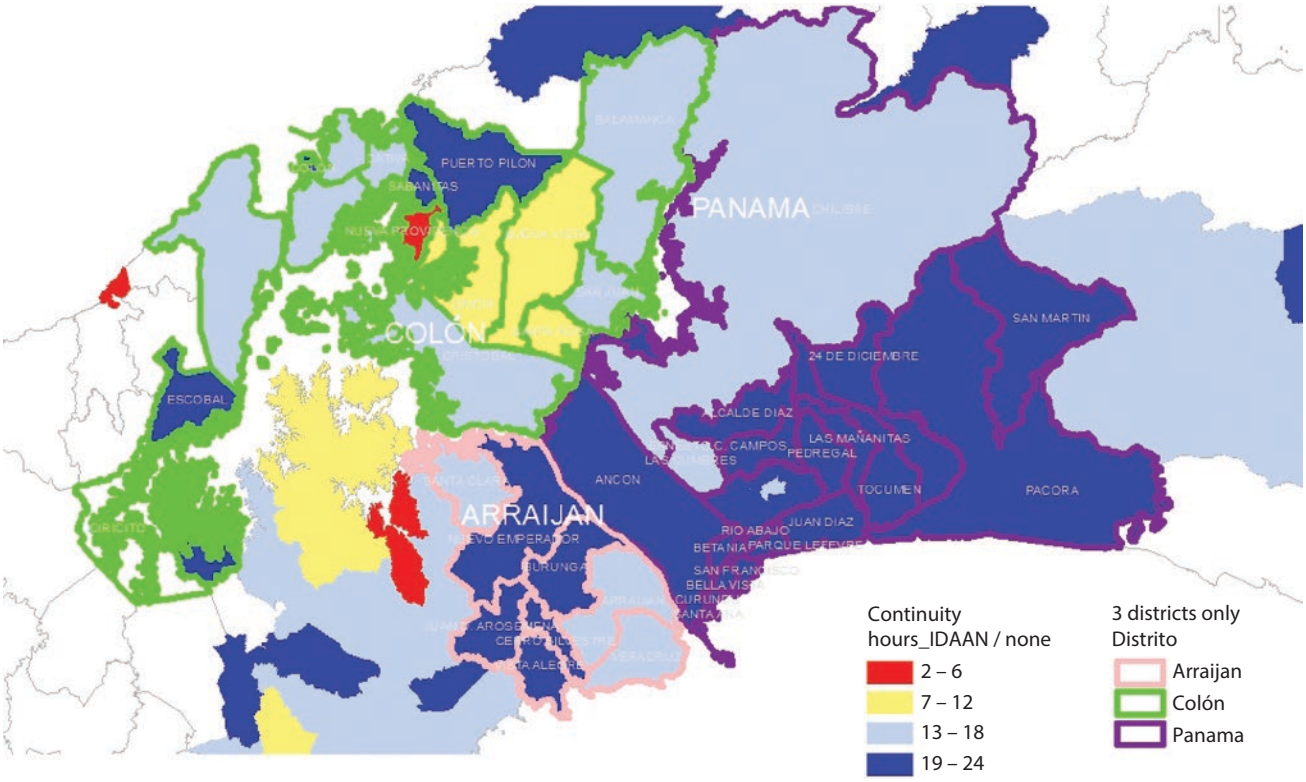
Source: Authors' calculations based on IDAAN data.

Map A.2: Water Turbidity Levels in Panama, Colón, and Arraijan in 2015



Source: Authors' calculations based on IDAAN data.

Map A.3: Continuity of Water Service, by Corregimiento



Source: Authors' calculations based on IDAAN and 2010 census data.

Appendix B
Quality of Service Provision by IDAAN, Definition and Indicators

The Sustainable Development Goals (SDG) 6's definition of improved water moves beyond coverage, and towards the recognition of *quality* of service to include continuity and *safety*, with a focus on water quality and safe disposal of wastewater. As part of SDG 6, this work is particularly relevant for 6.1 and 6.3 below, but also holds relevance for 6.2 as census data is used to examine where indigenous populations are not covered by the national utility's provision.

SDG 6.1	By 2030, achieve universal and equitable access to **safe** and **affordable** drinking water for all
SDG 6.2	By 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those **in vulnerable situations**
SDG 6.3	By 2030, **improve water quality** by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, **halving the proportion of untreated wastewater** and substantially increasing recycling and safe reuse globally

The definition of quality of service includes consideration of the following:

1. **Accessibility**: Does the national utility Institute for National Aqueducts and Sewerage Systems (Instituto de Acueductos y Alcantarillados Nacionale [IDAAN]) provides service in the *corregimiento* to both water and sewerage? This is not to say that anywhere without IDAAN coverage is unimproved, but we will only be considering IDAAN served areas in this analysis.

2. **Quality of potable water:** Although water quality testing contains a large array of chemical, physical and bacteriological analyses, here we are choosing to look at presence of residual chlorine as an indicator of both the quality of treatment provided, and the state of the infrastructure which carries water to the homes of customers. Levels of chlorination give a basic indication of water safety. Turbidity is also an indicator both of the water quality and of what the consumer's perception of water service may be.

3. **Consumer satisfaction:** In addition to turbidity, we are assessing the quality of service as reported by the consumer to a hotline that IDAAN provides for complaints. These data also help to validate and show up any information gaps that the service provider may have in terms of their own knowledge of irregularities in service provision.

4. **Continuity and interruptions to service:** It is possible to examine the level of continuity of service from two points of view. On the one hand, consumers may have a limited number of hours during which they have a continuous service every day. On the other, they may theoretically have 24 hours of service provision daily but regular unanticipated cut offs. Here we define a good quality of service to be between 18 and 24 hours and with an average duration of the interruptions to service per day as being below that permissible by the regulator ASEP according to their indicator framework.

Table B.1: Water and Sanitation Indicators, Source and Method of Calculation

Indicator	Source	Indicator calculation method
1. *Access* percentage and number of population covered by the national utility IDAAN by *corregimiento*	**IDAAN – Planning Department**	No. IDAAN clients per *corregimiento* Population per *corregimiento*
2. *Water Quality*		
a) Performance in the indicator for residual chlorine levels in the water of IDAAN WSS systems	**IDAAN – Operations Department & ASEP – Regulator**	Minimum value 0.8 mg/liter. The addition of chlorine is subject to a maximum concentration of trihalomethane of 0.1mgs/liter. The percentage is calculated as the average compliance with the norm over all the tests the level of compliance with the norm the no. test taken
b) Performance in the indicator for turbidity levels in the water of IDAAN systems		Preferably less than 1.0 UNT The percentage is c alculated as the average compliance with the norm over all the tests the level of compliance with the norm the no. test taken
3. Customer Service		
a) Level of responsiveness to complaints within a 30-day window of registering	**IDAAN – Commercial Department**	No. requests responded to within 30 days Total number of requests
b) Most common call in motives to the 311 helpline	**IDAAN – Operations Dep 311 helpline**	No. call ins for x motive to 311 in 2015 No. call ins to 311 in 2015
4. *Continuity*		
a) Hours of service per day and days of service per week from those reporting IDAAN coverage and those reporting non-IDAAN coverage	**Census 2010**	Average no. hours of service per day=(Hours of service per day*days of service per week)/7
b) Performance in the indicator for number of interruptions by WSS system by client	**ASEP – Regulator**	Σ(Duration of each interruption*no. clients affected total no. clients for that WSS system

table continues next page

Table B.1: Continued

Indicator	Source	Indicator calculation method
5. *Sanitation*		
a) Coverage of sewerage network	**IDAAN – Planning Dep**	No. IDAAN clients with "AL"(alcantarillado) per *corregimiento* Population per *corregimiento*
b) Coverage of sewerage network with safely managed disposal and treatment	**IDAAN – Planning Department**	No. IDAAN clients with sewerage network+ PTAR_(treatment) per *corregimiento* Population per corregimiento
6. *Poverty* Percentage of the population under the poverty line	**EPM 2015 and Census 2010**	The median income per capita of the household in the EPM which is employed in the estimations is valued in dollars earnt per month and includes labor income, income from private business from some member of the family and non-labor income for example from rental, public or private cash transfers. For the estimation of the incidence of poverty, this per capita income measure is compared with the value of the extreme and general poverty line. The value of these lines is respectively 69.33 and 140.52 US dollars for the urban areas of the districts of Panama and San Miguelito in Panama Province and 59.25 and 105.26 US dollars in the rest of the country. (Metodologia_resultados_25Abril2016)

5. **Safely managed sanitation:** As a result of having access to information on where IDAAN provides wastewater treatment, it is possible to conduct an assessment of what percentage of Panama's corregimientos has safely managed sanitation. We define safely managed as having safe disposal of excreta where a sewerage system is provided, avoiding breakages, pipe blockages, spillages and associated risks. Furthermore, data from the customer hotline can inform where there are sewerage pipe breakage reports. In other words, to have safely managed sanitation is not just the provision of the sewerage infrastructure, but also its continued, safe operation and maintenance.