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Guatemala's Water Supply, Sanitation, and Hygiene Poverty Diagnostic

Challenges and Opportunities

GUATEMALA

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Executive Summary

Poverty rates in Guatemala are among the highest in Latin America and the Caribbean, and Guatemala is now the second poorest country in the region with only post-earthquake Haiti being poorer. Furthermore, Guatemala is an extreme outlier in the region in terms of chronic malnutrition and almost half of all children in the country suffer from stunting. In general, access to basic infrastructure, particularly access to improved drinking water and sanitation, is critical to improving health and reducing poverty. Yet more than half of Guatemalans lack access to improved sanitation and little progress has been made in reducing chronic malnutrition. Extreme disparities exist between geographical areas, and the rural population remains disproportionately disadvantaged, while the extreme poor and indigenous are more consistently and persistently excluded.

Given the challenges associated with expanding coverage in rural areas, these results are not particularly surprising. Because of the number of low-density communities of variable topographies which only have minimal transport and other basic infrastructure, access to rural communities is limited. This leads to a reduced availability of goods and materials, difficulties establishing supply chains, decreased economies of scale, and ultimately high costs per capita. Moreover, regulatory and legal frameworks prioritize urban areas, which leads to the absence of a dedicated sector policy that clearly defines the provision and quality of services for rural users. Geographical remoteness increases political and administrative isolation, and rural communities are often overlooked by the central government, even though community water supply, sanitation, and hygiene (WASH) service providers ultimately depend on the central government for training, technical capacity, and long-term, post-construction support. The limited resource base of rural areas, which are home to a higher percentage of low-income households, renders communities highly dependent on external sources of funding. However, the lack of effective regulations governing community service providers affects the performance of these providers and impedes their ability to access alternative sources of funding.

This report seeks to understand this paradigm through a careful examination of trends in access to water supply and sanitation and in corresponding linkages to poverty and health. It also reviews the governance structure and expenditure plans underpinning service delivery in the WASH sector in Guatemala.

The report's main findings suggest that the challenges facing the WASH sector in Guatemala are significant and will require, among other things, stronger political leadership to successfully reform and regulate the sector, greater focus on rural sanitation, and increased spending and budget execution.

Key Findings

The poverty rate in Guatemala is high and trending in the opposite direction from the rest of the region. The poverty headcount in Guatemala increased from 55 percent in 2006 to 60 percent in 2014, while extreme poverty rose from 33 to 37 percent over the same period. Inequality in Guatemala is similarly high, but has fallen much faster than in either Central America or Latin America as a whole. However, gaps in inequality between the poor and the nonpoor remain large, with a contributing factor being the differences in access to basic services. Although this phenomenon is not unique to Guatemala, the key problems in Guatemalan society include the size of these gaps and the challenges to narrowing them, particularly in the face of limited socioeconomic mobility. There are strong spatial and ethnic patterns of poverty. The evidence presented in this document suggests that the poorest people are concentrated in rural areas that have high percentages of indigenous

populations, and that are characterized by the lowest coverage rates of basic services and the lowest levels of human capital. Unequal access to basic infrastructure—electricity, water supply, and sanitation—continues to persist in much of Guatemala. While access to infrastructure has increased in recent years, coverage remains far from universal, particularly with respect to the quality and reliability of service provision.

The impacts of limited access to basic infrastructure, specifically to water supply and sanitation, on social and economic well-being are well established. Access to improved drinking water supply and sanitation reduces malnutrition and the prevalence of diarrheal disease and directly affects rates of morbidity and mortality. Furthermore, timesaving benefits can be achieved through reduction in the amount of time spent carrying water. This can also result in a decreased dependency on healthcare services and increases in improved health, which in turn can result in increased productivity and economic benefits. Globally, rural populations are disproportionately affected, with more than half the rural population lacking access to improved sanitation and one-fifth lacking access to an improved water supply. These trends are reflected with noticeable precision in Guatemala. Increasing rural sanitation coverage is one of the key challenges facing the country today given its importance to individual—and community—health.

Although the national target for access to improved drinking water established in the Millennium Development Goals (MDG) was met, historical, geographic inequities persist, and pressing challenges are to provide reliable services are increasing. Nationally, 91 percent of the population has access to improved drinking water, an increase of 14 percentage points since the onset of the MDGs, most of which occurred during the first ten years of implementation. Since then, the overall composition of access to water supply and service delivery has remained fairly constant over time. Despite the improvement in coverage in relative terms, in absolute terms there is still a significant number of Guatemalan households using water from precarious or unimproved sources such as unprotected wells, rivers, or lakes. Access to improved drinking water is concentrated in the Pacific Ocean Basin, an area facing potential water risk in the future, while the most underserved are concentrated in the north and central areas of the country, where, counterintuitively, there is an abundance of freshwater resources. This indicates that water scarcity in Guatemala is predominantly an economic issue. Service levels have remained relatively unchanged over time, yet the average monthly cost of water almost doubled from 2006 to 2014, further disadvantaging groups already impoverished. These findings are especially relevant given the emphasis of Target 6.1 of the Sustainable Development Goals (SDGs) to achieve *universal and equitable access to safely managed drinking water for all*, which considers accessibility, availability, and quality of drinking water within and beyond the home to include, for example, schools and health centers.

Sanitation is a catalyst for improving health outcomes, yet almost half of all Guatemalans lack access to improved sanitation. Addressing the gaps in achieving the national MDG target for access to improved sanitation remains critical, particularly given the expanded definition of Target 6.2 of the SDGs to *achieve adequate access 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*. While important gains have been made in expanding sewerage coverage, and open defecation is decreasing, only three departments met the national MDG target for sanitation. As public investments in the WASH sector have favored drinking water, sanitation coverage has fallen far behind, particularly in rural areas where coverage rates are still too low to ensure an adequate quality of life.

Living in a rural area is a key barrier to accessing improved drinking water and sanitation. The disparity in access to improved drinking water and sanitation between geographical areas is evident, and the rural population remains disproportionately disadvantaged. Guatemalans living in extreme poverty are the most consistently and persistently excluded group, despite achieving some of the greatest gains relative to other groups, whereas indigenous groups access improved drinking water and sanitation at rates similar to other poverty groups. Not surprisingly then, living in a rural area is the key predictor of access to improved drinking

water and sanitation, while living in poverty and being indigenous decreases even further the likelihood of having access to improved sanitation. Overall, despite Guatemala's moderate success in achieving the national MDGs, it is crucial to note that applying the SDG indicators for water and sanitation[1] today would almost certainly result in significantly lower rates of access than those indicated by the current assessment.

Current estimates suggest that only 15 percent of water supplies are disinfected and that less than 5 percent of wastewater is treated prior to release. Importantly, one-fifth of all people do not treat their drinking water at home, although because of a lack of coherent data at the national level, it is difficult to contrast this figure against systems that are being treated at the source. Either way, it is abundantly clear that disinfection rates are exceptionally low, pointing to a need for greater efforts at the municipal level. To this end, endeavors have been made within the WASH sector to develop a national water system registry and water quality monitoring program (the Information System for Water Quality Surveillance [SIVIAGUA]). Rural water system are monitored at twice the frequency of urban systems. However, the Ministry of Health, charged with the responsibility for monitoring the quality of drinking water and wastewater discharges, lacks the technical and financial capacity to ensure the timely collection, transmission, evaluation, and dissemination of information. The need for greater coordination between agencies tasked with the provision of drinking water and sanitation and health is undeniable. However, a better solution might be to assign management and responsibility for SIVIAGUA to a dedicated national water authority.

One-fifth of all households report having children who suffer from diarrheal disease, and a third report having children who suffer from respiratory infections. There are no appreciable differences of childhood disease by geographic area, poverty status, or ethnicity. Instead, evidence suggests that the incidence of diarrheal disease and respiratory infections in children is not linked to water quality, but rather to the household's source of drinking water and its type of sanitation. Thus, targeting improved sanitation and hygiene may be a greater determining factor in combatting childhood disease related to WASH.

Guatemala is an outlier in Latin America in terms of chronic malnutrition, and almost half of all Guatemalan children are stunted. Guatemala exhibits similar patterns of childhood mortality seen globally. In children under five, acute respiratory infections are the leading cause of death, at 34 percent. Diarrheal diseases are the next largest cause of death in this age group, at 18 percent. Guatemala's high chronic malnutrition (stunting) among children is also an indication of the high levels of poverty and inequality in the country. The persistently high, chronic malnutrition rates in Guatemala indicate a lack of the most basic type of human capital–good health–driven in part by a lack of access to basic services. The extent of malnutrition in Guatemala, along with its historical intractability and its effects on other welfare outcomes, puts solving the malnutrition conundrum at the top of any priority list. Guatemala's level of chronic malnutrition is closer to those in poor Sub-Saharan African countries than to the levels of its regional neighbors. Malnutrition represents a substantial cost to Guatemalans, limiting opportunities to participate in the economy and to contribute to the country's social and economic development. The cost of malnutrition to the economy is also high because it undermines investments in public services, particularly healthcare, and deprives the labor market of productive workers.

There has been little progress in reducing historical rates of chronic malnutrition overall, the determinants of which range from having access to clean water, safe sanitation, and food security to having access to primary health care and adequate childcare. Although the urban-rural gap in malnutrition closed from 17 percent in 2008 to 11 percent in 2014, disconcertingly this was due mainly to an increase in malnutrition rates in urban areas. Furthermore, there was an increase in malnutrition among children living in the top wealth quintile and in households where there are more educated heads of households. Despite this lack of progress, between 2009 and 2015, there was an improvement in children's access to factors that affect malnutrition. As laid out in the UNICEF framework on nutrition, there are numerous factors that affect malnutrition levels, including WASH, food security, dietary diversity and care, and health care.

An assessment of the adequacy of these dimensions, including their impact on malnutrition and the extent to which they have changed over time, shows that although there has been significant progress, this progress has not resulted in better outcomes. This could support the increasing body of evidence that suggests chronic malnutrition may be related to the consumption of aflatoxin-contaminated food. This means that solving the malnutrition challenge will require multisector interventions in the areas of health, education, WASH, and agriculture.

Current institutional and organizational arrangements reveal multiple constraints to service delivery in Guatemala that affect the pace of increasing access to safe water supply and improved sanitation for the poorest. Specifically, the regulatory and management model governing the provision of WASH services in Guatemala is hindered by incomplete regulations and gaps and duplications in the roles and responsibilities assigned to actors at various levels of government, most notably a lack of national leadership and support to rural areas. This is further compounded by a lack of information, which affects decision making and limits feedback needed to enforce oversight and accountability. It could be argued that the process of decentralization promoted in the 2000s has yet to overcome historical weaknesses in technical capacities that persist in the majority of departments and municipalities. The central government has not fully assumed its role in the development of policies and the coordination of plans and programs, and as a result, responsibility for the sector remains fragmented.

Average capital expenditure and spending efficiency in Guatemala is inadequate to meet current demands. Total expenditure as a share of national gross domestic product (GDP) in the WASH sector in Guatemala averaged significantly less than in the health and education sectors. Capital investment recently fell below regional levels required to sustain services, and below the level of capital investment of Guatemala's well-performing regional peers, and this trend appears to be continuing. The optimal spending level is likely to be well above current spending levels. Without increased investments, Guatemala is likely to fall short of the requirements needed to achieve the SDGs. Limited regulation, poor financial oversight and accountability, weak intergovernmental arrangements, and lack of implementing capacity, especially in rural areas, has led to bottlenecks that have prevented the sector from converting financial resources into sustainable services. Spending is inefficient. In order to maximize quality public service delivery, it is important to improve the effective expenditures allocated to the WASH sector, as well as to overcome capacity limitations. Accommodating higher social infrastructure spending will necessitate an increase in revenues from both improved tax administration and sector policy and institutional changes.

Main Recommendations

Addressing the needs of the most vulnerable populations and achieving the SDGs will require major institutional reforms at the national and subnational levels. The challenges facing Guatemala's WASH sector are significant—especially given critically high rates of chronic malnutrition and significant gaps in coverage in rural areas. Specifically, Guatemala would benefit from having a consolidated national water authority to ensure adequate execution and oversight of public policies, regulations, and guidelines accompanied by a program to strengthen national institutions in order to increase capacity in the WASH sector across all levels of government, with a specific focus on rural service providers.

Closing the geographical gap and achieving the SDGs will require a dedicated sector policy that clearly defines the provision and quality of services in rural areas, with a particular emphasis on rural sanitation and hygiene. Living in a rural area significantly limits access to safely-managed drinking WASH services. To address this challenge effectively requires a better understanding of the socioeconomic constraints affecting those communities. A detailed analysis of the barriers to improved WASH services and their links to poverty and health should be undertaken at the local level to help identify, develop, and implement policies and programs designed to address the needs of rural populations.

Combatting childhood disease will require multisector engagement and coordination to improve hygiene, accompanied by a rigorous service-provision program and a knowledge agenda. Increasing access to places of handwashing with soap and water, particularly in poor, rural communities, while promoting awareness of disease transmission routes and the importance of treating drinking water at home, could help reduce the incidence of diarrheal disease and respiratory infections underpinning chronic malnutrition. Recent research[2] suggests chronic malnutrition is also associated with the consumption of aflatoxin-contaminated food by mothers and children. Further research is urgently needed to better understand the effects of aflatoxin poisoning on an already-compromised digestive system. Both endeavors should be supported by a consolidated multisector approach to interventions already targeting improved health and hygiene, such as the World Bank-supported Guatemala Nutrition and Health Project, *Crecer Sano*.

Providing sustainable delivery of public[3] services and meeting the SDGs will require increased levels of investment and greater budget execution. First and foremost, from a public expenditure perspective, the government should prioritize the WASH sector and maximize public investment in it. A larger share of public resources must be dedicated to the sector, along with greater efficiency in their expenditure, to help Guatemala achieve the SDGs. To this end, optimal spending is expected to be upwards of 0.39 percent of GDP. Second, the government should improve the effective and efficient expenditure of the budget allocated to the sector and should increase its capacity to maximize the provision of public service delivery. This could include improving the architecture of the national investment system, ensuring that weak municipalities are not excluded from the allocation of investment funds earmarked for the sector. It could also include improving funding for both operation and maintenance of systems and for replacement and renewal of assets.

Increasing accountability within the sector and improving decision making to better inform policy will require access to timely, relevant, accurate, and transparent information. Strengthening and consolidating SIGSA (the National Health Management Information System) and SIVIAGUA could enable sector stakeholders to better respond to the needs of the sector, to improve decision-making processes, to better inform policy, and to increase the accountability and oversight of service providers. Expanding current databases to include information on water availability, accessibility, and quality would help the government achieve global monitoring requirements, such as the SDGs, while informing pollution-mitigation and climate-change strategies. Evaluating the database's compatibility with different information and communication technology (ICT)-based applications, such as the Information System for Rural Water and Sanitation (SIASAR), could provide a low-cost, low-tech solution to enhance data collection, management, and reporting in rural areas. Such an endeavor should be accompanied by targeted technical assistance to support departmental inspectors, municipalities, drinking water steering committees (CAAP), and service providers, particularly to address the widespread lack of water treatment and to develop enhanced water quality monitoring programs.

Increasing the public's willingness to pay (WTP) for these services will require a measurable increase in access to services and improved performance. The systemic culture of nonpayment for services affects the water supply and sanitation sector's sustainability. However, the public generally is required to pay for services, and those with less access to improved services in rural areas are the ones who pay the most through poor health and low quality of life. The benefit–cost ratio of water supply and sanitation interventions in Latin America and the Caribbean has been estimated at 5.2 (7.3 for sanitation and 2.4 for water) thus making a compelling case for providing improved services. Furthermore, studies suggest that average WTP for water increases when improvements in access are greatest. Specifically, in some of Latin America's most vulnerable countries, WTP has been shown to increase 2.5 times for access to piped water versus access to improved water.[4] In short, the economic imperative for increasing access to improved WASH services is strong, showing that leveraging success can increase WTP, which can then lead to improved sustainability within the overall sector.

Notes

1. Target 6.1.1 (the proportion of population using safely managed drinking water services) and Target 6.1.2 (the proportion of population using safely managed sanitation services, including a handwashing facility with soap and water), respectively.
2. See in particular IARC 2015.
3. Increased private sector participation could potentially benefit the WASH sector through, for example, performance-based contracts designed to improve service delivery, Public Private Partnerships, delegated management, and so forth. However the lack of available information precluded an assessment of the private sector's current role in the WASH sector in Guatemala and would require a detailed analysis prior to drawing meaningful conclusions.
4. Average WTP was estimated to increase from US$18.81 for access to improved water to US$48.69 for access to piped water compared to estimated costs of US$3.10 and US$13.45, respectively, in Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, and Peru (Van Houtven et al. 2017).

References

IARC (International Agency for Research on Cancer). 2015. "Mycotoxin Control in Low-and Middle-Income Countries." IARC Working Group Report 9, (accessed April 2017), http://www.iarc.fr/en/publications/pdfs-online/wrk/wrk9/IARC_publicationWGR9_full.pdf.

Van Houtven, G., S. Pattanayak, F. Usmani, and J.C. Yang. 2017. "What are Households Willing to Pay for Improved Water Access? Results from a Meta-Analysis." *Ecological Economics* 136: 125–35. doi:10.1016/j.ecolecon.2017.01.023.

Abbreviations

AECID	Agencia Española para la Cooperación Internacional para el Desarrollo/Spanish Agency for International Cooperation and Development
CAAP	Comités Administradores de Agua Potable/Drinking Water Steering Committees
COCODE	Consejos Comunitarios de Desarrollo/Community Development Councils
COMUDES	Consejos Municipales de Desarrollo/Municipal Development Councils
CONADUR	Consejo Nacional de Desarrollo Urbano y Rural/National Council of Urban and Rural Development
DCS	Development Councils System
ECLAC	Economic Commission for Latin America and the Caribbean
ENCOVI	Encuesta Nacional sobre Condiciones de Vida/National Household Survey
ENSMI	Encuesta Nacional de Salud Materna-Infantil/National Maternal and Infant Health Survey
EMPAGUA	Empresa Municipal de Agua (Municipalidad de Guatemala)/Municipal Water Company (Municipality of Guatemala)
FOCARD-APS	Foro Centroamericano y de República Dominicana de Agua Potable y Saneamiento/Central America and Dominican Republic Forum for Water and Sanitation
HDI	Human Development Index
HOI	Human Opportunity Index
IDB	Inter-American Development Bank
IFPRI	International Food Policy Research Institute
IGSS	Instituto Guatemalteco de Seguridad Social/Guatemalan Social Security Institute
INE	Instituto Nacional de Estadística/National Statistics Institute
INFOM	Instituto de Fomento Municipal/Institute of Municipal Development
JMP	Joint Monitoring Programme
MARN	Ministerio de Ambiente y Recursos Naturales/Ministry of Environment and Natural Resources
MDG	Millennium Development Goal
MINFIN	Ministerio de Finanzas Públicas/Ministry of Public Finance
MSPAS	Ministerio de Salud Pública y Asistencia Social/Ministry of Public Health and Social Assistance
NGO	nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
OMA	Oficina Municipal de Agua/Municipal Water Office
OMP	Oficina Municipal de Planificación/Municipal Planning Office

PPP	purchasing power parity
RASGUA	Red de Agua y Saneamiento de Guatemala/Guatemalan Water and Sanitation Network
SCD	Systematic Country Diagnostic
SCEP	Secretaría de Coordinación Ejecutiva de la Presidencia/Presidential Executive Coordination Secretariat
SDG	Sustainable Development Goal
SEGEPLAN	Secretaría de Planificación y Programación de la Presidencia/Secretariat of Planning and Programming of the Presidency
SIASAR	Sistema de Información de Agua y Saneamiento Rural/Rural Water and Sanitation Information System
SICOIN	Sistema de Contabilidad Integrada/Integrated Accounting System
SIGSA	Sistema de Información Gerencial de Salud/Health Management System
SIVIAGUA	Sistema de Información para Vigilancia de la Calidad del Agua/Information System for Water Quality Surveillance
SNIP	Sistema Nacional de Inversión Pública/National Public Investment System
UNDP	United Nations Development Programme
UNEPAR	Unidad Ejecutora del Programa de Acueductos Rurales/Executive Unit of the Rural Aqueduct Program
UNICEF	United Nations Children's Fund
WASH	water supply, sanitation, and hygiene
WBG	World Bank Group
WDI	World Development Indicators
WDR	World Development Report
WGI	Worldwide Governance Indicators
WHO	World Health Organization
WTP	willingness-to-pay

Chapter 1
Introduction

Background

Guatemala's recent political history includes a 36-year civil war that ended with the signing of the Peace Accords in 1996. Like much of Latin America, the armed conflict was the result of a series of ideological differences and social discontent; however, Guatemala's war was the longest and one of the most violent in Central America. Institutions were seriously weakened and the country was left in a state of disarray requiring reconciliation and rebuilding. In 2015, Guatemala experienced a new political crisis recreating a state of institutional instability. Repudiated by the public for a general lack of transparency and rampant acts of corruption, the vice president and, later, the president were forced to resign. Leaving office before the end of their terms, both elected officials faced legal proceedings along with several of their ministers. This political crisis at the highest level of the Executive Branch is the institutional political context in which public services are currently provided.

With a population of over 15 million people split almost evenly between urban and rural areas, Guatemala is the most populous country in Central America. Birth, death, infant mortality, and fertility rates are among the highest in Central America, while life expectancy is low (Encyclopedia Britannica 2017). Correspondingly, almost 40 percent of the population is under 14 years of age, and the median age is 21.2, the lowest in Latin America (United Nations 2015). Ethnically diverse, 42 percent of the population belongs to an indigenous group, the highest share in Latin America. The K'iche are the largest indigenous group at 1.6 million people, while another 17 Mayan groups plus the Xinca and Garifuna populations together include over 4 million people. Indigenous people are, in general, more likely to live in rural areas—in contrast to the rest of the population, which is split 50-50 between rural and urban areas—which affects their access to services. However, there are large variations between the different Mayan groups. K'iche are the most urban of the groups, with almost 40 percent of their members living in urban areas while the Q'eqchí are the most rural at 84 percent. Indigenous people represent the majority of the population in some departments but only a tiny minority in others.

Although Guatemala represents the biggest economy in Central America, it has the highest levels of inequality, with poverty rates—especially in rural and indigenous areas—among the highest in the Latin American region (World Bank 2015). The poverty rate in the country increased from 55 percent in 2000 to 60 percent in 2014, in striking contrast to the significant overall decline in poverty in most of Central America and Latin American as a whole. Nonmonetary indicators of welfare also highlight the extent to which Guatemala is an outlier in the region (see box 1.1 for a summary of recent transformations in the country). Chronic malnutrition (stunting) remains at levels seen only in countries with substantially lower incomes. Guatemala ranked 106 out of 120 countries in stunting in 2010, almost the same ranking it had in 1990.[1] Education levels are low, with only 18 percent of all 25 to 29 year olds having graduated from secondary school, which is half the Central American average and a quarter of the Organization for Economic Co-operation and Development (OECD) average. Access to improved water and sanitation is among the lowest in the region, rising from 87 percent in 2000 to 91 percent in 2014, and from 39 percent in 2000 to 53 percent in 2014, respectively. Only Bolivia and Haiti have lower rates of access to sanitation.

Box 1.1: Recent Transformations in the Country

Guatemala ranks as the largest country and economy in Central America with over 15 million inhabitants, of which more than half live in poverty. Guatemala's population is divided roughly equally between urban and rural areas. However, large disparities in economic development, access to basic infrastructure, health services, and health outcome indicators persist, with rural areas faring much worse than urban areas. Only three countries in the Latin America and the Caribbean group—Haiti, Guatemala, and Guyana—are still primarily rural. Overall, Guatemala's Human Development Index (HDI) value for 2015 of 0.640 places it in the medium human development category, ranking 125 out of 188 countries and territories, a ranking shared with Namibia. Guatemala's HDI is above the average of 0.631 for countries in the medium human development group, yet below the average of 0.751 for countries in Latin America and the Caribbean.

HDI rankings between departments vary highly. While the HDI value for the department of Guatemala (0.697) is higher than the regional average for Latin America and the Caribbean, HDI values for Quiché (0.470) and Huehuetenango (0.498) are considerably lower. At the municipal level, these differences are even stronger. The municipality of Guatemala City shows an HDI value of 0.826, comparable to several developed countries. In line with this profile of increasing human development, during the same period, Guatemala experienced progress in extending basic social services (health, education, water supply and sanitation, and electricity) to rural areas (see figure B.1.1.1). The gender gap in access to services narrowed sharply, although wide ethnic inequalities remain. The Economic Commission for Latin America and the Caribbean (ECLAC) of the United Nations created a typology of countries according to those with structural transformations in the rural sector and growth inclusion in terms of rural poverty reduction. Guatemala appeared as a country with fast structural transformations, slow rural transformations, and slow rural poverty reduction (see table B.1.1.1.).

To shift Guatemala's fragile rural transformation course, the government should center its efforts on providing essential services. Social policies designed to reduce inequality and poverty and to facilitate access to basic social services to the most vulnerable should be prioritized and strengthened. Great strides have been made over the past few decades to overcome the traditional urban-rural dichotomy. For instance, agriculture is no longer the only economic activity in rural areas as more and more families are combining farming and nonfarming activities to make a living. Cultural differences between rural and urban populations, especially among youth, are becoming blurred. In addition, the divide between urban and rural areas is becoming obscured as rural communities grow into medium-sized cities, and as more people live between rural and urban areas. Overall, policies and investments need to integrate poor, often marginalized, rural people into the economic mainstream so that rural development is socially, economically, and environmentally sustainable. In the case of Guatemala, this applies especially to historically neglected segments of the population, including rural women and youth, indigenous peoples, and Afro-descendant communities.

box continues next page

Box 1.1: Continued

Figure B1.1.1: Guatemala's Evolution in Human Development, 1990–2015
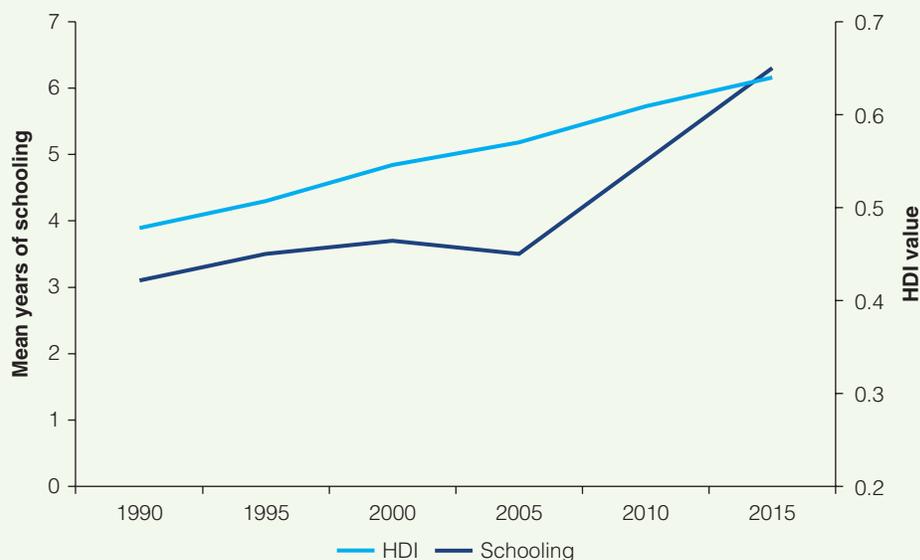
Table B1.1.1: Typology of Transformations for Rural Areas in Latin American and Caribbean Countries, 1990–2014

Speed of structural and rural transformation		Rural poverty reduction	
		Fast	Slow
Fast structural transformation	Fast rural transformation	Type A	Type B
		Chile, Brazil, Ecuador, Peru, Uruguay[a]	Costa Rica, Dominican Republic, Honduras
	Slow rural transformation	Type C	Type D
		Colombia, Panama	El Salvador, Guatemala, Mexico[a]
Slow structural transformation	Fast rural transformation	Type E	
		Paraguay, Nicaragua	
	Slow rural transformation	Type F	
		Bolivia	

Tremendous and persistent inequalities can be found in Guatemala across ethnic groups, locations, and economic sectors. The Gini coefficient of income, a common measure to assess income inequality, was 0.49 in 2014. This is well below previous levels but is still ranked at the top end of world inequality. In a sense, one needs to visualize "two Guatemalas" with large gaps in outcomes between them to understand the country's challenges. One Guatemala is rural and the other urban, one is indigenous and the other nonindigenous, one is informal and the other is formal, and one lacks access to basic services while the other has the ability to pay for those services when the state does not provide them. The gaps between the "two Guatemalas" are large. The indigenous peoples of Guatemala are 1.7 times as likely to be poor as nonindigenous peoples, while at the same time they are poorer than indigenous peoples in most other Latin American countries. Chronic malnutrition (stunting) is high throughout the country (affecting 47 percent of all children) but the figure is 66 percent among children in the lowest welfare quintile and 61 percent among indigenous children (MSPAS et al. 2015).[2] This is much higher than malnutrition rates among indigenous children in El Salvador (40 percent), Peru-Quechua (15.4 percent), India (25.3 percent), and Brazil (25.7 percent).[3]

Why Does Guatemala Need a WASH Poverty Diagnostic?

The water supply and sanitation sector has been struggling to advance the pace of coverage in rural areas in terms of prioritization and investments. Despite a steeper increase in sanitation coverage in the last 15 years, sanitation coverage is falling far behind drinking water coverage, with particularly low levels in rural areas where the greatest shortfalls affect areas characterized by large indigenous populations. Despite the improvement in drinking water coverage in relative terms, in absolute terms there are still a significant number of Guatemalan households using water from precarious or unimproved sources such as rivers or lakes. On top of this tendency, coverage levels are still too low to ensure an adequate quality of life for many people, with almost 4 million lacking access to improved sanitation. Unaccounted-for-water reaches 50 percent of total drinking water supplies in urban areas while the provision of drinking water in rural areas appears to be more efficient with only a 10 percent loss.[4]

The WASH Poverty Diagnostic of Guatemala aims to explore these dimensions and provide evidence and analysis to identify other important tendencies of the sector and its institutions. The emphasis on inequality and inclusion is the foundation of the World Bank Group's (WBG) twin goals of eradicating poverty and promoting shared prosperity. If the development community is going to actively help address inequalities in WASH service delivery at the country level, it needs to better understand the demographics of the poor and underserved, how these coincide with a lack of access to WASH services, and how WASH services can be made more effective with the participation of those who lack access. In response to this need, the Water, Poverty, and Governance Global Practices jointly conducted a series of country-based WASH Poverty Diagnostics. Their purpose was to help the World Bank, client countries, and development partners identify key challenges and opportunities to improve access, quality, and sustainability of WASH services to the poor and to those at the "bottom 40 percent" of income distribution within a country. This poverty diagnostic addresses four core questions:

1. Who and where are the poor and the bottom 40 percent of national distribution (income and/or wealth)? The bottom 40 percent in Guatemala is not a homogenous group, and in most cases the term should be considered an umbrella term under which subpopulations fall (for example, extreme poor, poor, female-headed households, ethnic minorities, and other vulnerable groups).

2. What is the level of access and quality of WASH services experienced by the poor and bottom 40 percent as compared to the rest of the subpopulations? The main purpose of this inquiry will be to bring together poverty and sector data, and where appropriate, to present it visually. The Country WASH Poverty Diagnostic is primarily concerned with

informing country-level policy and programs, and although it will endeavor to use the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) standard definitions, country circumstances may require the use of other national definitions that differ from JMP. In terms of JMP definitions, this analysis is primarily based on the Millennium Development Goals (MDG) classification of "access to improved water and sanitation." However, to the extent that national surveys provide insights into the broader SDG classification of access, for example where data were available on the time required to reach a drinking water source, and on whether the drinking water source is on premises, available when needed, and free of priority chemical contaminants, additional commentary has been provided (box 1.2).

3. What are the linkages and synergies between WASH and other sectors? Inequality in outcomes such as income is influenced by inequality of other opportunities, such as access to basic services, and the inability of households to benefit from the synergies associated with access to more than one basic service. In some countries, such as Indonesia, the governments recognize these inequalities and are demanding analytical work that can help highlight linkages between sectors to foster cross-sectoral collaboration that can enhance poverty-reduction efforts. In other countries, demand for such analysis is low, and country teams may choose to address this question in an effort to stimulate demand among governments to think more proactively about cross-sectoral collaboration. This country-level analysis will be grounded in the global body of evidence on the relationship between WASH and health and nutrition.

4. What are the WASH service-delivery constraints and potential solutions to improving services to the poor and bottom 40 percent? Addressing some or all of the previous core questions is intended to help frame a key question of this work, which is CQ-4. This core question was addressed through a range of methods, including desk reviews, using conceptual frameworks of service-delivery arrangements, and other attributes that exclude the poor from receiving services.

Box 1.2: Country WASH Poverty Diagnostic at a Glance

- The Country WASH Poverty Diagnostic will seek to identify key challenges and opportunities to improve access, quality, and sustainability of WASH services to the bottom 40 percent of the income distribution.

- This Country WASH Poverty Diagnostic will serve as input for developing strategies to improve WASH service delivery among the poor and the bottom 40 percent.

- The Country WASH Poverty Diagnostic will focus on a set of four core questions aimed at characterizing the poor and the bottom 40 percent, and on service-delivery constraints by urban and rural, and by sanitation and water supply subsectors.

- The Country WASH Poverty Diagnostic will include a range of options to address a set of core questions which will range from using existing quantitative and qualitative data and collecting primary data to fill critical information gaps to employing participatory exercises that incorporate the voices of the poor and the bottom 40 percent, and those of service providers.

- The Country WASH Poverty Diagnostic will be prepared in consultation with client governments, development partners, technical stakeholders, and civil society. It will be based on the country's development vision, and will draw on national and sector development strategies and plans.

Sector poverty analysis is necessary to identify and align WASH investments with the World Bank twin goals of ending poverty and boosting shared prosperity. Poverty assessments conducted by the Poverty Global Practice routinely estimate who the poor are and where they live, but analysis on WASH is often limited or omitted. A 2012 portfolio review of the World Bank's water supply and sanitation lending operations identified lack of poverty data as one constraint to designing pro-poor interventions. In addition to poverty assessments, a key analytical piece that will inform WBG country engagement is the 2015 Systematic Country Diagnostic (SCD). The SCD series aims to identify and prioritize the top constraints in a country to help countries achieve development objectives that are consistent with the WBG's corporate goals. The analysis in the SCD is conducted at the macro level, looking at growth, inclusion, and sustainability across sectors, and will benefit from even greater sector-specific analyses on inequality, inclusion, and service delivery provided by the country WASH Poverty Diagnostic.

Improving the design of WBG operations and influencing sector policy and dialogue requires integrated analysis of poverty and sector data, and high-quality participatory analysis. To be operationally relevant, government counterparts and sector professionals are demanding more disaggregated analysis that identifies inequalities in service provision by urban-rural, income level, and geography by small administrative units (for example, at the district level) across the four subsectors of urban water supply, urban sanitation, rural water supply, and rural sanitation. Complementing this quantitative analysis with a better understanding of the political economy of service delivery, and with participatory action research that elicits the insights of and actions by the poor and their service providers, is central to improving the access and quality of service delivery. The World Bank, by using integrated analysis of poverty and sector data, spatial mapping, and insights from the poor and from service providers, will then be able to: (a) better respond to clients and inform country engagement strategies and SCDs; (b) mainstream poverty analysis into country-level sector policy dialogue; and (c) improve targeting and implementation of programs and projects financed by the World Bank, individual governments, or partners to improve service delivery to the poor and to the bottom 40 percent. Making this information publicly available will help facilitate sector dialogue on improving service delivery at the country level.

Report Structure

This report is structured as follows: Chapter 1 provides a brief background of the current state of affairs of Guatemala relevant to the WASH sector while presenting a cohesive argument for the need for a WASH Poverty Diagnostic. Chapter 2 describes the distribution and strength of poverty and inequities in Guatemala, paying particular attention to its different ethnic and poverty groups and geographic divides. Chapter 3 presents the details of water supply and sanitation coverage in Guatemala, focusing on historical trends observed during the 2000–14 period. Chapter 4 explains the convergence between access to water supply and sanitation and to poverty and defines the socioeconomic variables that predict a population's access to water supply and sanitation. Chapter 5 presents a similar explanation of the impact that a lack of access to water supply and sanitation has on health, including implications for reduced childhood disease. Chapter 6 analyzes the institutional framework that governs Guatemala's WASH sector, defining and describing in detail its weaknesses and opportunities for growth. Chapter 7 evaluates the sector's fiscal efficiency, evaluating spending across different levels of government and estimating the sector's availability to meet the new SDGs for universal access. Finally, chapter 8 presents policy recommendations and examples of practical interventions designed to help strengthen Guatemala's WASH sector.

Notes

1. Based on data from the World Development Indicators using the periods 2010 to 2014 and 2000 to 2004. http://databank.worldbank.org/data/home.aspx.

2. MSPAS et al. (2015).
3. Hall (2015) using data from Hall and Patrinos (2014). The data for Brazil's indigenous people come from Horta et al. (2013).
4. In the absence of an overarching Water Law, the legislation governing the sector is made up of numerous regulations from different sources, particularly originating from the Constitution, the Municipal Code, the Health Code, the Environmental Protection and Improvement Act, and various technical rules and regulations currently under review. The functions of planning, coordination, policy formulation, financing, quality standards setting and control, and service delivery are split up among different public agencies active in the sector, which makes it difficult for any of them to exercise overall implementation and monitoring activities.

References

Encyclopaedia Britannica. 2017. 1st ed. (accessed February, 2017), https://www.britannica.com/place/Guatemala.

Hall, Gillete H., and Harry A. Patrinos. 2014. Indigenous Peoples, *Poverty and Development*. Cambridge University Press.

Hall, Gillette H. 2015. "Poverty and Exclusion among Indigenous Peoples: What's the Global Evidence?" Open Learning Campus. World Bank, Washington, DC. https://olc.worldbank.org/content/poverty-and-exclu- sion-among-indigenous-peoples-what-global-evidence.

Horta, Bernando, Ricardo Ventura, James Welch, Andrey Cardoso, Janaina dos Santos, Ana Oliveira Pedro Lira, and Carlos Coimbra Jr. 2013. "Nutritional Status of Indigenous Children: Findings from the First National Survey of Indigenous People's Health and Nutrition in Brazil." *International Journal for Equity in Health* 2013: 12:23. doi: 10.1186/1475-9276-12-23.

Ministerio de Salud Pública y Asistencia Social (MSPAS), Instituto Nacional de Estadística (INE), ICF Internacional. 2015. *Encuesta Nacional de Salud Materno Infantil 2014–2015*. Ciudad de Guatemala, MSPAS.

United Nations. 2015. "World Population Prospects. Key Findings and Advance Tables." United Nations. New York. http://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf.

World Bank. 2015. *BOOST Database, 2004–2015*. Washington, DC, World Bank.

UNDP. 2016. "Human Development Report 2016. Briefing Note for Countries on the 2016 Human Development Report." Guatemala, United Nations Development Programme.

Chapter 2
Poverty in Guatemala

Poverty and Inequality

Poverty rates in Guatemala are among the highest in Latin America and the Caribbean and in recent years have been increasing. The middle class is small and shrinking. Inequality has declined but this is due more to falling incomes at the higher end of the distribution than to growth among the poorest. There is strong evidence pointing to the existence of "two Guatemalas" with the divide being seen along geographic, ethnic, human capital, and even demographic lines. The poor are concentrated in rural areas and among indigenous groups and have low human capital and poor outcomes. Labor income does not drive poverty reduction, and public social policies have had only a limited effect on poverty (Sanchez, Scott, and Lopez 2016).

There has been a sharp increase in income poverty in Guatemala in recent years. This is of particular concern given that such a rising trend has not been seen in neighboring countries or among Guatemala's economic peers.[1] Combined with its previous high levels of poverty, the recent increase in poverty makes Guatemala the second poorest country in Latin America and the Caribbean: only post-earthquake Haiti is poorer (figure 2.1). The poverty headcount—measured with an internationally comparable poverty line of US$4 per day per capita—increased from 55 percent in 2006 to 60 percent in 2014. Extreme poverty—defined internationally as per capita income under US$2.5 per day—followed a similar trend, rising from 33 to 37 percent between 2006 and 2014 (figure 2.2).[2] While poverty trends over the last quarter of a century have shown some decline, the change is both small—with overall poverty falling at an annualized rate of only about half a percent per year—and well below that the rates in the Latin American and the Caribbean region. A bigger problem than this very slow rate of reduction is that there has been a strong recent reversal. On an annualized basis, overall poverty has risen 1.7 percent per year since 2006.

Guatemala's extreme poverty rate of 37 percent is very high, one and a half times the Latin American and the Caribbean average (24 percent). Its overall poverty rate is surpassed only by that of Haiti (87 percent) in Latin America, and by Senegal (89 percent) among its structural peers (figure 2.3). Not only is its poverty rate high, but also the poverty trend has moved in the opposite direction of trends in Latin America and the Caribbean and in both its structural and aspirational peers. While there was a 17 percentage point decline in poverty in Latin America and the Caribbean between 2000 and 2012, Guatemala's poverty rate increased.

The gaps between the poor and the nonpoor in Guatemala are large.[3] In general, the poor are more likely to be informally employed, to live in rural areas in specific departments, to belong to an indigenous group, and to have very low levels of education (figure 2.4). This is not uncommon; many other countries could also describe the differences between poor and nonpoor in a similar fashion. In Guatemala, the key issue is the size of the gap and how difficult it has been to narrow these gaps because of the limited socioeconomic mobility in Guatemala.

Chronic poverty is highest in rural areas and varies strongly by ethnicity (see figures 2.4, 2.5, and 2.6 for breakdowns of poverty in rural and urban areas). The Mam experience the highest level of chronic poverty with two-thirds of households remaining in poverty. While having the lowest level of chronic poverty, the Q'eqchi experience the highest rate of new poverty with 18 percent of their households having fallen into poverty between 2000 and 2014.

Figure 2.1: Poverty Headcount Rate, Guatemala and Peers, 2014
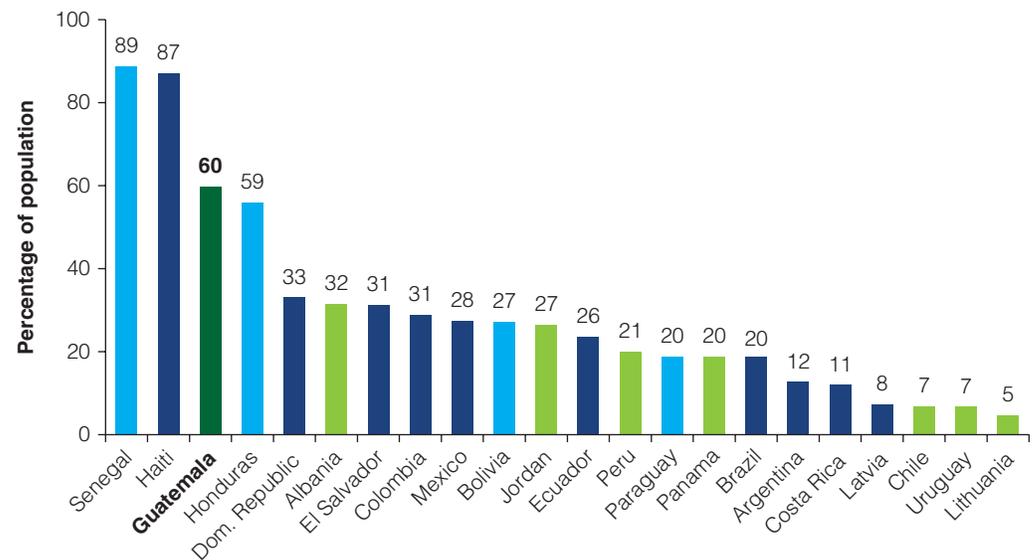
Source: SEDLAC harmonized database (SEDLAS and the World Bank).
Note: Countries classified as aspirational peers (countries that are a good example for Guatemala) are highlighted in dark blue, structural peers (countries that are a good benchmark for Guatemala) in light blue, and other Latin American countries in green. The year for each country is the closest to 2013. The Guatemala data are from 2014. Based on a US$4 PPP poverty line.

Figure 2.2: International Poverty Headcount, 1989, 2000, 2006, and 2014

■ Poor ($4 a day)   ■ Extreme poor ($2.50 a day)   ■ Global extreme poor ($1.9 a day)
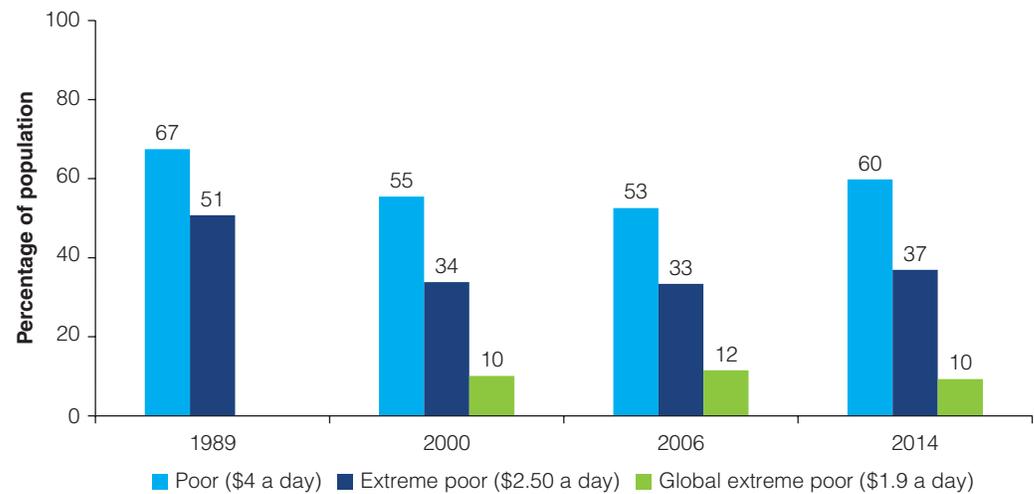
Sources: For 1989, World Bank 2003. For other years, calculations using the 2000, 2006, and 2014 ENCOVI.
Note: Based on income aggregate.

The nonindigenous population has both the lowest levels of chronic poverty and the highest share of households who are not poor. There are significant differences among the ethnic groups in Guatemala, both in poverty levels and in trends. The multiple ethnicities represented in Guatemala are distinct across a range of characteristics and welfare outcomes. In terms of population, the K'iche are the largest indigenous group at 1.6 million people, while another

Figure 2.3: Poverty Rate, Guatemala and Peers, 2004–14
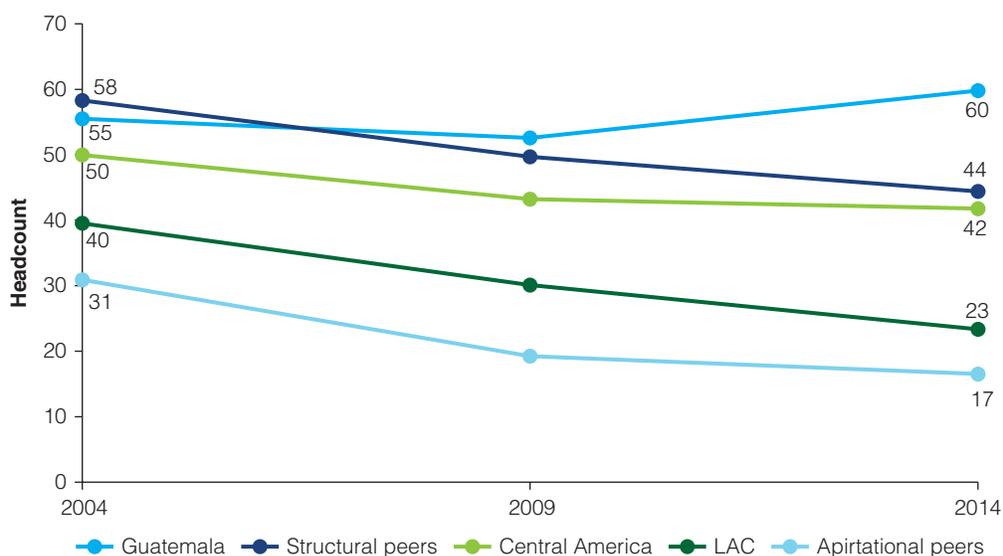
Source: Calculations based on the World Economic Outlook.
Note: The dates are indicative ("circa"). The poverty data for Guatemala are from 2000, 2006, and 2014 ENCOVI. LAC = Latin America and the Caribbean.

Figure 2.4: Share of Poor, Indigenous and Nonindigenous, 2014
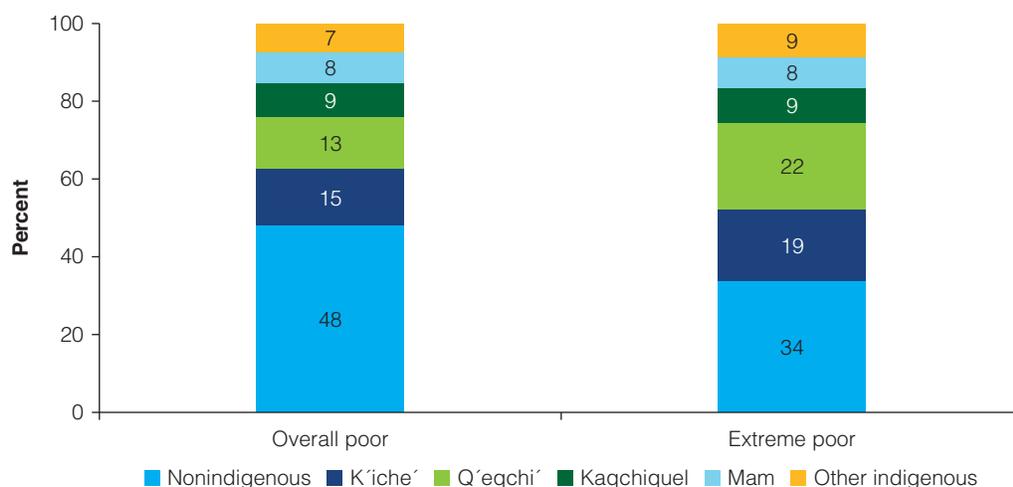
Source: Calculations based on the 2014 ENCOVI.
Note: Based on official consumption measure of poverty and national poverty lines.

17 Mayan groups plus the Xinca and Garifuna populations together represent just over 1 million people. Indigenous people are, in general, more likely to live in rural areas—in contrast to the rest of the other population, which is split 50-50 between rural and urban areas—which affects their access to services. However, there are large variations between the different Mayan groups. K'iche are the most urban of the groups, with almost 40 percent of their

Figure 2.5: Official Poverty Headcount, Urban and Rural, 2000, 2006, and 2014
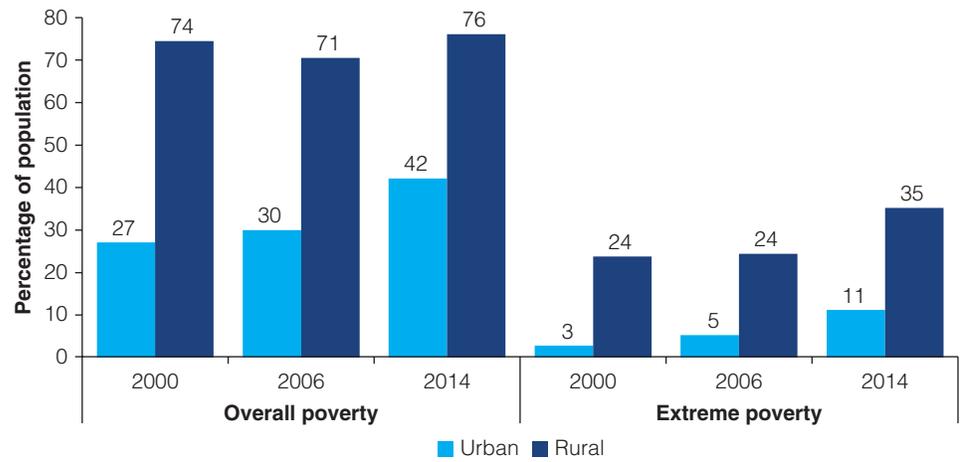
Source: Calculations based on the 2000, 2006, and 2014 ENCOVI.
Note: Based on official consumption measure of poverty and national poverty lines.

Figure 2.6: Share of Urban Population, by Poverty Status, 2000, 2006, and 2014
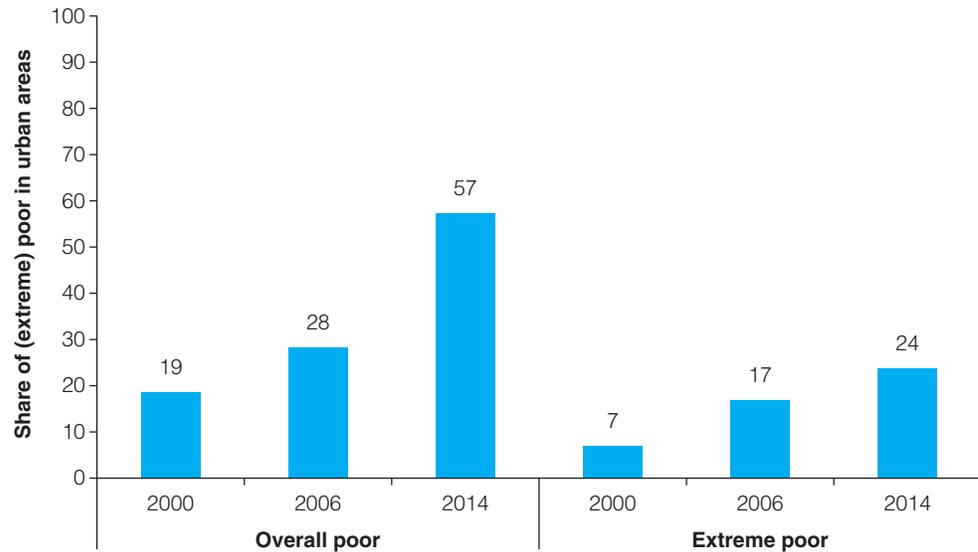
Source: Calculations based on the 2000, 2006, and 2014 ENCOVI.
Note: Based on official consumption measure of poverty and national poverty lines.

members living in urban areas while the Q'eqchí are the most rural at 84 percent. Indigenous people represent the majority of the population in some departments but only a tiny minority in others.

Differences at the department level are enormous: in 2014, with regard to both overall poverty and extreme poverty, there was close to a 50 percent difference between the poverty rate in the poorest and the least poor departments. In 2014, Alta Verapaz was the poorest

department, with an overall poverty rate of 83 percent (and an extreme poverty rate of 54 percent). In contrast, the department of Guatemala had an overall rate of 33 percent, and only 5 percent of its population lived in extreme poverty. The geographic gap closed somewhat in terms of overall poverty, but the opposite was true for extreme poverty, where both the absolute gap between the richest and poorest departments and the variance between departments rose between 2006 and 2014 (figure 2.7).

There are clear spatial patterns of poverty in Guatemala (maps 2.1 and 2.2). The areas of the country with the lowest levels of poverty are in the corridor that stretches from the Pacific port of Puerto Quetzal, crosses through the Metropolitan region, and ends at the Atlantic port of Puerto Barrios, a pattern that has remained relatively consistent over time.

Figure 2.7: Extreme and Overall Poverty Headcount Rates, by Department, 2006 and 2014

a. Extreme poverty

b. Overall poverty
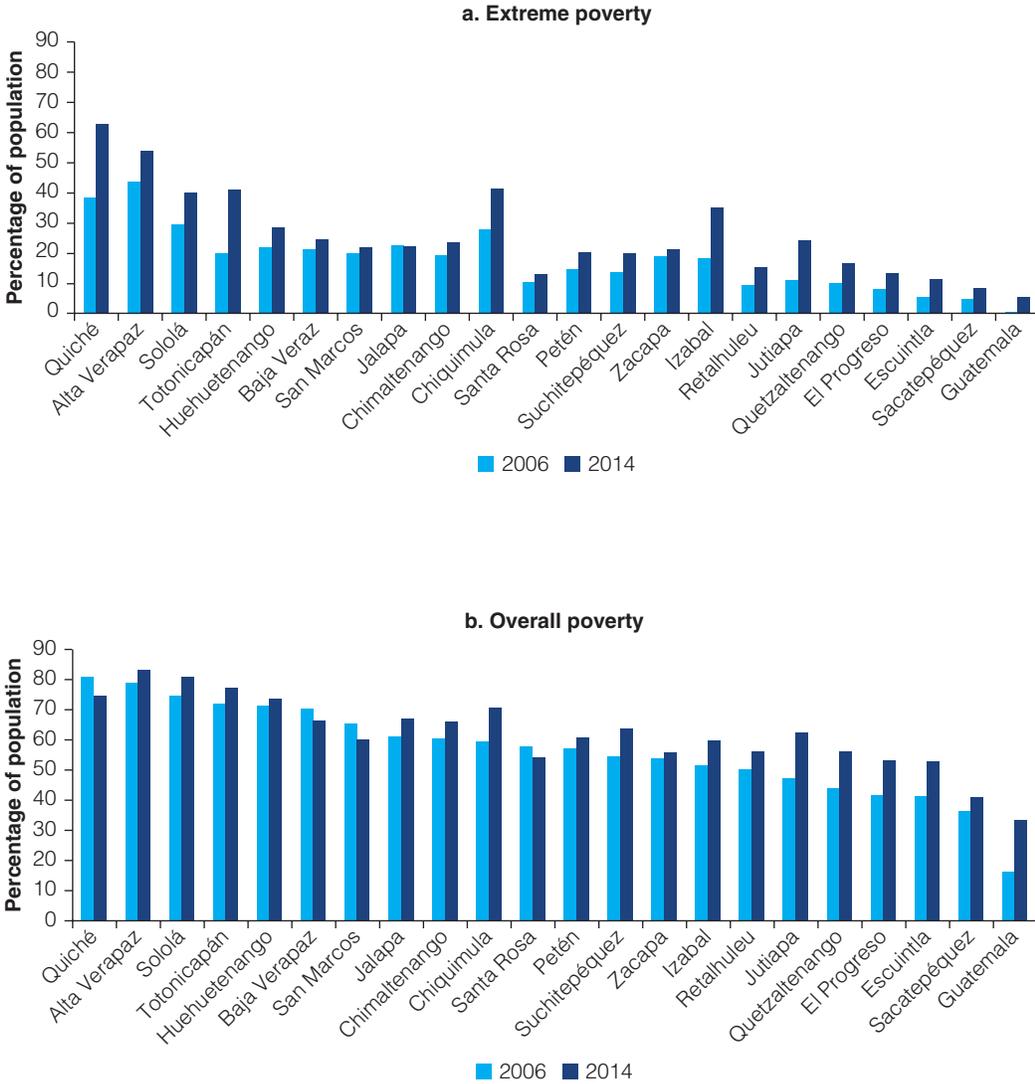
Map 2.1: Change in Spatial Distribution of General Poverty, by Department

a. 2000

75.86036–92.60017
66.43521–75.86036
49.9931–66.43521
17.99318–49.9931

b. 2014

70.61766–83.08968
61.78939–70.61766
55.92803–61.78939
33.33368–55.92803
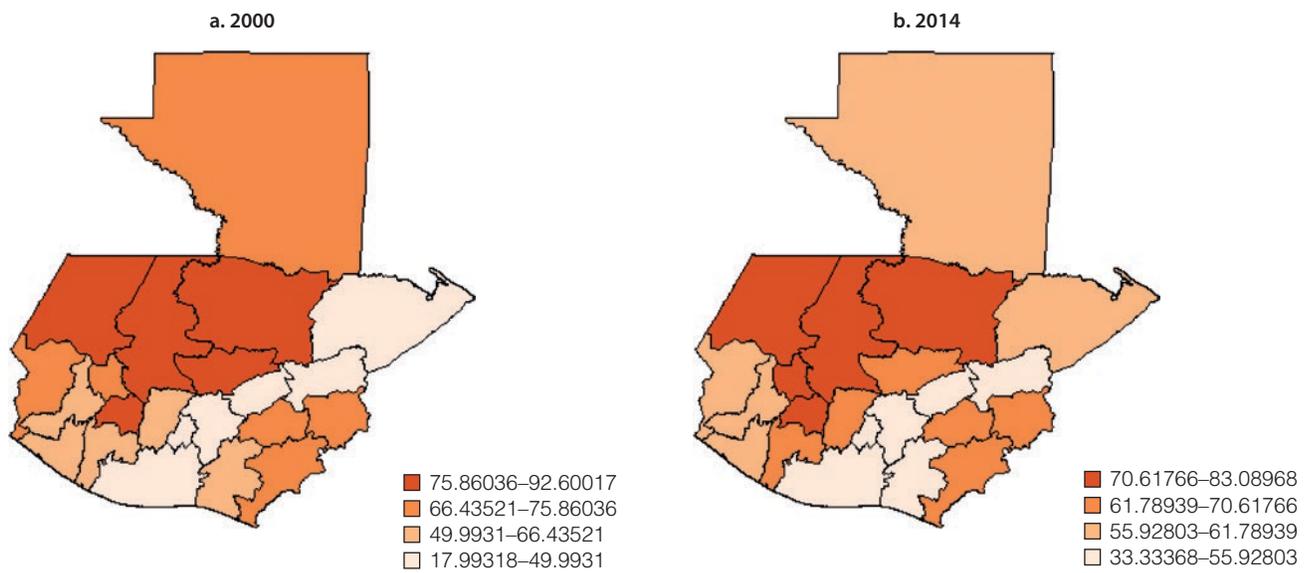
Map 2.2: Change in Spatial Distribution of Extreme Poverty, by Department

a. 2000

26.70958–44.05058
16.97734–26.70958
6.918445–16.97734
0–6.918445

b. 2014

35.17612–53.62367
22.17676–35.17612
15.2715–22.17676
5.419122–15.2715
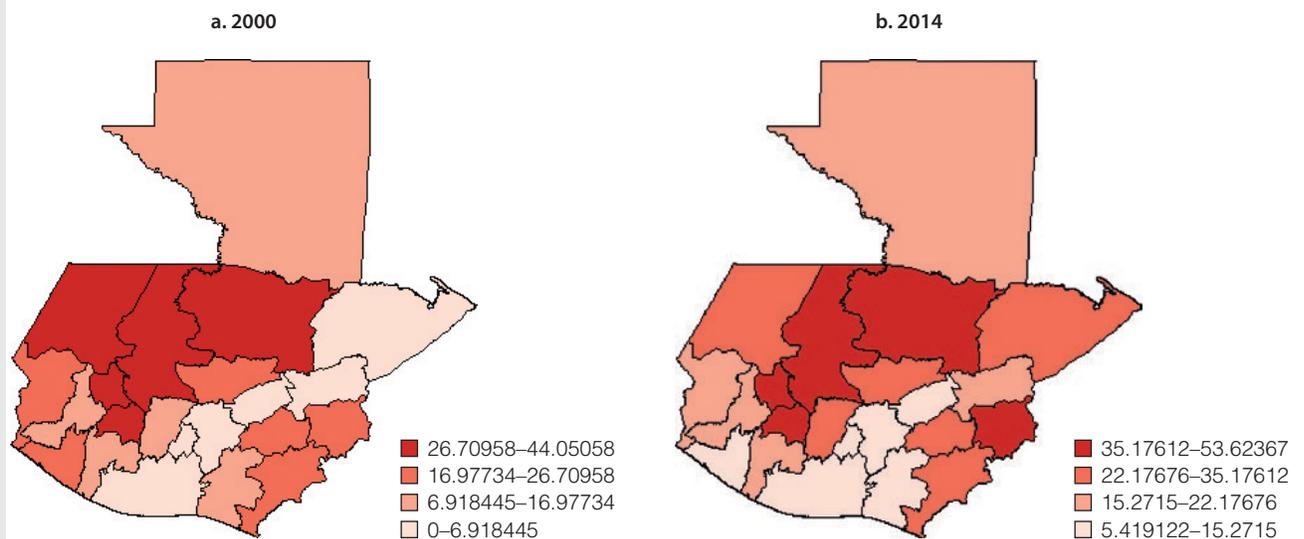
Access to Basic Services and Human Opportunities

Low and unequal access to basic infrastructure—electricity, water supply, and sanitation—persists in much of Guatemala. Access to infrastructure has increased in recent years, but coverage is far from universal. There are clear geographic patterns of access to services. The share of the population covered by basic services has increased in the past 15 years. Similar to the trends in school enrollment rates, access to infrastructure increased more quickly for the bottom 40 percent of the population and for indigenous groups, helping to begin closing the gap between the "two Guatemalas." The provision of basic services largely mirrors the concentration of welfare and population in the departments around the capital, although geographic patterns of coverage are not completely correlated with poverty. Suchitepéquez and Sololá, which have quite high poverty rates, also have high coverage of electricity (although Suchitepéquez has limited sanitation services and Sololá has little access to piped water). The initial high levels of inequality in service access mean that ethnic and socioeconomic characteristics continue to be correlated with access to basic infrastructure, despite the positive progress that has been made (figure 2.8). Access to sanitation has increased for all groups. This is the service with both the lowest coverage and the largest gains. However, gaps between groups remain. Even if access continues to expand at recent rates, universal coverage is still not going to be achieved in the short run. The index for municipal public services for 2013 shows that the performance of 76 percent of the municipalities (223 of 340 municipalities), was medium-low and low in terms of provision of public services, which undoubtedly explains the gaps in coverage and the poor quality of service in general.

The extent to which a child has access to basic infrastructure in Guatemala depends on the characteristics of his or her household. As shown above, there is an equity gap in access to services in Guatemala due to a lack of universal coverage. An additional equity gap occurs

Figure 2.8: Levels and Change in Levels of Access to Basic Infrastructure, by Population, 2000–14
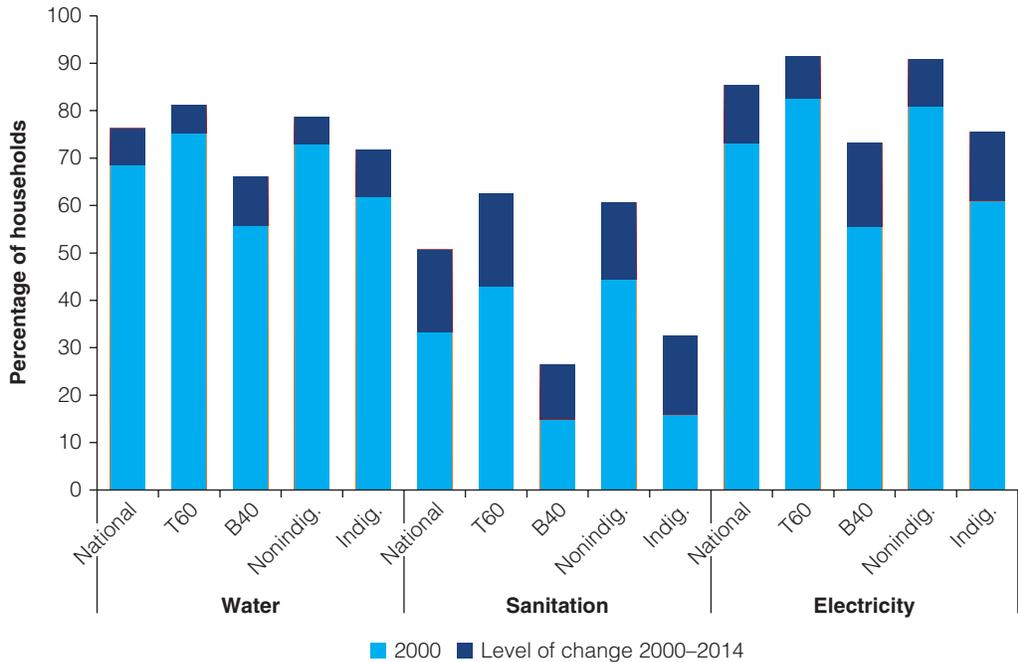
Source: Calculations based on the 2000 and 2014 ENCOVI.
Note: Access is defined as having electricity, running water, a flush toilet, or improved latrine in the dwelling. B40 = bottom 40 percent of population; T60 = top 60 percent of population.

Figure 2.9: Service Coverage and Human Opportunity Index, 2000 and 2014
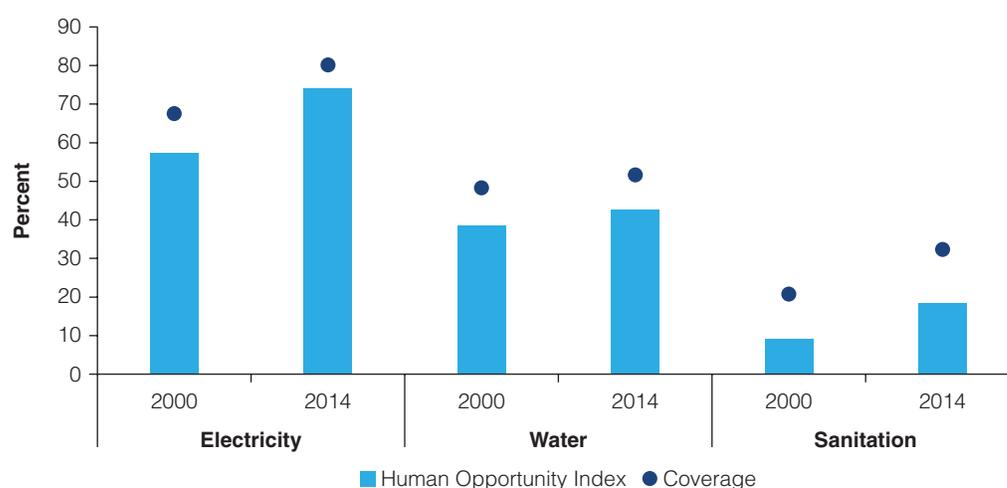
Source: Based on the 2000 and 2014 ENCOVI.
Note: Circumstances are location, gender of the child, parental education and income, and ethnicity.

because access to social infrastructure is not evenly or randomly distributed but instead is correlated with specific characteristics of the population. The World Bank's Human Opportunity Index (HOI), an equity-adjusted measure of coverage, shows that the distribution of service provision is such that household welfare, ethnicity, parental education, and geographic location, among other things, are highly correlated with access (figure 2.9).[4] In 2014, Guatemala had the third highest gap in Latin America, as a share of coverage for electricity, the fifth highest for water, and the second highest for sanitation. Levels of sanitation remain particularly low in Guatemala although the 2014 figure represented a 17 percentage point increase over 2000 (figure 2.10). The influence of these circumstances on access has diminished over time, in part due to increased service access across all circumstance groups (the so-called scale effect) and in part due to a change in the underlying population, most likely due to increased urbanization. For water and sanitation, the composition effect is explains the recent improvements in the HOI. The small equalization effect suggests that inequities will continue to persist because there will be slow convergence of coverage rates among groups.

The improvements in the HOI reflect changes in the role played by different circumstances in explaining unequal access (figure 2.9 and figure 2.10; see also figure 2.13). The significance of living in an urban area has declined, reflecting both the expansion of services beyond cities and the growing share of the population living in cities. Parental education and income also have decreased in importance. Ethnicity, in contrast, has increased in importance: a child of the Q'eqchi people continues to have a lower probability of accessing services than other indigenous groups, and the gap between Q'eqchi children and other indigenous groups has widened. The evidence for other indigenous groups is mixed, with some appearing to have gained and others to have lost in terms of access to these basic services. Socioeconomic mobility is affected by infrastructure and human capital. Between 2000 and 2011, those rural municipalities that moved up from being among the poorest (those with more than 75 percent of their population in poverty) to being in the next group (those with 50–75 percent of their populations in poverty) had very different characteristics from those that stayed in the poorest group. Access to services, such as water supply, sanitation, and electricity, was higher in those municipalities with falling poverty, higher road density (and thus access to markets, economic opportunities, and other services) (figure 2.11), and lower share of indigenous people (figure 2.12).

Guatemala's Water Supply, Sanitation, and Hygiene Poverty Diagnostic

Figure 2.10: Human Opportunity Index and Children's Access to Basic Services, by Country
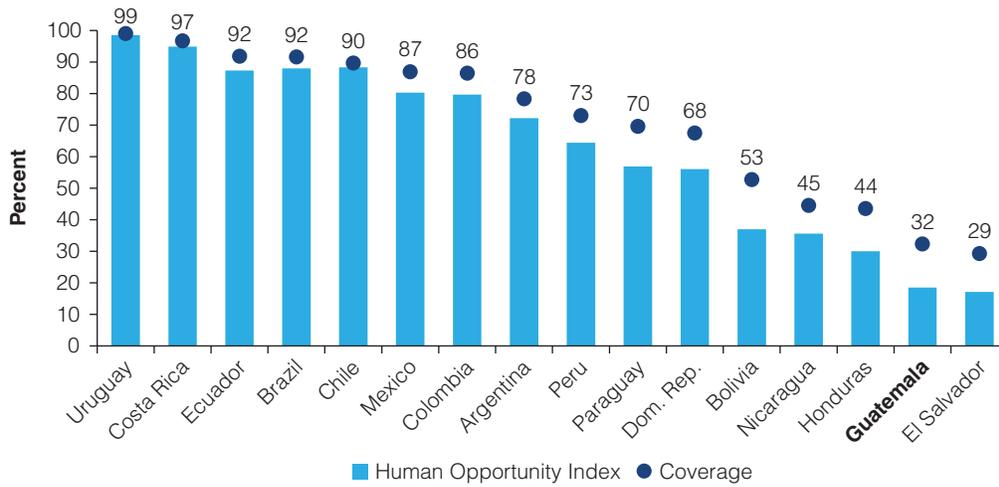
Figure 2.11: Relationship of Poverty Rate and Road Density, by Municipality Type, 2000–11
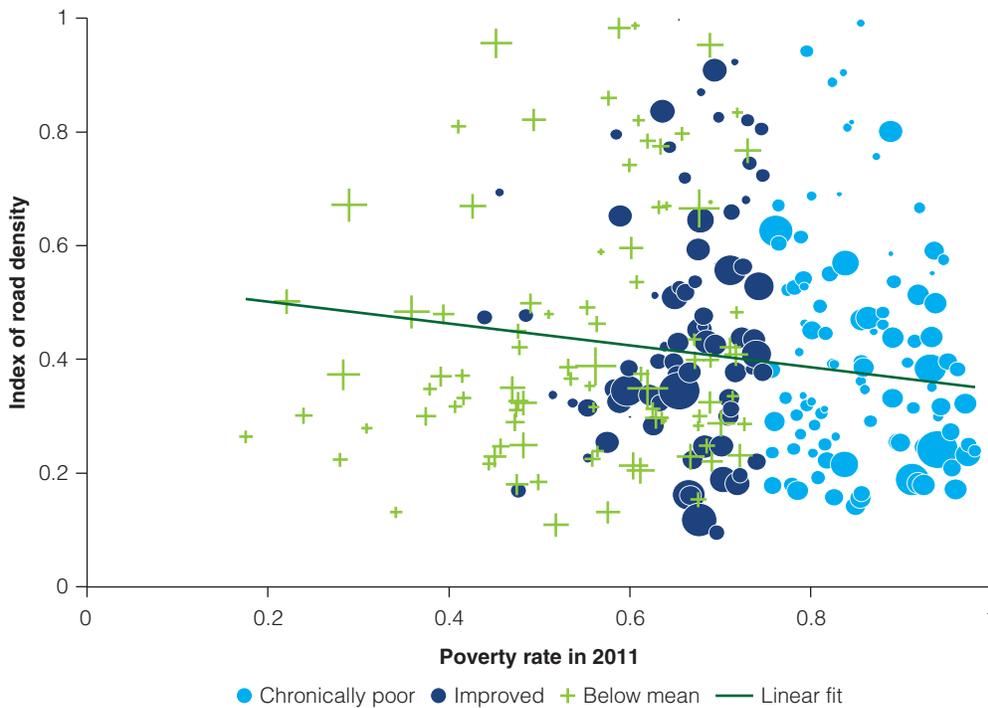
Figure 2.12: Municipality Types, by Concentration of Indigenous Peoples, 2000–11
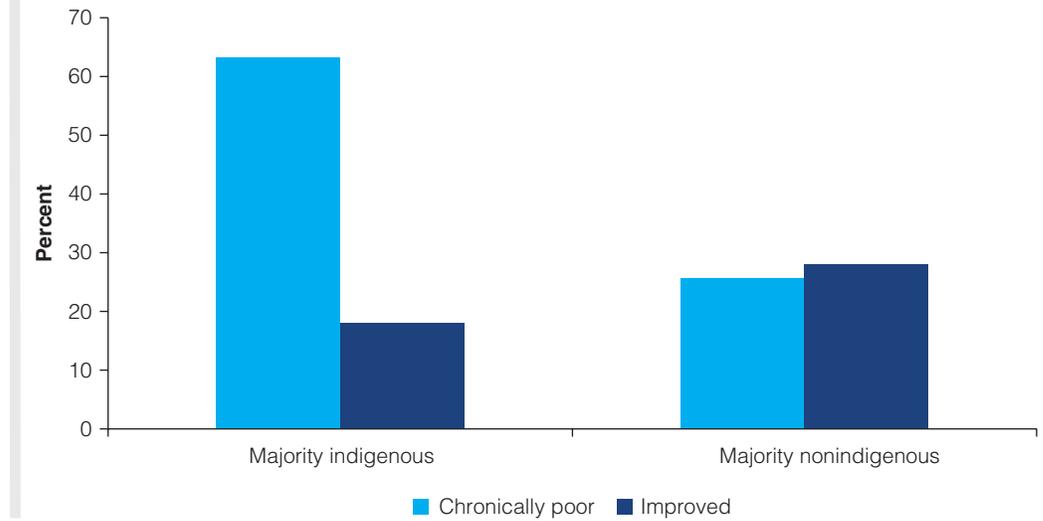
Figure 2.13: Decomposition of Human Opportunity Index, D-Index, by Circumstance, 2000 and 2014
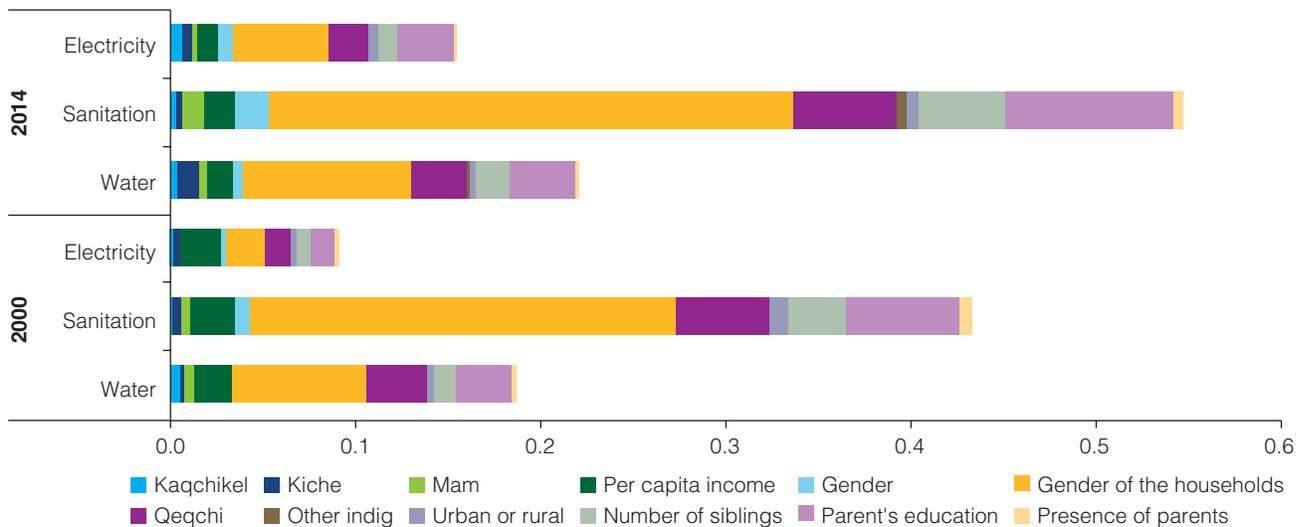
The gaps between the poor and the nonpoor in Guatemala are large. This is not unique to Guatemala; however, the key problem is the size of the gaps and the difficulties narrowing them, particularly because of limited socioeconomic mobility. Moreover, although poverty is highest in rural areas, there has been a striking increase in urban poverty. Furthermore, low and unequal access to basic infrastructure—electricity, water, and sanitation—persists in much of Guatemala. Access to infrastructure has increased in recent years, but coverage is far from universal.

The impacts of limited access to basic infrastructure, and specifically to water supply and sanitation, on social and economic well-being are well established. Access to improved drinking water and sanitation reduces the prevalence of diarrheal diseases, which directly affects rates of morbidity and mortality in addition to reducing malnutrition. Furthermore, timesaving benefits are achieved through a reduction in the amount of time spent carrying water. Economic benefits are realized through a decreased dependency on healthcare services, while increases in improved health result in increased productivity. The benefit-cost ratio of water and sanitation interventions in Latin America and the Caribbean has been estimated at 5.2 (7.3 for sanitation and 2.4 for water) (Hutton 2012). Globally, rural populations are disproportionately affected with more than half the rural population lacking access to improved sanitation and one-fifth lacking access to a water supply (UNICEF 2015), a trend that is reflected with noticeable precision in Guatemala.

Notes

1. See annexes to this report (World Bank 2018) for details on countries considered as Guatemala's economic peers along with other comparator countries used in this report.
2. The data presented in the first section of this chapter are income-based measures compared to international poverty lines. Official poverty measures, as used in this section, and wherever the focus is on international comparisons, an income aggregate will be used as well as international poverty lines as follows: US$1.25 per person per day (the global extreme poverty line), US$2.5 per person per day (extreme poverty line for Latin America and the Caribbean), and US$4 per person per day (overall poverty line for Latin America and the Caribbean). The lines are in 2005 purchasing power parity (PPP) terms. While there has been an update to the 2011 PPP for the US$1.25 line, there has been no update for the US$2.5 and US$4 lines. For this reason, we have used the US$1.25 global extreme poverty line in 2005 PPP.
3. In Guatemala, because poverty affects about 60 percent of the population, the indicators that define the bottom 40 percent and the top 60 percent of the wealth distribution do not strictly refer to poor and nonpoor categories, respectively.
4. See Barros et al. (2009) for a discussion of the HOI methodology.

References

Baez, Javier, Kiyomi Cadena, and Mara Eugenia Genoni, Leonardo Lucchetti, 2015. "Chronic Poverty in Guatemala: Analysis Using Poverty Maps." Washington, DC: World Bank.

Barros, Racardo Paes de, Francisco Ferreira, Jose Molinas, and Jaime Saavedra Chanduvi. 2009. *Measuring Inequality of Opportunities in Latin America and the Caribbean*. Washington, DC: Palgrave Macmillan, World Bank.

Hutton, G. 2012. *Global Costs and Benefits of Drinking-Water Supply and Sanitation Interventions to Reach the MDG Target and Universal Coverage*. Geneva: World Health Organization.

Sanchez, Susana M., Kinnon Scott, and J. Humberto Lopez. 2016. "Guatemala: Closing Gaps to Generate More Inclusive Growth." Systematic Country Diagnostic. Washington, DC: World Bank.

UNICEF (United Nations Children's Emergency Fund). 2015. "Achieving Results for Children: The Case for Support." New York: UNICEF. https://www.unicef.org/publicpartnerships/files/WASHTheCaseForSupport.pdf.

World Bank. 2018. "Guatemala Water Supply, Sanitation and Hygiene Poverty Diagnostic: Annexes." WASH Poverty Diagnostic Series. World Bank., Washington, DC http://documents.worldbank.org/curated/en/828241523461894078/annexes.

Chapter 3
Access to Water Supply and Sanitation in Guatemala

In 2015, the world shifted from the Millennium Development Goals (MDG) 1990–2015 to the Sustainable Development Goals (SDG) 2015–30. Goal 6 targets the availability and sustainable management of water supply and sanitation for all (United Nations 2016) and aims to achieve universal and equitable access to safe and affordable drinking water and sanitation for all, while improving water quality, expanding water-use efficiency, implementing integrated water resources management (IWRM), and protecting and restoring water-related ecosystems (United Nations 2016) by 2030. The main concepts of WASH coverage under the SDGs are use of a safely managed drinking water source, use of safely managed sanitation, and access to a place of hand washing with soap and water present. They are both more refined and stricter than the definition of coverage under the MDG classification. In particular, to be safely managed, a drinking water source must be improved, but must also be on premises, available when needed, and free of fecal and nationally-determined chemical contaminants, whereas sanitation looks beyond the immediate technology to whether human waste is effectively separated from potential human contact. Finally, hygiene is officially being monitored for the first time. This report primarily analyses national census data collected prior to the introduction of the SDGs. As a result, the MDG classification is the primary reference point for assessment against international standards. However, where possible, additional insight concerning the challenge of meeting the SDGs has been provided.

Since the MDGs were established in 1990, access to improved water and sanitation in Guatemala has risen by 14 and 22 percentage points, respectively. As a result, Guatemala has achieved the goal of halving the proportion of the population without access to an improved drinking water supply, while the goal for halving the proportion of the population without access to an improved sanitation facility remains unmet with a gap of 13 percentage points (table 3.1).

Table 3.1: Progress toward Achieving the Millennium Development Goals
Percent

MDG indicator	Baseline 1990[a]	Progress 2000	2006	2014	2015 Target	Gap
Proportion of population using an improved drinking water source	77[b]	87	89	91	88.5	-
Proportion of population using an improved sanitation facility	31[c]	39	48	53	65.5	12.5

Source: SEGEPLAN 2015.
a. National and international baseline estimates for 1990 vary considerable. JMP (2015) data indicate 77 percent and 47 percent of the population had access to an improved drinking water source and improved sanitation respectively, while SEGEPLAN (2105) data suggest access rates measured 64 percent and 31 percent. In the absence of a definitive measure, we have opted to use the baseline that best fits the data series.
b. ENCOVI 2014.
c. JMP 2015.

Trends in Access to Water Supply

Nationally, 91 percent of the population has access to improved drinking water, an increase of 14 percentage points since the establishment of the MDGs, most of which occurred during the first ten years of implementation. Since then, the overall composition of access to water has remained fairly constant (see figure 3.1).

The most notable change has been an increase of 8 percentage points in piped water to premises, currently 6 times more prevalent than tubewells, the two most common sources of improved drinking water in Guatemala. Interestingly, average rainwater use has increased by 2 percentage points, seemingly as a direct result of an increase of 4 percentage points in rural areas. While the majority of the population benefits from a private source, 12 percent continue to share, representing a decrease of 5 percentage points from 2000. A further 9 percent lack access to improved drinking water altogether, 6 percent of whom rely on surface water (see table 3.2).

Between 2006 and 2014, urban areas in particular experienced almost no change in the overall composition of access to improved water, with the exception of a 6 percentage point increase in access to a private source. Although total reliance on tanker trucks decreased by 2 percentage points, this was matched by a corresponding increase of 1 percentage point in both the use of surface water and other unimproved sources. While rural areas have seen a 3 percentage point gain in access to improved drinking water, they still lag behind urban areas by 7 percentage points and as a whole remain below the national MDG target of 88.5 percent (see figure 3.2). Notwithstanding the aforementioned subtleties, access to water overall has changed very little in Guatemala since 2000.

Figure 3.1: Change in National Drinking Water Coverage, 2000, 2006, and 2014
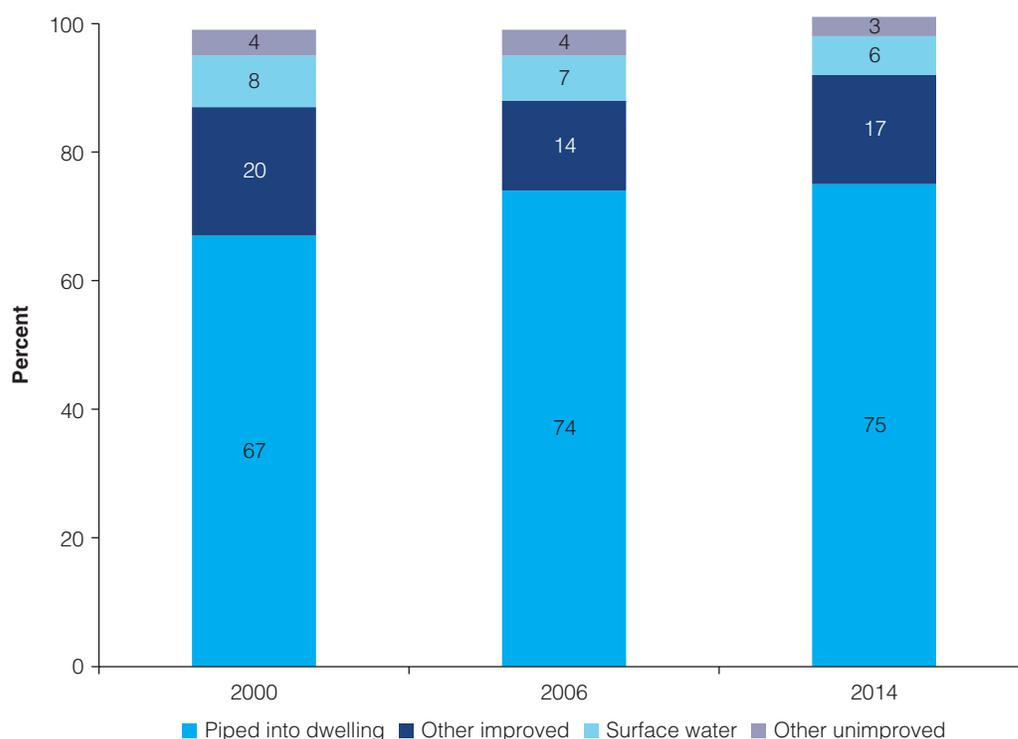
Source: ENCOVI 2000, 2006, 2014.

Table 3.2: Change in Access to Drinking Water, by Source, 2000, 2005, and 2014
Percent

Type of drinking water source	2000	2006	2014
Access to improved water supply	87.0	89.0	91.0
Piped to premises	67.0	74.0	75.0
Piped to neighbor/public	4.0	2.0	2.0
Rainwater	1.0	1.0	3.0
Tube well/borehole	15.0	11.0	12.0
Lack of access to improved water supply	12.0	11.0	9.0
Truck or barrel	0.0	1.0	0.0
Surface water	8.0	7.0	6.0
Other unimproved	4.0	3.0	3.0
Shared source	17.0	15.0	12.0
Private source	83.0	85.0	88.0

Source: ENCOVI 2000, 2006, 2014.

Figure 3.2: Change in Urban versus Rural Drinking Water Coverage, 2006–14
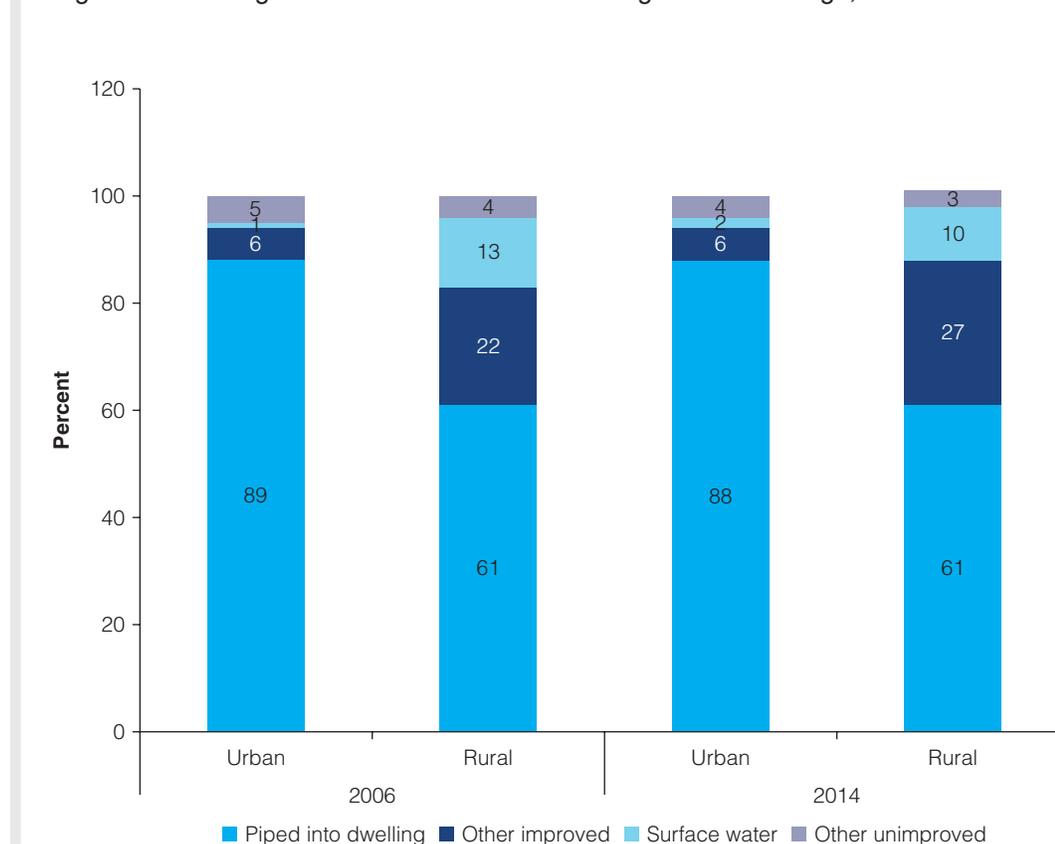
Source: ENCOVI 2006, 2014.

Water Supply Service Provision

Between 2000 and 2006, the proportion of the population with household connections expanded noticeably, leading to an increase of 8 percentage points; however, there has been no change since then. Similarly, although connections to a water meter increased 6 percent

reaching a high of 34 percent during the period 2000–06, they have since decreased to 29 percent. The provision of water services is predominantly public, and the proportion of the population relying on a private service is declining as alternative models of provision expand. A little over a third of the population receives water from a drinking-water committee although this varies significantly by geography, with rates more than four times higher in rural areas than in urban areas. It is somewhat surprising then that the proportion of the urban population receiving water from a drinking-water committee rose by 11 percent from 2000 to 2014 (figure 3.3), when historically private service providers have been more prevalent in urban areas.

Service levels have remained relatively unchanged throughout the period of analysis. The average number of hours of service per day is 17 while the average number of days without water per month is four. Interestingly, the average number of hours per day is slightly greater in rural areas (18.6 hours) than urban areas (16.3 hours). Despite this lack of change in service provision, the average monthly cost of water has almost doubled from Q.12 to Q.22 per month, and water in urban areas costs more than twice as much than in rural areas (see figure 3.4 that measures service level changes against price changes).

It's important to note the SDGs broader classification of access to water encompasses the concept of "safely managed" and includes such variables as whether the source is on premises and available when needed. Integrating these criteria into the current evaluation, the national average of 91 percent drops first to 75 percent and then to 52 percent.[1]

Progress toward achieving the MDGs is much more visible at the departmental scale. In 2000, the difference in access to an improved drinking water source between departments with the highest and lowest rates—(Retalhuleu with 99 percent and Chiquimula with 50 percent)— measured just under 50 percent (figure 3.5). In contrast, in 2014, the gap had been reduced to 17 percent (between Sololá and Alta Verapaz at 99 percent and 81 percent respectively). Furthermore, seven of the ten most underserved departments in 2000 experienced gains in the order of 10 percentage points or more. Indeed, access to an improved drinking water source in Chiquimula and Alta Verapaz, the two most underserved departments in 2000, increased by 33 and 17 percent respectively.

Figure 3.3: Water Supply Provision in Guatemala, 2014

Public   Private   Water committee
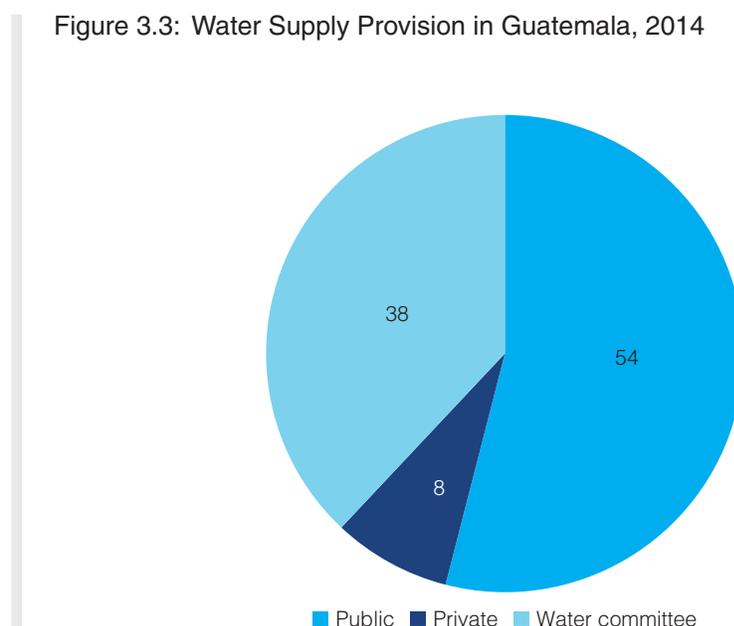
Source: ENCOVI 2000, 2006, 2014.

Figure 3.4: Change in Water Service Levels against Change in Price, 2000, 2006, and 2014
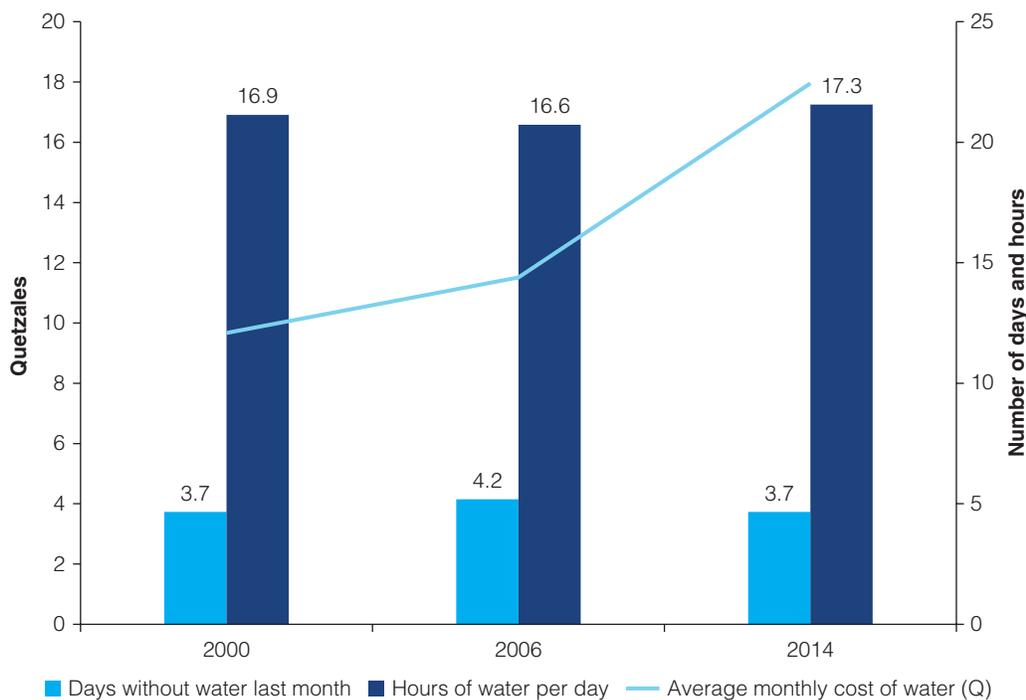
Source: ENCOVI 2000, 2006, 2014.
Note: Q = quintile.

Figure 3.5: Change in Improved Drinking Water Coverage, by Department, 2000 and 2014
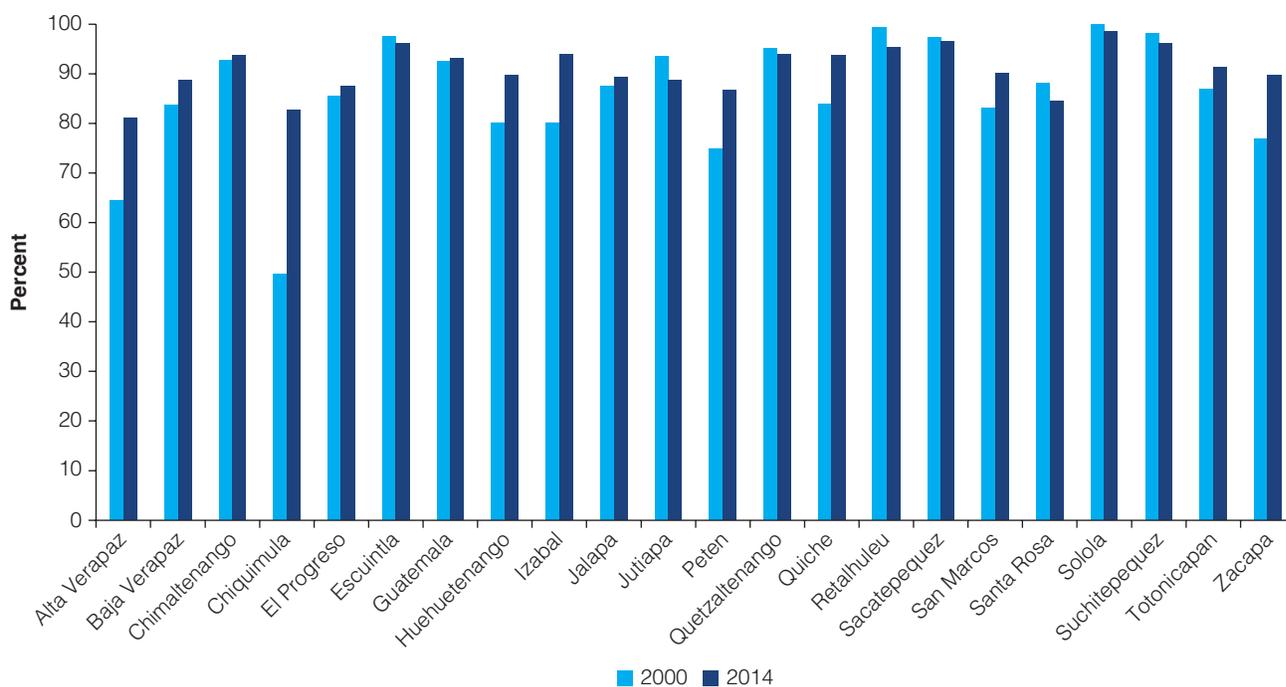
Source: ENCOVI 2000, 2014.

To the contrary, several departments with historically higher access rates, such as Jutiapa, Retalhuleu and Sololá, have seen decreases over time, conceivably as a result of increased migration to urban areas where growth often outpaces the expansion of infrastructure. Spatially, access to an improved drinking water source tends to follow population density and is concentrated in the southeast along the pacific coast, where much of the country's agricultural industry is located. Conversely, with the exception of Izabal, access is constrained in the central and northern regions of the country (map 3.1). Somewhat counter-intuitively, these distribution patterns are at odds with sources of available water resources, with the Pacific Ocean Basin being the smallest, most populated, and least hydrologically rich of Guatemala's three hydrographic regions. It should be noted that at present Guatemala's freshwater resources are deemed plentiful and more than adequate to meet demand. However, under pessimistic climate change scenarios, and owing to the unequal temporal and spatial distribution of water, Guatemala, and the Pacific Ocean Basin in particular, could be facing water risk in the future.[2] This is an area of research that should be investigated more thoroughly.

Despite overall progress, access to improved drinking water remains below the national MDG target in five departments, including three of the most rural departments in the country: Alta Verapaz, Chiquimula, El Progreso, Petén, and Santa Rosa (figure 3.6) all of which rely on surface water at rates above the national average.

Ultimately, national data mask disparities at the departmental scale, especially outliers such as Alta Verapaz, where despite 81 percent of all people having access to an improved drinking water source, only 41 percent benefit from a piped supply to their premises. Notably, a further 32 percent rely on rainwater while 7 percent rely on tubewells or boreholes. Indeed, twelve of Guatemala's twenty-two departments are below the national average of 75 percent for piped supplies to premises. Furthermore, 10 departments exceed the national average of 6 percent for surface water use (figure 3.7), while eight departments exceed the national average of 12 percent for shared water supplies.

Map 3.1: Change in Drinking Water Coverage, by Department, 2000 versus 2014

a. 2000

Percent
- 95.10832–100
- 87.15408–95.10832
- 80.18567–87.15408
- 49.61679–80.18567

b. 2014

Percent
- 93.96398–98.55369
- 90.70213–93.96398
- 88.72878–90.70213
- 81.17082–88.72878
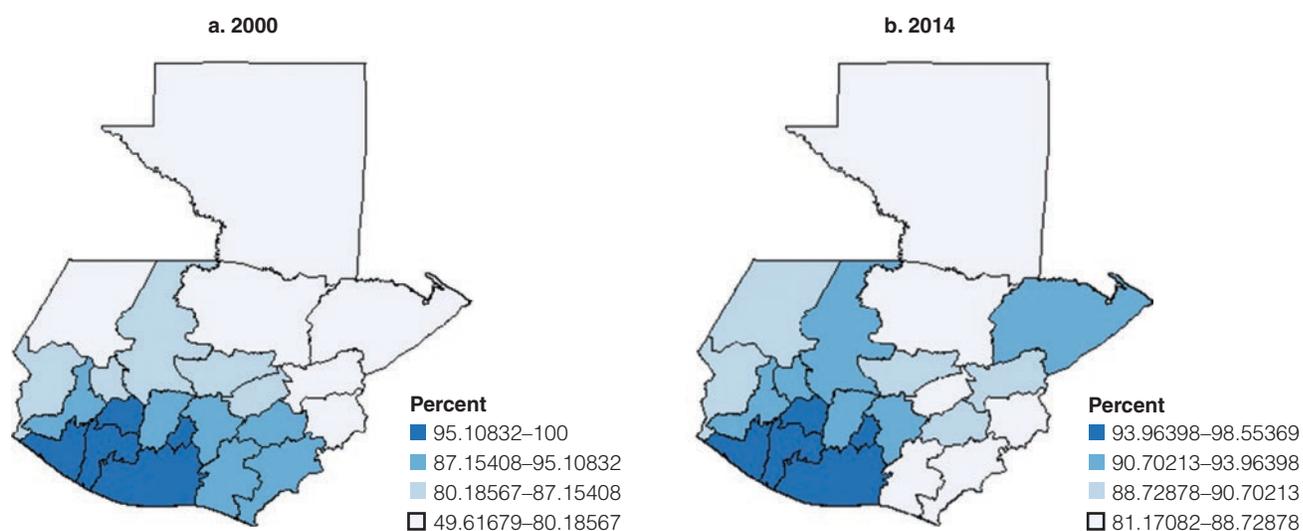
Source: ENCOVI 2000, 2014.

Figure 3.6: Drinking Water Coverage for the Five Most Underserved
Departments, 2014
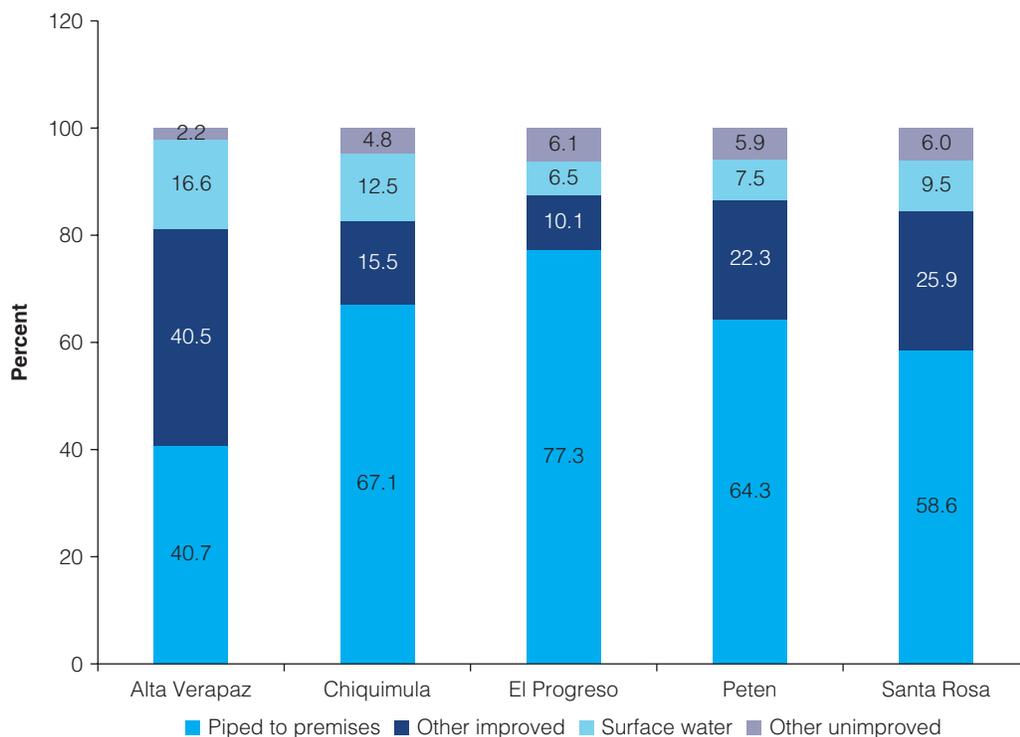
Source: ENCOVI 2014.

Figure 3.7: Surface Water Coverage Compared to National Average, by Department, 2014
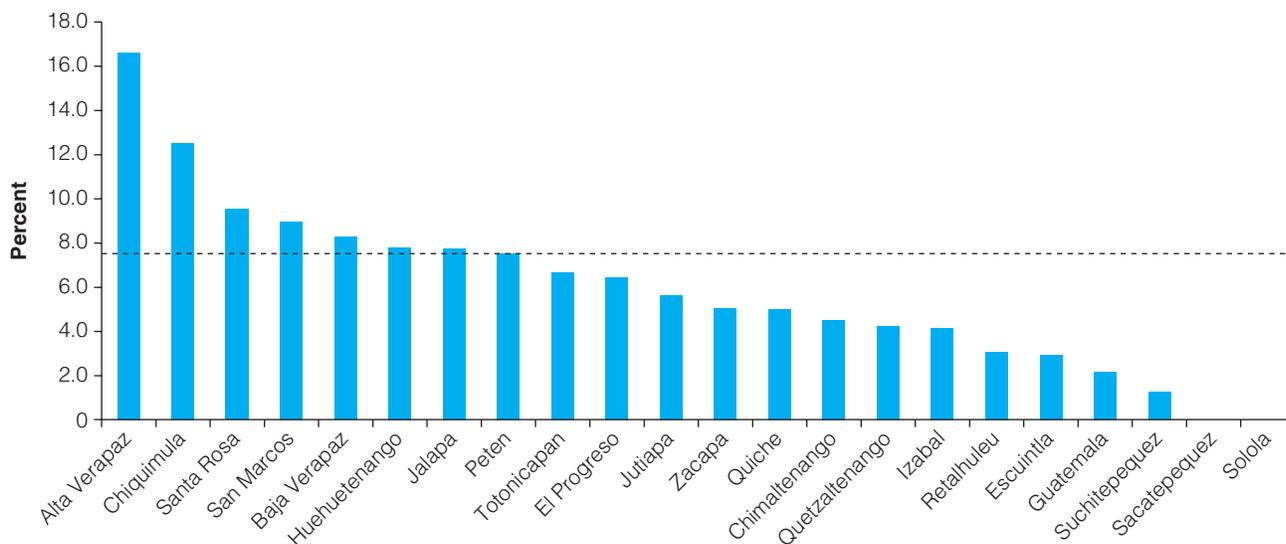
Source: ENCOVI 2014.
Note: Dotted line represents national average.

Trends in Access to Sanitation

Despite an overall increase of 22 percentage points since 1990 (table 3.3), almost half of all Guatemalans lack access to improved[3] sanitation (table 3.4). While strong gains were made in the first sixteen years following the commitment to the MDGs, progress has slowed considerably since 2006 and the gap towards achieving the MDG target of 65.5 percent stands at almost 14 percent (figure 3.8).

Nevertheless, small, but meaningful changes have occurred. For example, the percentage of the total population practicing open defecation has decreased by 9 percentage points, while latrine use has decreased by 6 percentage points. Similarly, important gains have been made in expanding sewage coverage from 26 percent to 38 percent. Nonetheless, the most prevalent form of sanitation (41 percent) continues to be unimproved latrines/cesspits.

Table 3.3: Change in National Sanitation Coverage
Percent

Type of sanitation facility	2000	2006	2014
Access to improved sanitation	39.0	48.0	53.0
Flush to sewer	26.0	35.0	38.0
Flush to septic tank	3.0	7.0	8.0
Pour flush/composting toilet/other improved	10.0	7.0	7.0
Lack of access to improved sanitation	61.0	52.0	47.0
Open defecation	14.0	10.0	5.0
Latrine/cesspits	47.0	42.0	41.0
Shared sanitation	14.0	15.0	11.0
Private sanitation	86.0	85.0	89.0

Source: ENCOVI 2000, 2006, 2014.

Table 3.4: Lack of Access to Improved Sanitation, by Department, 2014

Department	Open defecation	Latrine	Unimproved sanitation
Alta Verapaz	3.6	77.2	80.7
Baja Verapaz	5.8	50.2	56.0
Chimaltenango	1.5	42.9	44.4
Chiquimula	**30.4**	**24.7**	**55.1**
El Progreso	3.6	33.3	36.9
Escuintla	5.3	25.3	30.5
Guatemala	0.9	10.4	11.3
Huehuetenango	2.7	62.6	65.3
Izabal	3.4	42.0	45.4
Jalapa	**21.5**	**33.5**	**55.0**
Jutiapa	**21.9**	**21.6**	**43.5**

table continues next page

Table 3.4: Continued

Department	Open defecation	Latrine	Unimproved sanitation
Petén	4.4	65.7	70.1
Quetzaltenango	1.8	38.1	39.9
Quiche	6.5	59.1	65.6
Retalhuleu	3.3	53.5	56.9
Sacatepéquez	1.1	9.7	10.8
San Marcos	2.0	66.2	68.2
Santa Rosa	**11.8**	**25.2**	**37.0**
Sololá	2.3	61.7	64.0
Suchitepéquez	**15.1**	**27.4**	**42.4**
Totonicapán	4.9	67.9	72.8
Zacapa	**12.1**	**25.7**	**37.7**

Source: ENCOVI 2014.
Note: The departments in which open defecation is above 10 percent are in bold type.

Figure 3.8: Change in National Sanitation Coverage, 2000, 2006, and 2014
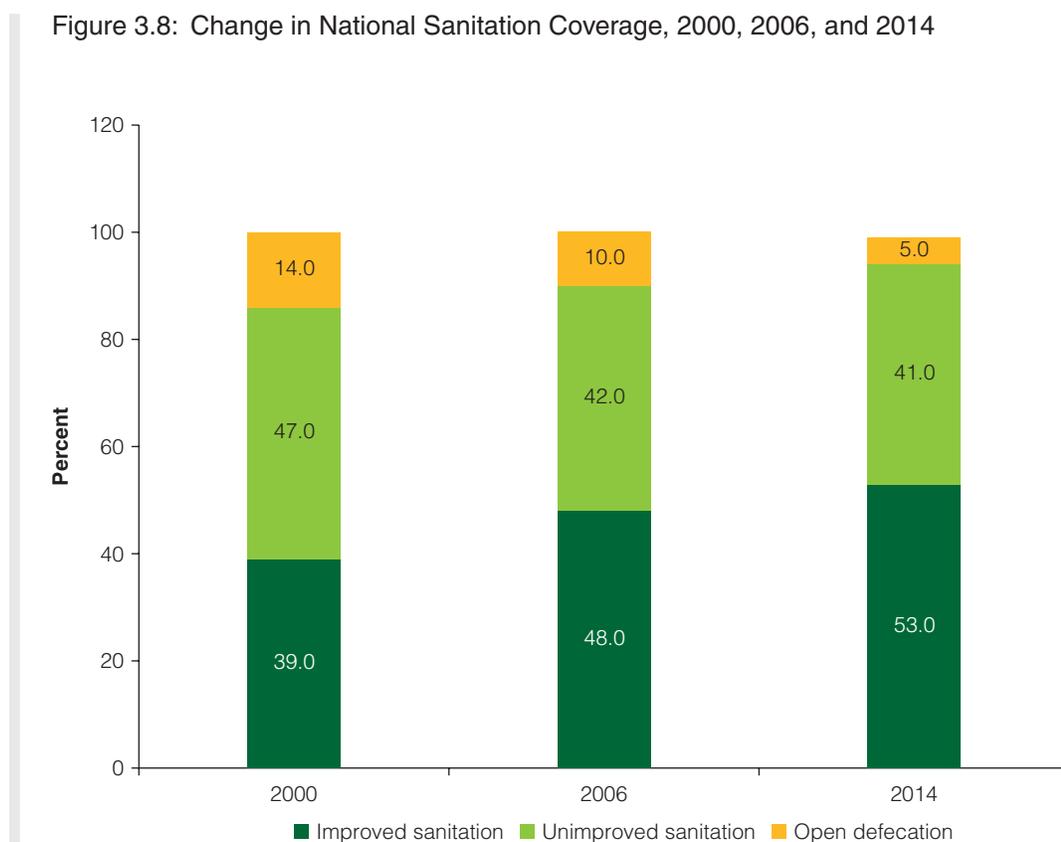
Source: ENCOVI 2000, 2006, 2014.

Contrary to access to water, the disparity in access to sanitation between geographical areas is substantial, and rural populations lag behind their urban counterparts by a staggering 55 percent (figure 3.9). Ultimately, the overall composition of access to sanitation between 2006 and 2014 remained fairly constant. However, what little change occurred has predominantly benefitted rural areas, where access to improved sanitation has increased by 7 percentage points and open defecation has decreased by 8 percentage points. Nevertheless, the overall gap between urban and rural areas decreased by only 5 percentage points in eight years.

The most prevalent type of sanitation in urban areas is a flush toilet with a sewage connection, while in rural areas, latrines are most common. At least 2 percent of the urban population practices open defecation. However, while open defecation is more problematic in urban areas owing to the increased ease of transmission of oral-fecal diseases in higher density areas, this figure is still much lower than in rural areas, where 9 percent of the population continues the practice. Latrine use in rural areas remains fairly steady at 65 percent. Finally, less people rely on shared sanitation in rural areas (8 percent) than in urban areas (14 percent).

The contrast in access to sanitation becomes even more evident when considered spatially, where the gap between the advantaged and disadvantaged is striking. Water supply and sanitation coverage do not fully converge. Whereas water coverage is concentrated along the Pacific Coast, sanitation coverage has expanded predominantly in the vicinity of the department of Guatemala (where the nation's capital is located) and yet remains woefully inadequate in the north and west of the country (map 3.2). Indeed, Guatemala is one of only three departments that have exceeded the national MDG target for sanitation coverage of 65.5 percent with 89 percent, alongside Escuintla with 70 percent and Sacatepéquez also with 89 percent.

Figure 3.9: Change in Urban versus Rural Sanitation Coverage, 2006 and 2014
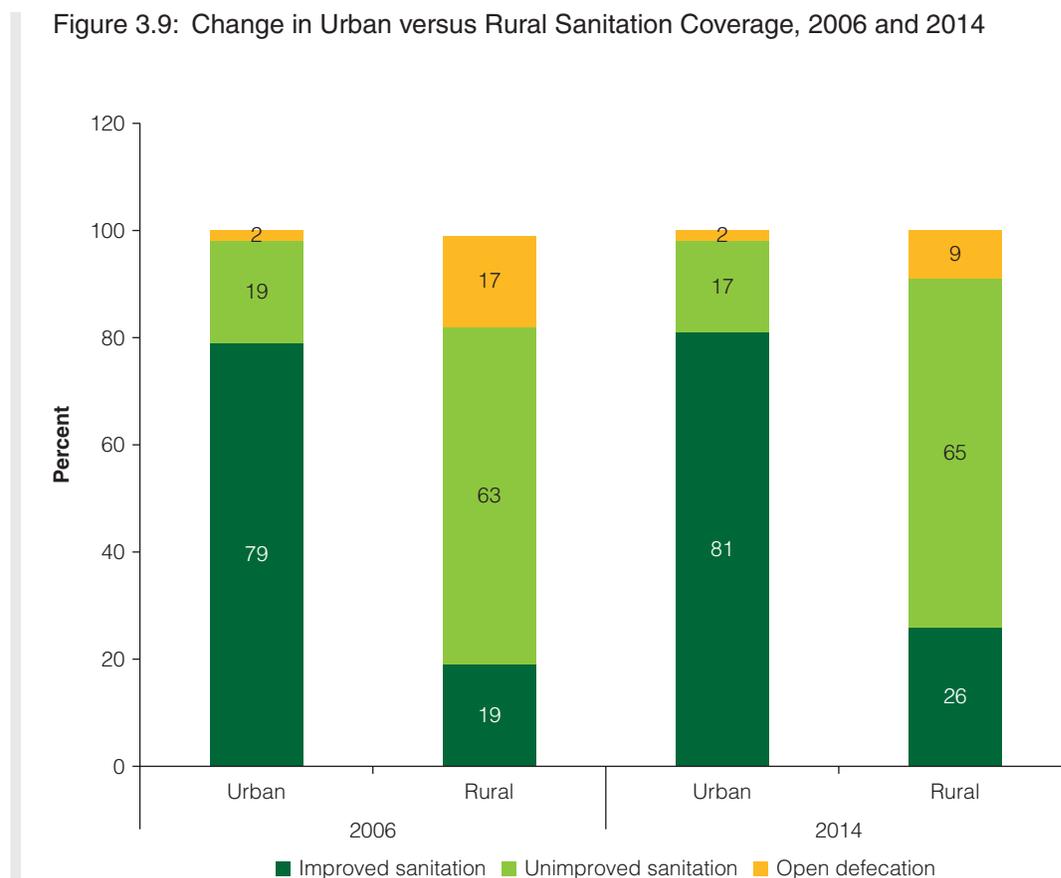
Source: ENCOVI 2006, 2014.

Map 3.2: Change in Sanitation Coverage, by Department, 2000 versus 2014

a. 2000

b. 2014

Percent
- ■ 41.60949–80.66326
- ■ 29.10415–41.60949
- ■ 18.67728–29.10415
- □ 8.155882–18.67728

Percent
- ■ 62.25796–89.18459
- ■ 49.78077–62.25796
- ■ 34.68496–49.78077
- □ 19.25766–34.68496
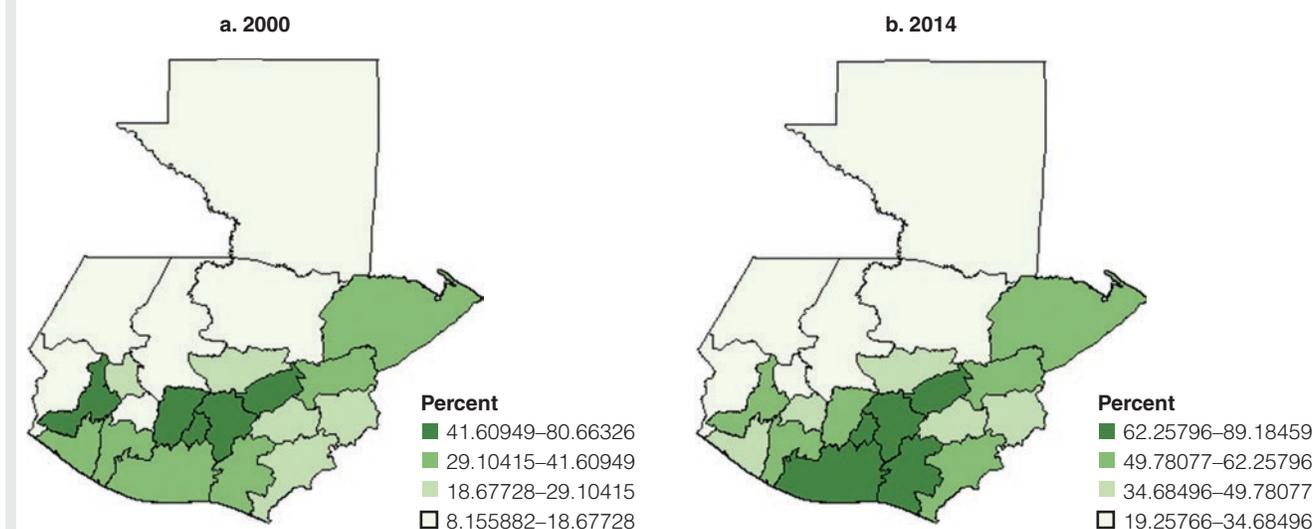
Source: ENCOVI 2000, 2014.

In 2000, the gap between the department with the lowest (Sacatepequez at 8 percent) and highest (Sololá at 81 percent) rates of access to an improved sanitation facility was 73 percentage points. Almost 15 years later, the gap remains effectively the same (figure 3.10). With an increase of 9 percentage points, Sololá remains the department with the most coverage, while at 19 percent Alta Verapaz has become the department with the least coverage. More than half of all departments are below the national average of 53 percent.

There does not appear to be a relationship between initial rates of access and change over time, which suggests that the most excluded departments in terms of access are not being prioritized (figure 3.11). This could indicate a lack of coordination at the country level. However, with so many people lacking access to an improved sanitation facility, any number of factors, such as gender, ethnicity, and poverty, could affect access, and this particular metric might be better assessed between groups.

Lack of access to an improved sanitation facility is above the national average of 47 percent in nine departments (table 3.4) with rates ranging from 55 percent in Chiquimula and Jalapa, up to a critical 81 percent in Alta Verapaz. The majority of people in all nine departments rely on latrines, with the exception of Chiquimula where, for one-third of the population, open defecation is still the dominant form of sanitation. Indeed, open defecation is above 10 percent in six departments (in bold). Intuitively we would expect open defecation to be more prevalent in rural areas where infrastructure is sparse, and indeed, open defecation decreases with decreasing rural populations (figure 3.12).

Despite inter-annual variability, open defecation and latrine use have declined steadily overall. In fact, a more detailed examination of data at the departmental scale reveals some promising results, namely a significant reduction in open defecation in some of the most historically excluded departments (figure 3.13). Specifically, Chiquimula and Petén experienced a decrease of almost 30 percent each from 2000 to 2014, while the departmental median decreased 10 percent during the same period, cutting in half the gap between the departments with the highest and lowest rates of open defecation.

Figure 3.10: Change in Improved Sanitation Coverage, by Department, 2000 and 2014
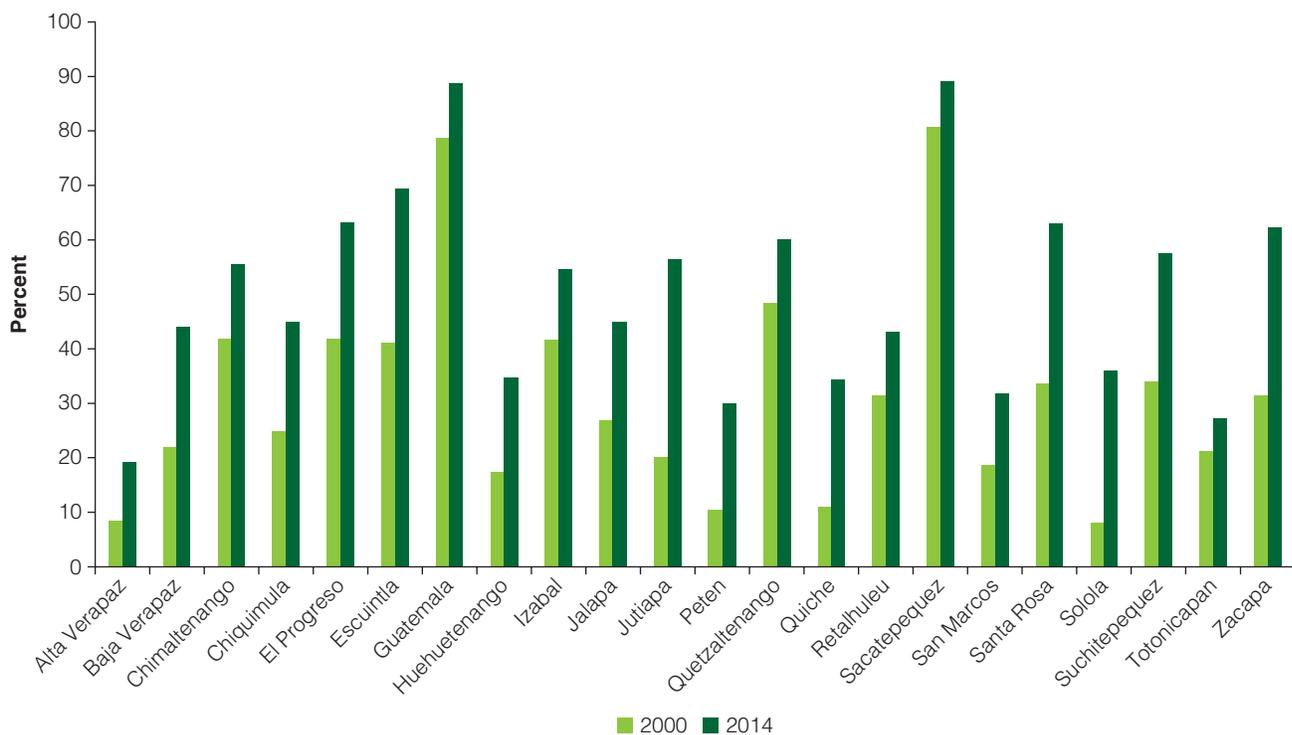
■ 2000 ■ 2014

Source: ENCOVI 2000, 2014.

Figure 3.11: Change in Access to Improved Sanitation (2000–14) Relative to Improved Sanitation Coverage (2000), by Department
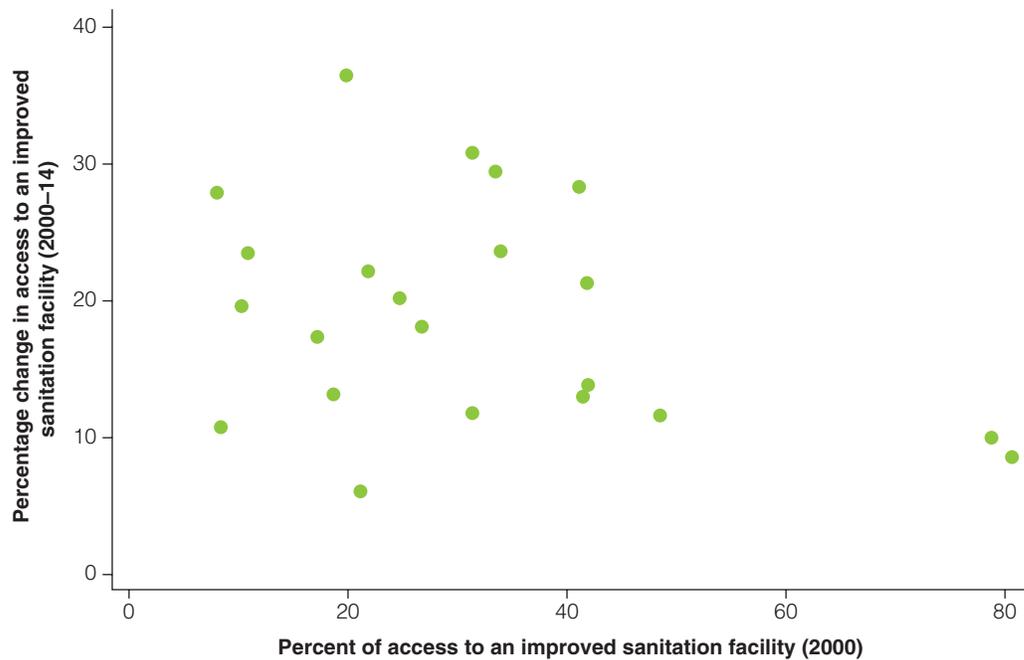
Source: ENCOVI, 2000, 2014.

Figure 3.12: Relationship between Open Defecation and Change in Rural Population, 2000–14
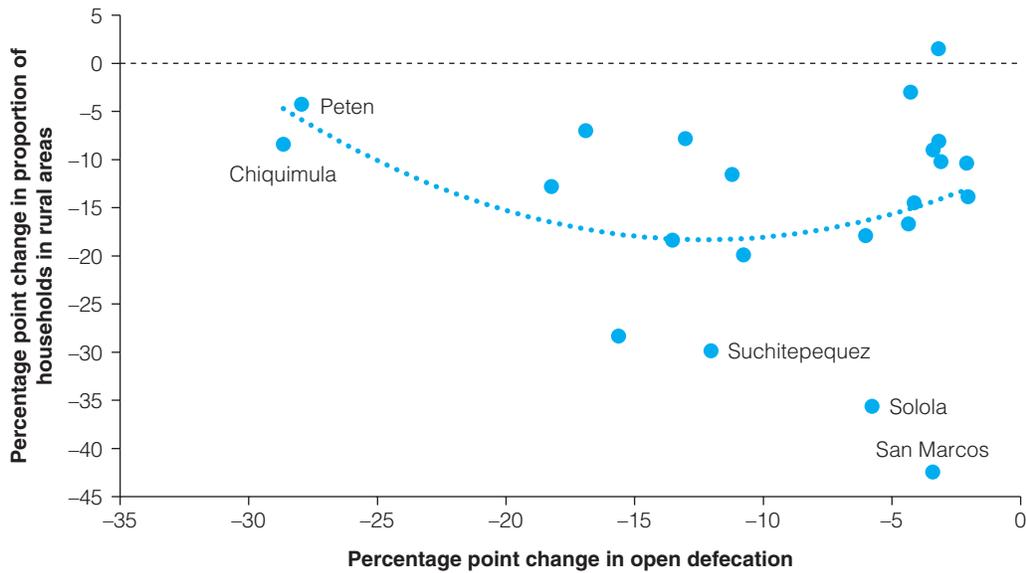
Source: ENCOVI 2000, 2014.

Figure 3.13: Change in Open Defecation (2000–14) relative to 2000 Levels
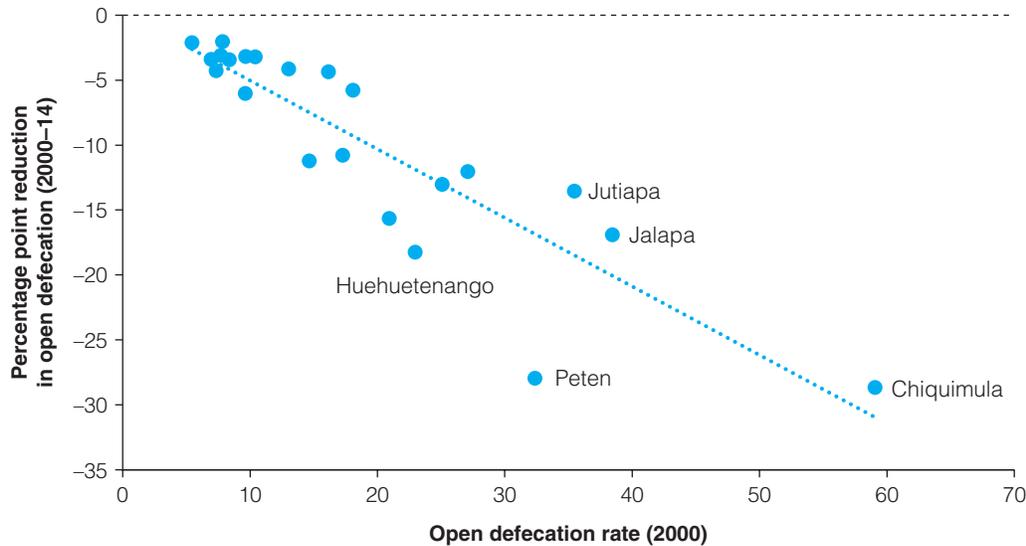
Source: ENCOVI 2000, 2014.

The gap between the departments with the highest and lowest rates of latrine use has not fallen as dramatically. In fact, after an initial decrease of 8 percent from 2000 to 2006, in 2014, the gap returned to 2000 levels. This could be a result of people transitioning from open defecation to latrine use, despite median latrine use having decreased by 9 percent from 2000 to 2014, and indeed, there appears to be a slight negative association between both variables (figure 3.14).

Figure 3.14: Relationship between Change in Open Defecation and Change in Latrine Use, 2000–14
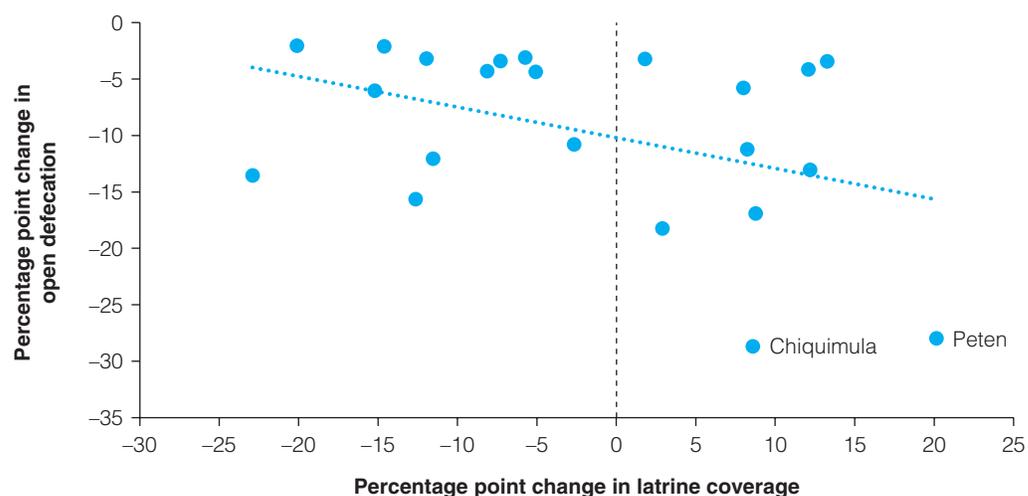
Source: ENCOVI 2000, 2014.
Note: There may be households substituting latrines with other sources, including connections to sewer or drainage between 2000 and 2014.

Although the national MDG target for improved water was met at the country level, the overall composition of access to water has remained fairly constant over time. Although service levels have remained relatively unchanged, the average monthly cost of water has almost doubled. Furthermore, access to water supply is concentrated in the Pacific Ocean Basin, which could face future water risk. Thus, water supply availability should be investigated more thoroughly, especially given the expanded focus of the SDGs. Overall, five departments remain below the national MDG indicator target for access to improved drinking water. Almost half of all Guatemalans lack access to improved sanitation, and the gap toward achieving the MDG target is still significant, especially now that the SDG target has shifted to providing universal access. While important gains have been made in expanding sewage coverage and open defecation is decreasing, only three departments have exceeded the national MDG target for access to improved sanitation. Overall, the disparity between geographical areas is significant and the rural population remains disproportionately disadvantaged.

Notes

1. Further analyses on these aspects are reported in detail in chapter 4.
2. Jimenez Cisneros, Blanca, and Jose Galazia Tundisi (2013).
3. National household survey data do not explicitly distinguish between improved and unimproved latrines. However, the original survey question combines latrines with cesspits (*pozo ciego*), suggesting they are more likely to be unimproved than improved. Further investigations will be required to determine the proportion of latrines that could otherwise be classified as improved. It is anticipated that this figure will be sufficiently low so as not to change the overall outcome of the analyses presented in this report. However, it should be stated that this could nonetheless result in either an overestimation or an underestimation of the figures represented herein.

References

Jimenez Cisneros, Blanca, and Jose Galazia Tundisi. 2013. "Diagnosis of Water in the Americas." Foro Consultivo Científico y Tecnológico, AC: Mexico.

ENCOVI. 2000. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2000. Guatemala.

———. 2006. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2006. Guatemala.

———. 2014. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2014. Guatemala.

JMP (Joint Monitoring Programme). 2015. "Progress on Sanitation and Drinking Water – 2015 Update and MDG Assessment." UNICEF and World Health Organization (accessed March 21, 2017), https://www.wssinfo.org/fileadmin/user_upload/resources/JMP -Update-report-2015_English.pdf.

SEGEPLAN. 2015. Secretaría de Planificación y Programación de la Presidencia - Segeplán. Informe final de cumplimiento de los Objetivos de Desarrollo del Milenio. Guatemala: Segeplán. 2015.

United Nations. 2016. "Sustainable Development Knowledge Platform" (accessed March 21, 2017), https://sustainabledevelopment.un.org/sdgs. United Nations, New York.

Chapter 4
WASH-Poverty Nexus

Trends in Access to Water Supply and Poverty

People living in extreme poverty are the most underserved group in terms of access to improved drinking water. However, between 2000 and 2014, the extremely poor saw their access to water increase by almost 12 percent. In contrast, among the nonpoor, access increased by only 2 percent (figure 4.1). With the exception of piped water to the dwelling, the differences between the extremely poor and others in poverty—all poor and the bottom 40 percent—are virtually indiscernible at the national level and all have rates that remain below the national MDG target of 88.5 percent for access to improved drinking water (table 4.1). Interestingly, the extremely poor have the highest rate of access to an unshared source of water among the aforementioned groups, including the nonpoor. Conceivably, this might be the result of an increased reliance on rainwater, which is commonly captured at the household scale and less likely to be shared than other types of water supply. Similarly, it might reflect the fact that the extremely poor are more likely to live in rural areas with lower population density and sparse infrastructure.

Figure 4.1: Change in Improved Water Coverage, by Poverty Status, 2000 and 2014
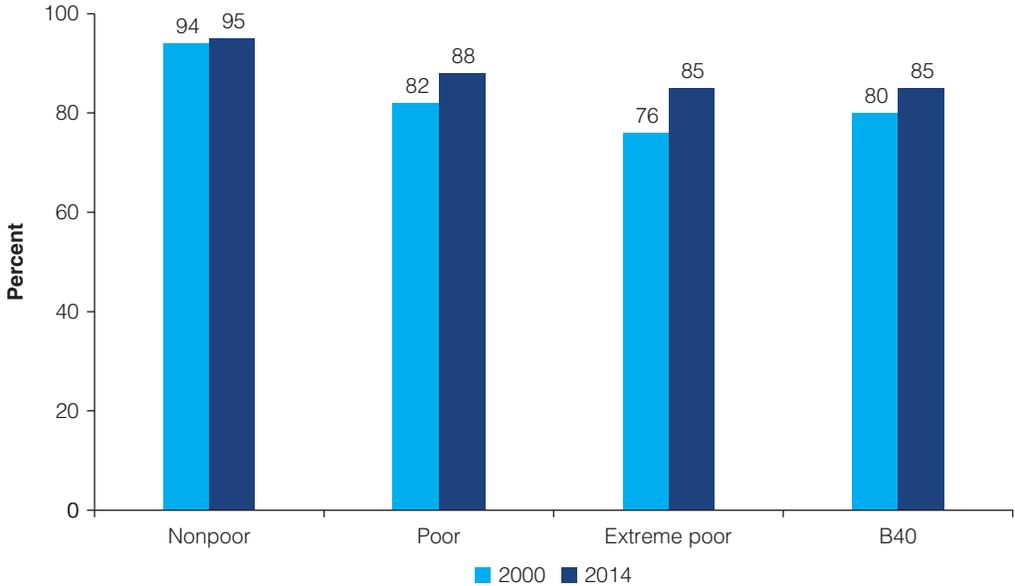
Source: ENCOVI 2000, 2014.
Note: B40 = bottom 40 percent of the population.

Table 4.1: Drinking Water Coverage, by Poverty Status, 2014
Percent

Type of drinking water source	Nonpoor	Poor	Extreme poor	B40
Access to improved water supply	96	88	85	86
Piped to premises	86	67	61	64
Piped to neighbor/public	1	2	3	3
Tubewell/borehole	9	14	14	14
Rainwater	1	4	7	5
Lack of access to improved water supply	4	12	14	13
Surface water	2	9	11	10
Other unimproved	2	3	3	3
Shared source	12	11	7	10
Private source	88	89	93	90

Source: ENCOVI 2014.

Note: B40 = bottom 40 percent of the population. The colored areas show the most disadvantaged position by category for the extreme poor.

Figure 4.2: Change in Drinking Water Coverage, by Ethnicity, 2000 and 2014

2000   2014
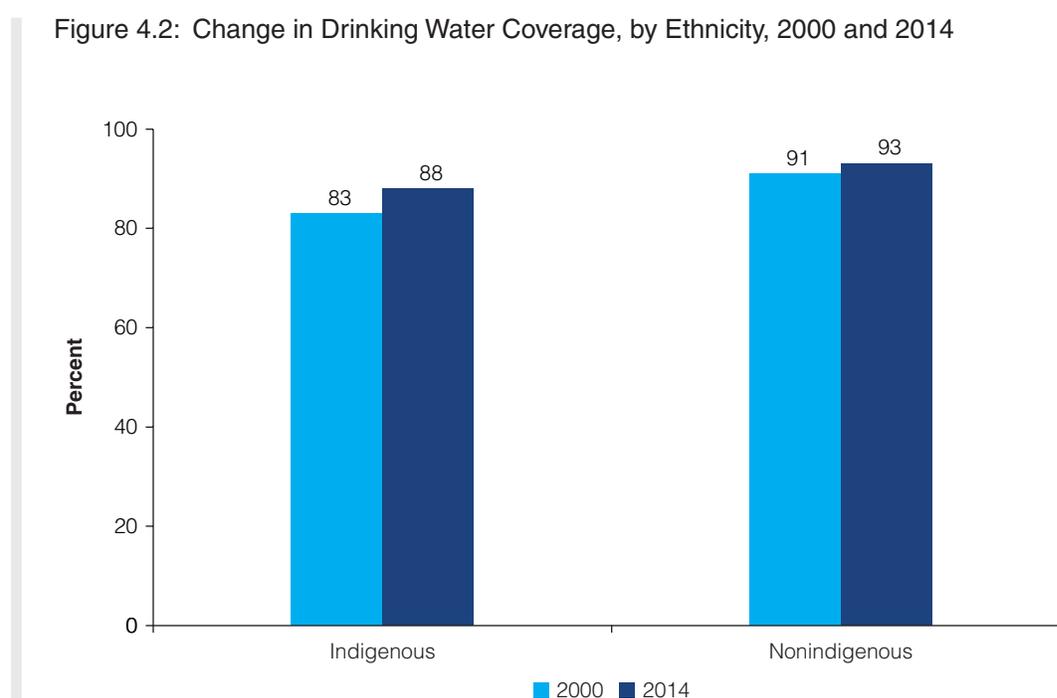
Source: ENCOVI 2006, 2014.

Indigenous groups have also seen an increase in access to improved drinking water. Between 2000 and 2014, access to improved drinking water by indigenous groups rose 6 percent (figure 4.2). In contrast, access among nonindigenous groups rose only 2 percent during the same period. The net result is a narrowing of the gap in water access to 5 percentage points. There appears to be no discernable difference between ethnicities, which perhaps reflects the overall poverty levels of indigenous groups in Guatemala.

Figure 4.3: Change in Access to Water on Premises, by Geographic Area, 2006 and 2014
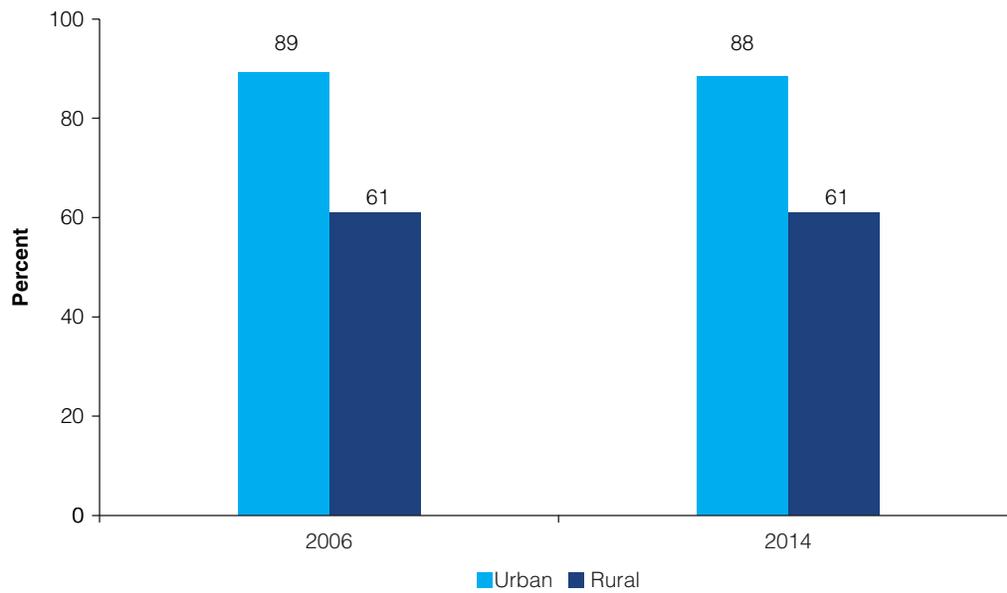
Source: ENCOVI 2006, 2014.

Figure 4.4: Change in Access to Water on Premises, by Socioeconomic Group
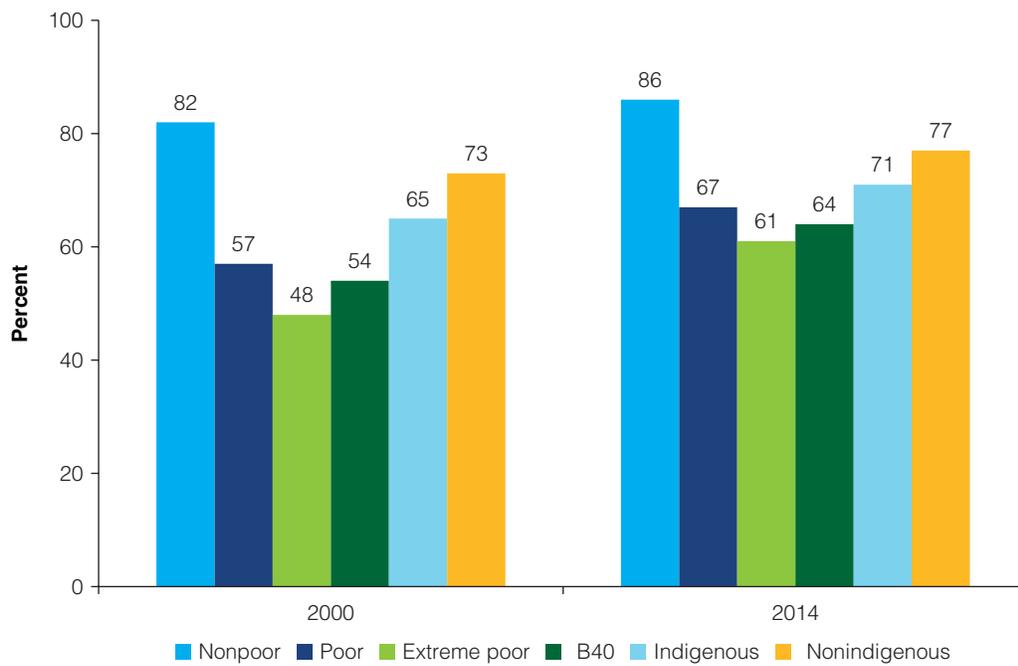
Source: ENCOVI 2006 and 2014.
Note: B40 = bottom 40 percent of the population.

One-quarter of all Guatemalans lack a water connection on their premises. While this figure has decreased by 7 percentage points overall since 2000, there was almost no change from 2006 to 2014. Rural populations are significantly more disadvantaged than urban populations, and the extremely poor persistently lag behind their contemporaries (figures 4.3 and 4.4). However, the most disadvantaged groups experienced the greatest gains (figure 4.4). The extremely poor experienced an increase of 27 percentage points in access, the poor and bottom 40 percent experienced increases of 18 and 19 percentage points respectively, and indigenous groups experienced an increase of 9 percent. In contrast, access increased by only 5 percent for the nonpoor and nonindigenous groups. As a result, the gap between the nonpoor and extreme poor has been reduced by a third and now stands at 25 percentage points. The gap between the indigenous and nonindigenous has been reduced by a quarter and is now 6 percentage points.

On average, distance to a water source has decreased consistently since 2000. However, the time required to make one round-trip to a water source increased significantly in 2006 and has yet to return to 2000 levels (figure 4.5). This could be the result of crowding, whereby more people are now required to share the same water source. Crowding occurs when per capita infrastructure is low or when the installation of infrastructure induces a demand above anticipated levels. In some ways, induced demands are a positive outcome, although it is important to ensure that the most excluded groups are not disadvantaged by the effect. As a result of the changes in definition affecting the classification of urban and rural areas described in chapter 1, this effect is not fully visible when contrasting geographic areas. However, the effects of crowding would be expected to have a greater impact in densely population areas. Indeed, while rural populations must travel farther to secure drinking water,

Figure 4.5: Change in Distance and Time to Water Source, by Meters and Minutes per Round-Trip, 2000, 2006, and 2014
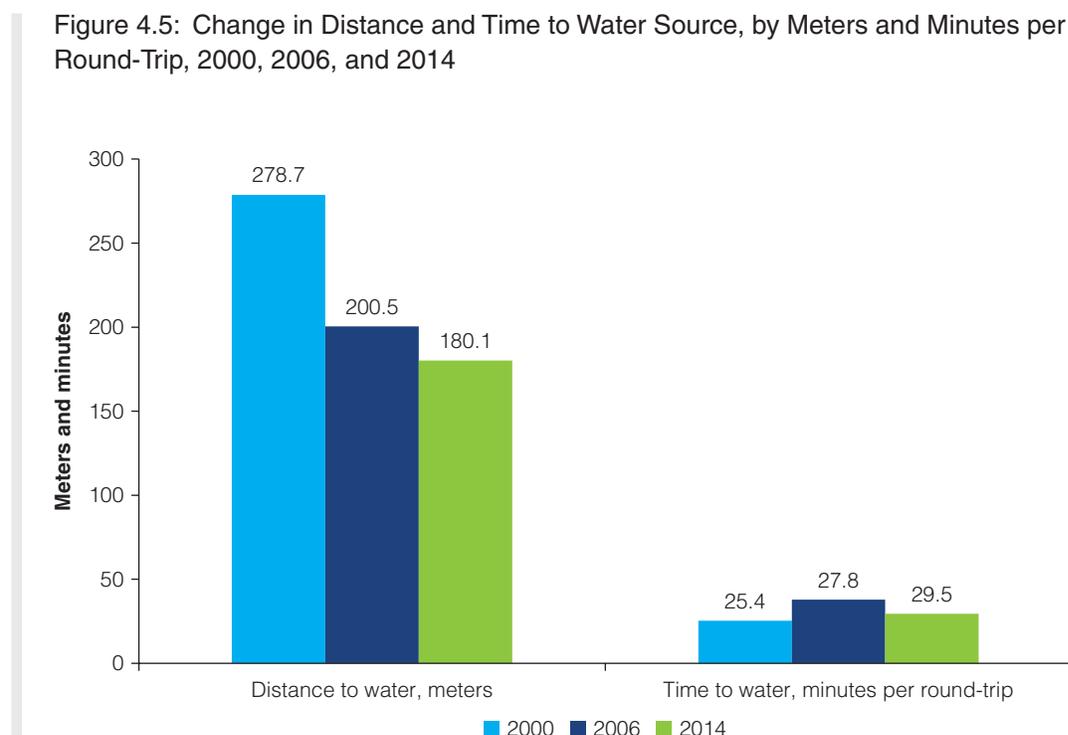
Source: ENCOVI 2000, 2006, 2014.

Figure 4.6: Change in Water-Carrying Activities between Geographic Areas, 2006 and 2014
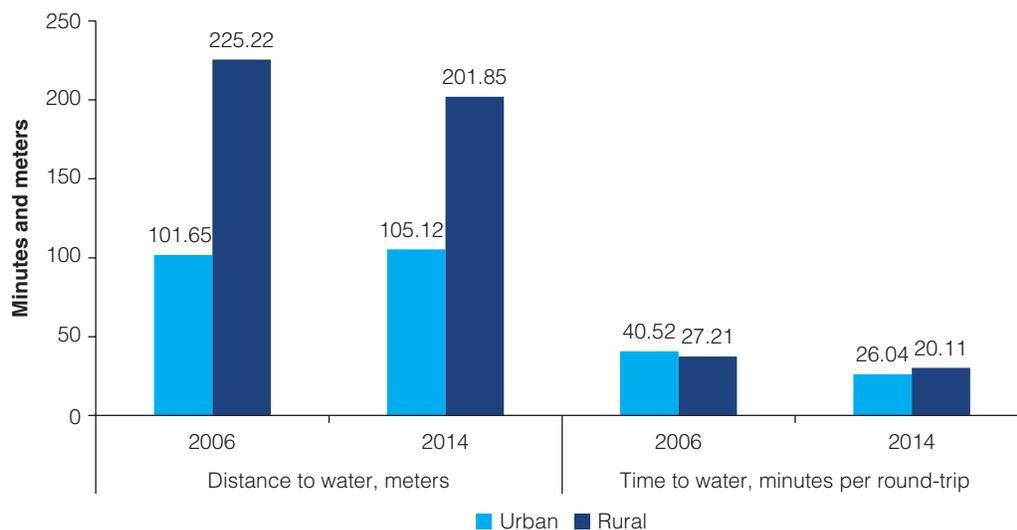
Source: ENCOVI 2000, 2006, 2014.

Figure 4.7: Change in Distance to Water, by Socioeconomic Group, 2000 and 2014
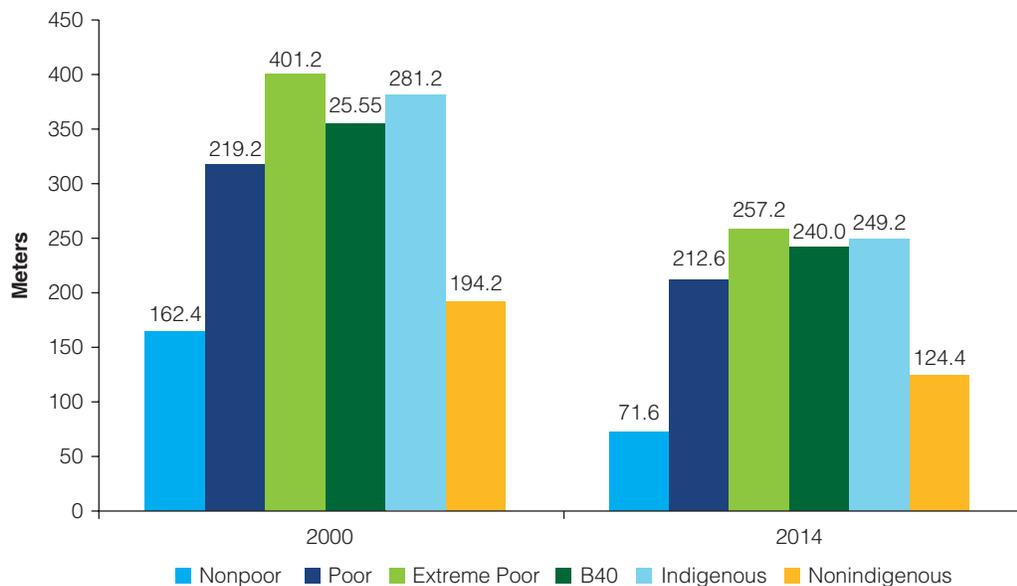
Source: ENCOVI 2000, 2014.
Note: B40 = bottom 40 percent of the population.

average collection times are roughly the same for the two groups. This finding suggests that urban populations spend proportionately more time collecting water per distance in meter travelled than rural populations (figure 4.6).

In terms of distance travelled, poor and indigenous groups fare worse than their counterparts, with the extreme poor being the most disadvantaged (figure 4.7). However, once again the extreme poor experienced the greatest improvement. The distance travelled to collect water fell by 144 meters between 2000 and 2014. Indigenous groups experienced similar improvements. In terms of time spent collecting water, the trend of decreasing distance but increasing time is visible across all groups (figure 4.8). With respect to time spent collecting water, there is no significant difference between groups, with the exception of the nonpoor, who fare slightly better than their counterparts.

When incorporating the SDGs' broader classification of access to water, 30 minutes is the acceptable threshold for a single round-trip. At the national scale, the average time spent collecting water is exactly 30 minutes. However, all three poverty groups assessed are above the threshold. As a result, according to the SDGs the proportion of the population that spends more than 30 minutes round trip collecting water would be excluded from the proportion of the population deemed to have access to improved drinking water.

Five departments remain below the national MDG target for access to improved drinking water: Alta Verapaz, Chiquimula, El Progreso, Petén, and Santa Rosa (see figure 2.5 in chapter 2). Each department has a majority rural population. Alta Verapaz, Chiquimula, and Petén are three of the five most rural departments in Guatemala, although El Progreso and Santa Rosa are average. While Alta Verapaz, Chiquimula, and Petén share at least one other characteristic with each other, Santa Rosa and El Progreso do not. In an attempt to understand the factors that might play a critical role in water access across departments, the relationship between socioeconomic variables commonly associated with a lack of access to improved water, such as ethnicity, poverty status, education, and the share of urban population, was evaluated, although this relationship is not immediately obvious (figure 4.9).

Figure 4.8: Change in Minutes Round-trip to Water, by Socioeconomic Groups, 2006 and 2014
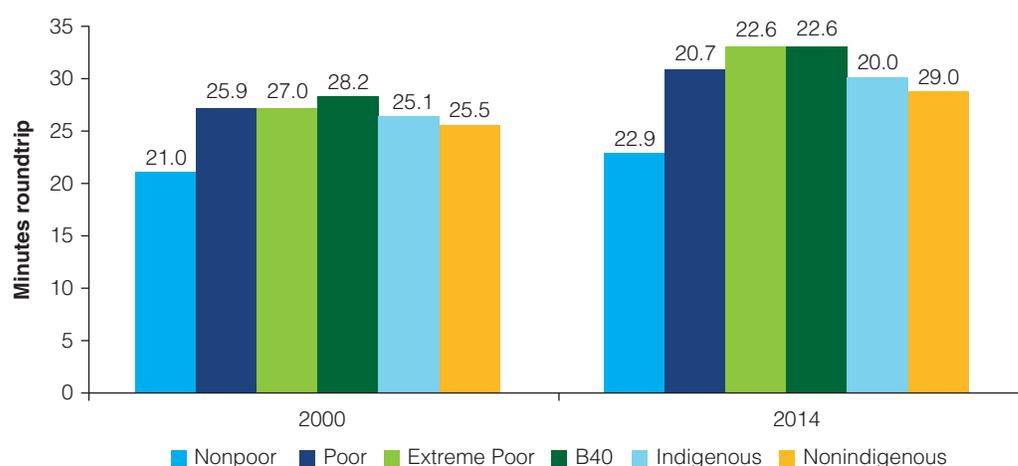
Source: ENCOVI 2000, 2014.
Note: B40 = bottom 40 percent of the population.

Figure 4.9: Percent of Population for Select Socioeconomic Variables as a Function of Access to Improved Sanitation, by Department
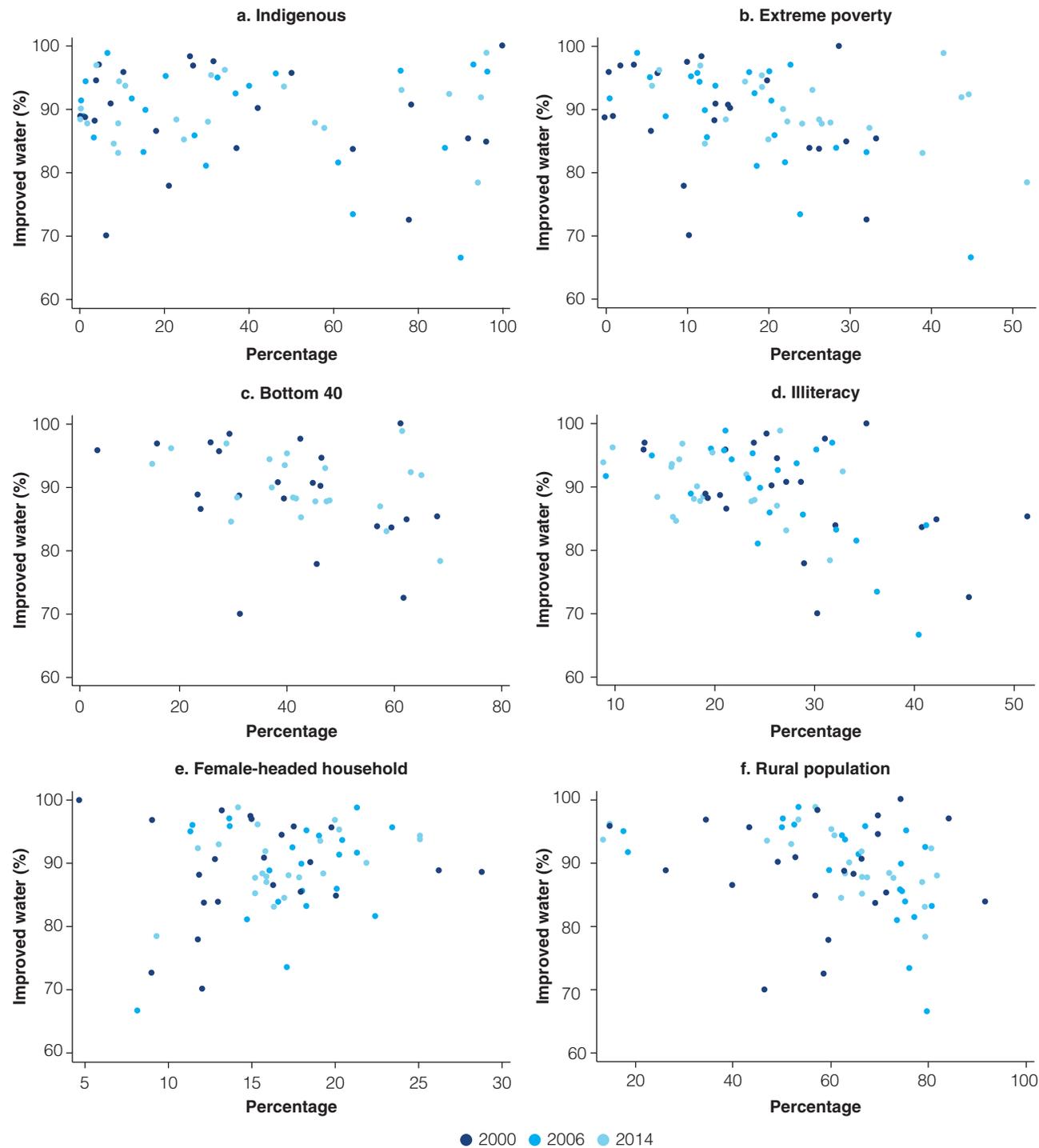
Source: ENCOVI 2000, 2006, 2014.

Table 4.2: Sanitation Coverage, by Poverty Status, 2014
Percent

Type of sanitation facility	Nonpoor	Poor	Extreme poor	Bottom 40
Access to improved sanitation	80	35	19	27
Flush to sewer	62	22	11	15
Flush to septic tank	9	7	4	6
Pour flush/composting toilet/other improved	9	6	4	5
Lack of access to improved sanitation	19	65	81	73
Open defecation	1	8	12	10
Latrine	18	57	69	63
Shared sanitation	10	11	8	11
Private sanitation	90	89	92	89

Source: ENCOVI 2014.
Note: The most disavantaged position for the extreme poor by category.

Figure 4.10: Change in Sanitation Coverage, by Poverty Status, 2000–14
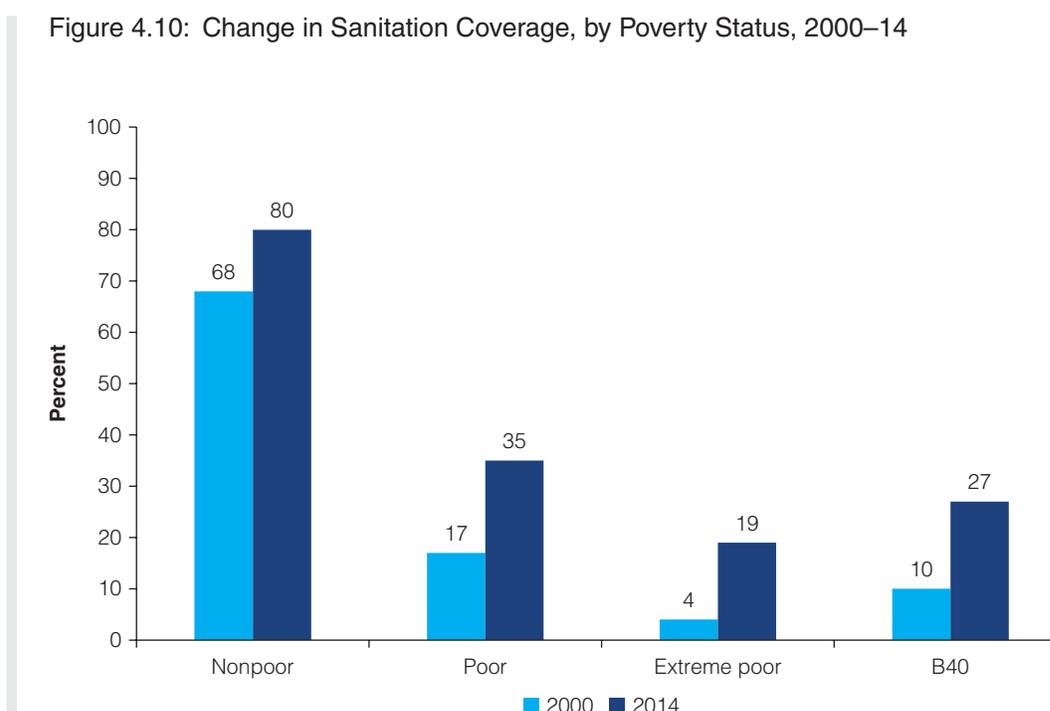
Source: ENCOVI 2000 and 2014.
Note: B40 = bottom 40 percent of the population.

Trends in Access to Sanitation and Poverty

In terms of sanitation coverage, the extremely poor are also the most underserved group (table 4.2). However, although poor and indigenous groups are disproportionately affected, both groups have experienced more gains than their counterparts (figure 4.10). Specifically, from 2000 to 2014, sanitation coverage expanded almost fourfold among the extremely poor. Expansion of coverage was lower among all poor, although it was still substantial (an increase of 106 percent), and was 170 percent for the bottom 40 percent. During the same period, the change among the nonpoor was only 18 percent. Clearly, this smaller change is due to the much higher starting levels of access among the nonpoor. Despite the large changes in access seen among the poor,

Box 4.1: A Profile of Indigenous Peoples and Access to WASH in Guatemala

In Ecuador, according to a World Bank report, the poverty rate in 2012 was 30 percent for the total population and 60 percent for indigenous peoples. By way of contrast, in Guatemala the poverty rate for the nonindigenous rural population in 2011 was 61 per cent, and 81 per cent for the rural indigenous group (Cord, Genoni, and Rodríguez-Castelán 2015). The rural population is predominantly comprised of indigenous peoples from among Guatemala's many ethnic and linguistic groups. Indigenous peoples are to a great degree socially marginalized by the region's structural and rural transformations. Indigenous peoples in Latin America and the Caribbean have suffered territorial dispossession and social exclusion (World Bank 2015). Until recently, their socio-economic conditions were almost invisible in official statistics (ECLAC 2014). The countries with the highest indigenous populations as a share of the total are Bolivia (62 percent), Guatemala (41 percent), Peru (24 percent), Mexico (15 percent) and Panama (12 percent). Poverty is higher among indigenous peoples than among the rest of the population (Cord, Genoni, and Rodríguez-Castelán 2015). Income gaps between indigenous and nonindigenous people in Bolivia, Ecuador, Guatemala, and Peru either remained unchanged or widened throughout most of the decade. Guatemala also shows a large gap of extreme poverty rates between indigenous and nonindigenous people.

A Snapshot of WASH and Child Nutrition Correlations in Indigenous Areas

Recent survey data collected from October 2016 to January 2017 in four departments, Huehuetenango, San Marcos, Quiche, and Totonicapán, show a snapshot of WASH coverage and nutrition for indigenous groups. The survey sample consisted of about 2,000 families with children under 24 months of age. The survey contained information on basic demographics, WASH infrastructure, and child health and nutritional outcomes.

Water Supply and Sanitation Infrastructure

The relationship between sanitation infrastructure and water sources to child health indicators is shown in figure B4.1.1. The charts depict the percentage of houses with dirt floors, PPP-based poverty, children with extreme stunting, and underweight children by sanitation infrastructure and water source. Compared to families with a toilet, those without sanitation infrastructure had a higher percentage of homes with dirt floors (86 percent), were poor (88 percent), had children who were extremely stunted (40 percent), and underweight (21 percent). When considering outcomes by water source, compared to piped water, families who obtained water from other sources had a higher percentage of homes with dirt floors (81 percent), were poor (82 percent), and had children who were extremely stunted (39 percent), or underweight (20 percent).

Anthropometric Measures in Indigenous Areas

According to World Health Organization (WHO) guidelines, stunting or growth retardation is defined as −2 standard deviations of the WHO Child Growth standard median for height-for-age. Chronic malnutrition and extreme stunting are defined as −3 standard deviations of the WHO Child Growth standard median for height-for-age and measures extreme chronic malnutrition because it is the result of long-term effects of nutritional deprivation (cumulative effects of undernutrition) or recurrent infections. Underweight children are those with a weigh-for-age below −2 standard deviations of the WHO Child Growth standard median.

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Box 4.1: Continued

Figure B4.1.1: Relationship between Sanitation Infrastructure and Water Sources for Selected Indicators

a. Sanitation

b. Water Source
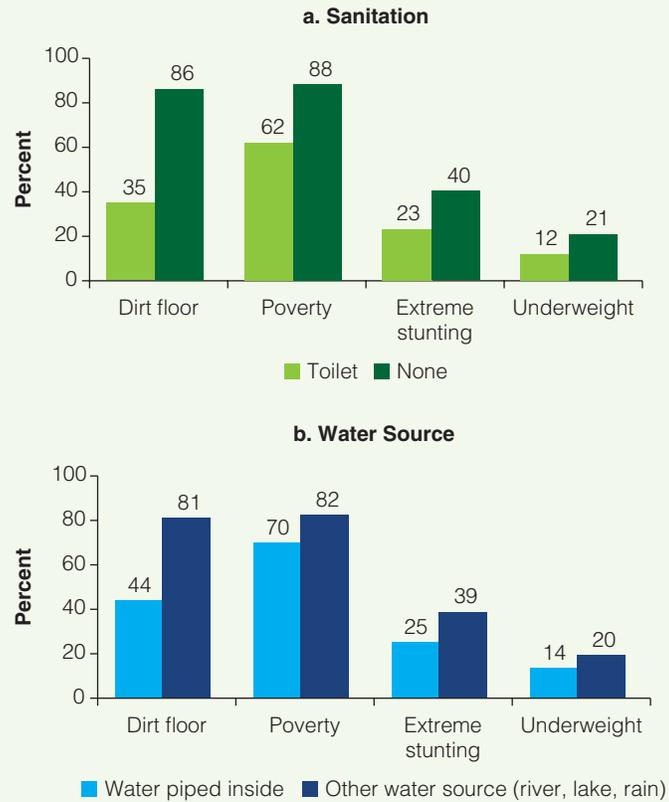
Source: World Bank Data Survey 2016.

Figure B4.1.2 shows trends of anthropometric indicators from the survey. Sixty-eight percent of the children in the sample were stunted, 32 percent were extremely stunted, and 15 percent were underweight. These results were similar for the departments of San Marcos, Huehuetenango, and Quiche, but as observed, were much higher for Totonicapán. A disturbing trend for these indicators was identified: as age increases, the percentage of stunted, extremely stunted, and underweight children increases. Pearson correlations of age in months against each anthropometric indicator were further analyzed to confirm these findings. Table B4.1.1 show that all correlations were statistically significant at the 1 percent level. These findings are troublesome and they indicate that policy makers should intervene as early as possible to prevent cumulative negative effects of nutrition deprivation that might impact child mortality, delayed mental development, poor cognitive capacity, and school performance.

The descriptive statistics show differences in anthropometric measures and basic demographics for those with different types of sanitation in their households. In general, the survey shows that indicators are worse for households without improved sanitation.

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Box 4.1: Continued

Figure B4.1.2: Trends in Anthropometric Indicators

a. Anthropometric indicators

b. Anthropometric measures, by age group
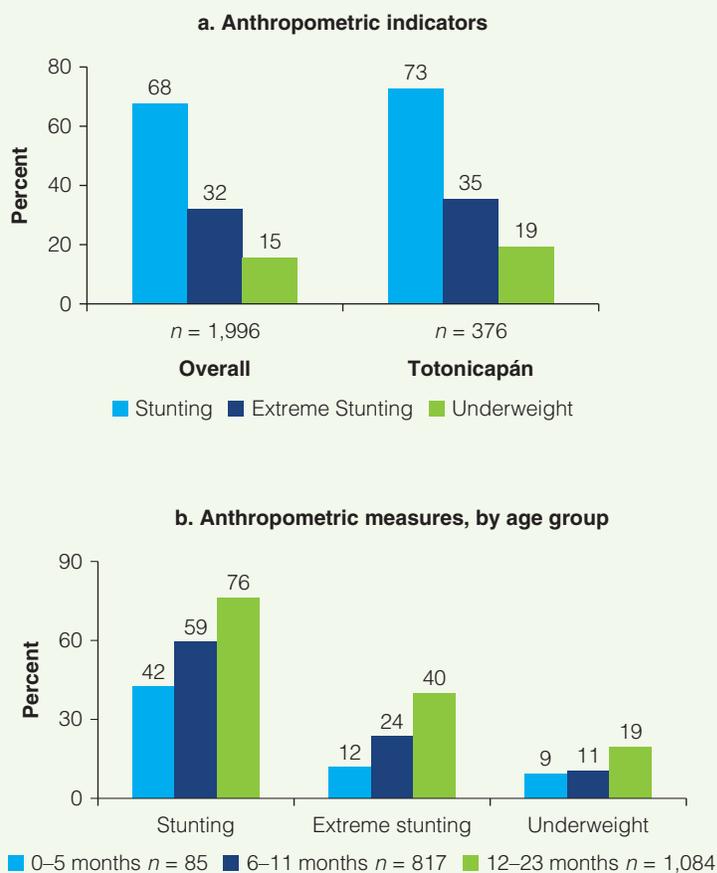
Source: World Bank Data Survey 2016.

Table B4.1.1: Pearson Correlations between WASH and Child Nutrition Indicators, 2016

	No sanitation	Latrine	Toilet	Other water source	Water piped outside the residence	Water piped inside the residence
Stunting	0.01	0.07***	−0.09***	0.03	0.02	−0.06**
Extreme stunting	0.08***	0.03	−0.10***	0.05*	−0.01	−0.06**
Underweight	0.07**	−0.01	−0.05*	0.04*	−0.02	−0.02
Diarrhea	−0.02	−0.01	0.03	0.00	0.00	0.02

Sources: Cord, Genoni, and Rodríguez-Castelán 2015; ECLAC 2014; World Bank Data Survey 2016.
Note: *p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001.

Box 4.1: Continued

The estimates show a positive and statistically significant correlation between having no sanitation and children experiencing extreme stunting and being underweight. At the same time, indicators improve for those with toilets. The correlation analysis confirmed these findings and showed a negative and significant correlation among those with toilets against stunting, extreme stunting, and being underweight. A similar pattern was found for those with water infrastructure in the home (negative correlation with respect to stunting and extreme stunting) and those without (for example, water is obtained from a river, creek, rain, lake) where there is a positive correlation with respect to extreme stunting and underweight).

Figure 4.11: Change in Sanitation Coverage, by Ethnicity, 2000–14
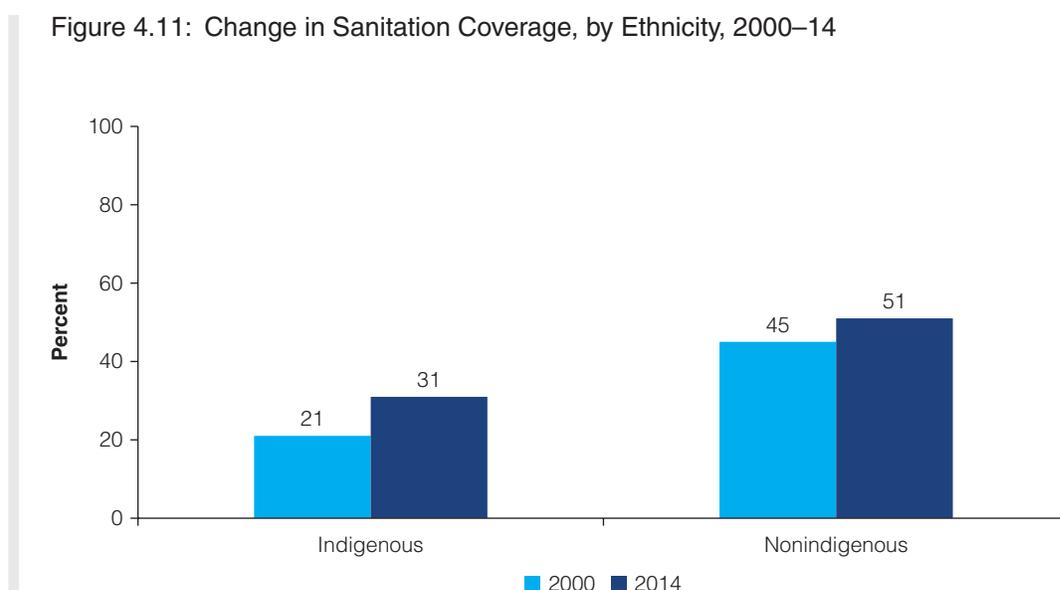
Source: ENCOVI 2000, 2014.

levels of access still remain very low as a result of the very low levels at which they started, and less than one in five people among the poor has access to improved sanitation. The gap between the nonpoor and the extremely poor is a startling 61 percentage points. When compared to poverty status, indigenous groups as a whole are similarly underserved. However, sanitation coverage for indigenous groups rose by 48 percent in the 14-year period in contrast to nonindigenous groups, which saw coverage rise by only 13 percent (figure 4.11). This resulted in a small reduction in the sanitation gap between the two groups (see box 4.1 for a discussion of access to WASH by indigenous people).

Three departments have exceeded the national MDG target of 65.5 percent for sanitation coverage. The question is whether there are specific features of Escuintla, Guatemala, and Sacatepéquez that are linked to this higher level of coverage. All three departments have populations that are predominantly urban and, in the case of Guatemala and Sacatepéquez, substantially so. Poverty levels are below the national average in all three departments and, in terms of extreme poverty, significantly so. Escuintla's population is one-third

Figure 4.12: Relationship between Selected Socioeconomic Variables, by Population and Access to Improved Sanitation, by Department

a. Indigenous

b. Extreme poverty

c. Bottom 40

d. Illiteracy

e. Female-headed household

f. Rural population
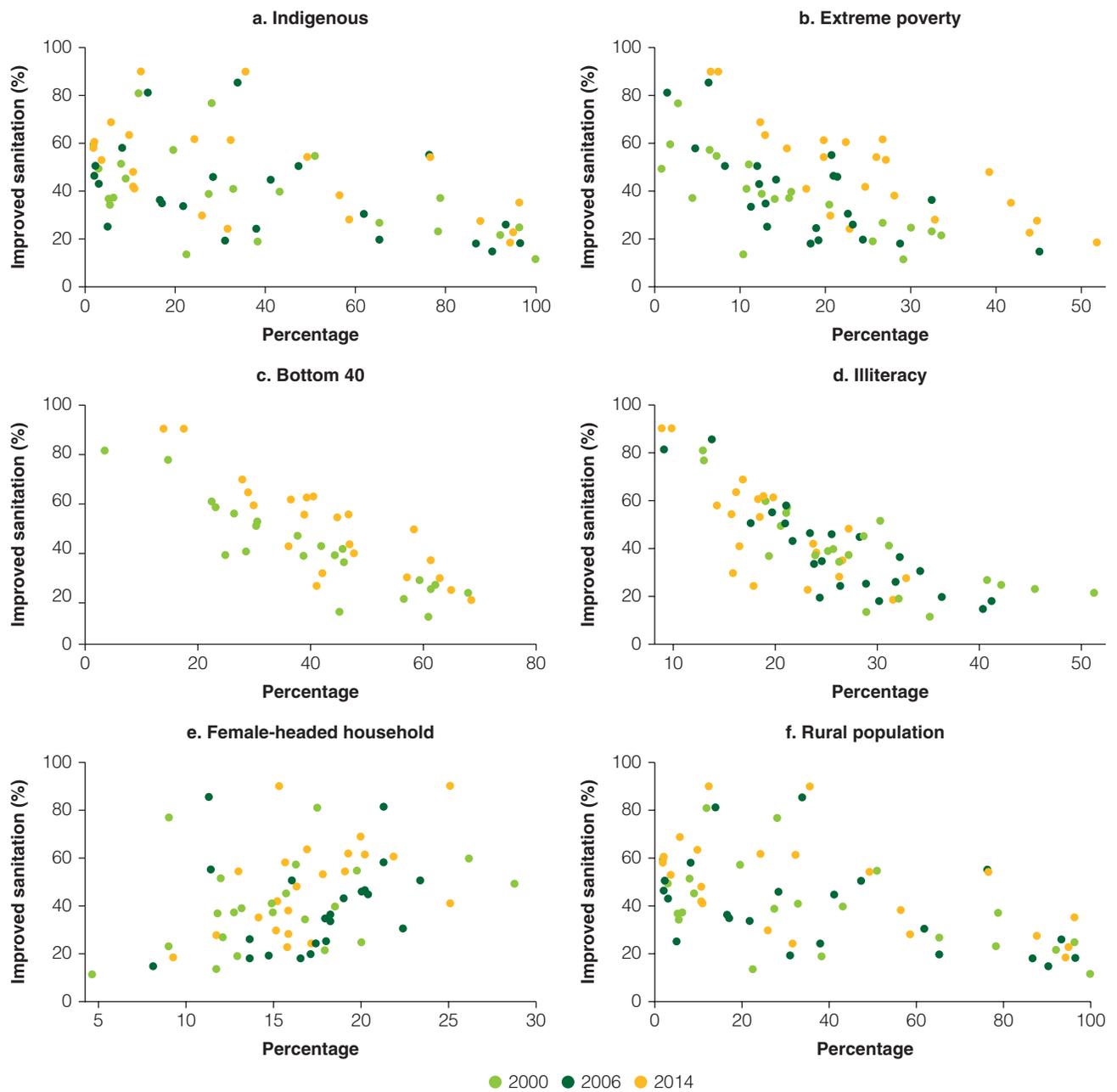
● 2000   ● 2006   ● 2014

Source: ENCOVI 2000, 2006, 2014.

indigenous, roughly the national average, while the populations of Guatemala and Sacatepéquez are significantly nonindigenous. Finally, all three departments show some of the highest completion rates in secondary school and higher education. In contrast to access to improved water, it appears that specific socioeconomic determinants of well-being could be equally viable predictors of access to improved sanitation and, with the exception of female-headed households, the negative relationship is obvious (figure 4.12).

Socioeconomic Predictors of Access to Water Supply and Sanitation

Living in a rural area and having access to improved sanitation are strong predictors of having access to improved drinking water; while living in a rural area, having access to improved drinking water, and living in poverty and ethnicity are strong predictors of having access to sanitation. To a lesser degree, living in poverty and ethnicity also affects getting access to improved drinking water, while literacy and living in a household headed by a woman who works outside the home also affects getting access to improved sanitation. The results of a probit regression analysis,[1] performed to predict the impact of a select number of socioeconomic indicators of well-being on access to improved drinking water and sanitation, indicated that while the marginal effects were low, all of the selected variables were significantly ($p < 0.01$) associated with access to improved drinking water. Specifically, living in a rural area decreases the likelihood of having access to improved water by 9 percentage points, while access to improved sanitation increases the likelihood of access by 8.7 percentage points. Finally, living in general poverty and ethnicity decreases the likelihood by 4.3 percentage points and 2.9 percentage points respectively. Similarly, with the exception of the dependency ratio, all of the selected variables are significantly ($p < 0.01$) associated with access to improved sanitation. However, the marginal effects are much higher. In particular, living in a rural area decreases the likelihood of having access to improved sanitation by 42.5 percentage points, having access to improved water increases the likelihood by 30 percentage points, living in general poverty decreases the likelihood by 21.2 percentage points and finally, ethnicity decreases the likelihood by 16.7 percentage points.

The detailed results varied by department, suggesting that perhaps the specific demographics and policies of each department played an important role, although the same general trends continued that were encountered at the national scale. For example, access to improved sanitation was a consistent predictor of access to improved drinking water, while living in a rural area, living in poverty, ethnicity, and access to improved drinking water were consistent predictors of access to sanitation.

Note

1. A probit regression analysis was run at the household level using 2014 data from the ENCOVI survey.

References

Cord, L., M. E. Genoni, and C. Rodríguez-Castelán. 2015. *Shared Prosperity and Poverty Eradication in Latin America and the Caribbean.* Washington, DC: World Bank.

ECLAC (United Nations Economic Commission for Latin America and the Caribbean). 2014. "Los Pueblos Indígenas en América Latina: Avances en el Último Decenio y Retos Pendientes para la Garantía de sus Derechos." Santiago, Chile, ECLAC.

ENCOVI. 2000. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2000. Guatemala.

———. 2006. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2006. Guatemala.

———. 2014. Instituto Nacional de Estadistica. *Encuesta Nacional de Condiciones de Vida 2014*. Guatemala.

World Bank. 2015. *BOOST Database, 2004–15*. https://datacatalog.worldbank.org/dataset /guatemala-boost-public-expenditure-database.

World Bank Impact Evaluation Baseline Survey (2016-17). "Pilot to Improve the Development and Nutrition of Young Children in Poor Rural Areas in Guatemala." Strategic Impact Evaluation Fund (SIEF), World Bank, Washington, DC.

Chapter 5
WASH and Health

Guatemala evinces the same patterns of childhood mortality seen globally. In Guatemala, acute respiratory infections (ARIs) are the leading cause of death in children under five claiming 34 percent of all deaths. Diarrheal diseases are the next largest killer of children at 18 percent of all deaths. Moreover, almost half of all children suffer from chronic malnutrition. The links between WASH and health are well established. This chapter looks at the evidence of linkages between infrastructure and health outcomes, particularly malnutrition.

Health

Many health indicators have substantially improved over the past 15 years. Guatemala is on track to meet the MDG for under-five mortality, although there is some evidence that the rate of decline in child mortality is slowing (World Bank 2015). Infant mortality rates are falling nationally. However, there is tremendous heterogeneity in both levels and trends. Infant mortality rates are much higher in the Northwest and Northeast regions (figure 5.1).[1] The rate for the Central region has halved since 1997 and the rate for Petén has halved in just over the past decade. The Metropolitan region, in contrast, has experienced the opposite trend, reflecting the rise in urban extreme poverty.

Access to health care is limited, and geographic disparities persist.[2] There has been an increase in healthcare infrastructure over the past 25 years. The number of primary health facilities, those used most by the poor, has increased by 44 percent since 1990, and the number of primary health centers with beds for maternal and child

Figure 5.1: Changes in Infant Mortality Rates, by Region, 1977–2014
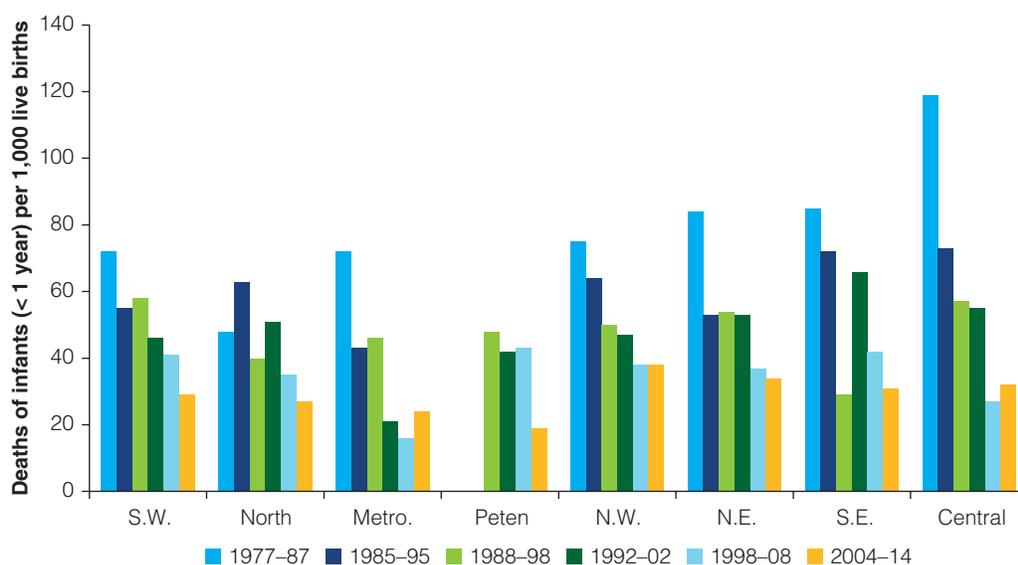
Source: MSPAS et al. 2009, 2015.
Note: Rates are calculated for the 10-year period prior to each survey date, 1977–87 ... 2004–14.

health services has increased by 67 percent. The greatest increases came after the Peace Accords of 1996. However, the overall provision of health services is still low and there are sharp inequities in this provision. The ratio of health facilities to population varies across the country, with the lowest ratios being in the Northern and Central regions. There are many fewer facilities in the Northwest, where a large share of the country's indigenous and rural populations live. In the Petén area, also a poorer region of the country, primary health care facilities offer only a limited range of services. The departments with the lowest facility-to-population ratios are Alta Verapaz (0.38 health posts per 10,000 inhabitants, well below the standard of five health posts per 10,000 inhabitants), and Guatemala City (0.26).

Guatemala is an outlier in the region in terms of chronic malnutrition (stunting).[3] Data from 2014 to 2015 show that almost half of all children in Guatemala (47 percent) are stunted, an indication of the high levels of poverty and inequality in the country (figure 5.2).[4] This rate of chronic malnutrition is higher than in most Latin American and Caribbean countries. Bolivia and Ecuador are the closest, but their rates are only 27 and 25 percent respectively. Among countries that have data on malnutrition since 2010, Guatemala's rate of chronic malnutrition is only lower than the rates of the Republic of Yemen, Papua New Guinea, Eritrea, and Burundi, two of which are low-income countries.[5] A smaller but still considerable share of children (12.6 percent) is underweight.

Not only is malnutrition high, it has shown little change. The overall change in both indicators of malnutrition in the past six years has been negligible: stunting declined by only 3 percentage points from its 2008–09 level of 50 percent, and levels of underweight children declined from 13.1 percent to 12.6 percent. Even within this small positive change, there are some worrying signs. In the five-month and under age cohort, 30 percent of children are stunted, and by the age of 19–23 months, stunting increases to 54 percent, a pattern that has not changed since 2000. However, stunting among the youngest group has risen from 22 percent since 2008–09.[6] The differences in stunting rates across wealth quintiles are large, ranging from 66 percent in the lowest quintile to 17 percent in the highest, again showing a pattern similar to that of

Figure 5.2: Stunting Rates among Children 3–59 Months, by Ethnicity and Wealth Quintile, 2008 and 2014
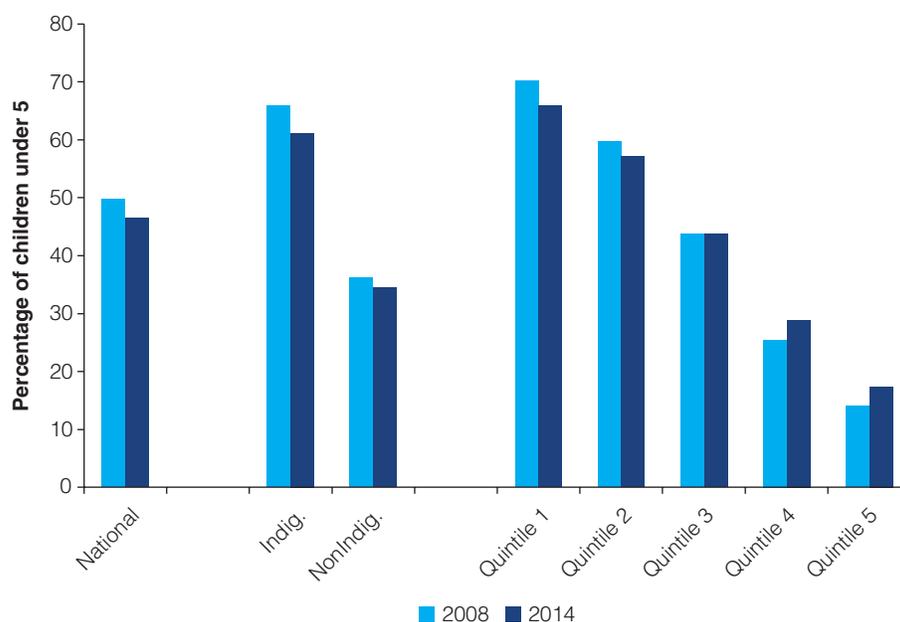
Source: Sanchez, Scott, and Lopez 2016. Based on data from ESMI 2008–09 and 2014–15.

previous years. Of concern is the fact that while the level of stunting among children in the bottom 40 percent has fallen since 2008–09, there has been a small increase for those in the top two quintiles (see box 5.1 for an analysis of aflatoxins on stunting).

Malnutrition rates have actually increased in several departments. In El Progreso and Jalapa, stunting rose by 15 and 9 percent, respectively (figure 5.3). However, the gravity of the malnutrition situation is best illustrated by the fact that even in the department with the lowest levels of stunting (Guatemala), three out of ten children suffer from chronic malnutrition. In absolute terms, the number of children suffering from stunting has gone up 10 percent since 2008, an increase of almost 100,000 children.

Box 5.1: Aflatoxins and Stunting

From an economic perspective, there is a need to break the vicious cycle of under-nutrition and poverty since failing to address them has negative results, including: losses in national GDP of 2–3 percent; reduced physical productivity of the work force (due to short stature); reduced cognitive development; delays in starting school (7 months); losses of schooling (~0.7 grades); reductions in lifetime earnings; overall reduced economic productivity, wages and income; and in women, poor reproductive performance, including smaller babies. Collectively, these factors lead to the inter-generational transmission of under-nutrition and poverty. An increasing concern about the linkages between stunting, nutrition, and access to basic WASH services in Guatemala is the role that aflatoxins play in child's development. A child stunted at three years of age remains stunted at adulthood, even if the child starts to receive good nutrition at any time after three years of age. Perversely, over-feeding undernourished children after the age of two to three years increases the risk of overweight and obesity, but does not result in catch-up growth in height. By contrast, effective nutrition interventions in children before the age of three years have been shown to have long-lasting positive impacts on a series of outcomes. A study in Guatemala, for example, showed that improving early childhood nutrition had large and significant impacts on cognitive development during childhood and later in life, on the level of education achieved, and on economic productivity (~46% higher wages among those who were exposed to the intervention during their first two to three years of life). Importantly, the younger the children were at the time they were first exposed to the intervention, and the longer they were exposed to it during their first two to three years of life, the greater the effects were on the long-term outcomes. The underlying reasons for this improvement appeared to be improved cognition, schooling, and attainment of skilled jobs rather than through improvements in height as previously believed.

Yet, recent evidence shows that aflatoxins in food is common in Guatemala (See Map B5.1.1 and Figure B5.1.1). Consumption of aflatoxin-contaminated food is also associated with lifelong impediments to health and development, including cognitive impairments, susceptibility to disease, and reduced response to vaccinations. Although direct causality and the mechanisms by which mycotoxins cause these outcomes are not fully understood, it is known that they are likely to involve multi-system, multi-organ, and organ-specific effects, and there is accumulating evidence of the role of inflammation and the adverse impact on intestinal integrity as important factors. Environmental (or tropical) enteropathy

box continues next page

Box 5.1: Continued

Map B5.1.1: Aflatoxins and Climate in Guatemala, 2012

- Sample point with high production of crops
- Low prevalence, low humidity
- Low prevalence, dry climate
- High prevalence, low humidity
- High prevalence, high humidity
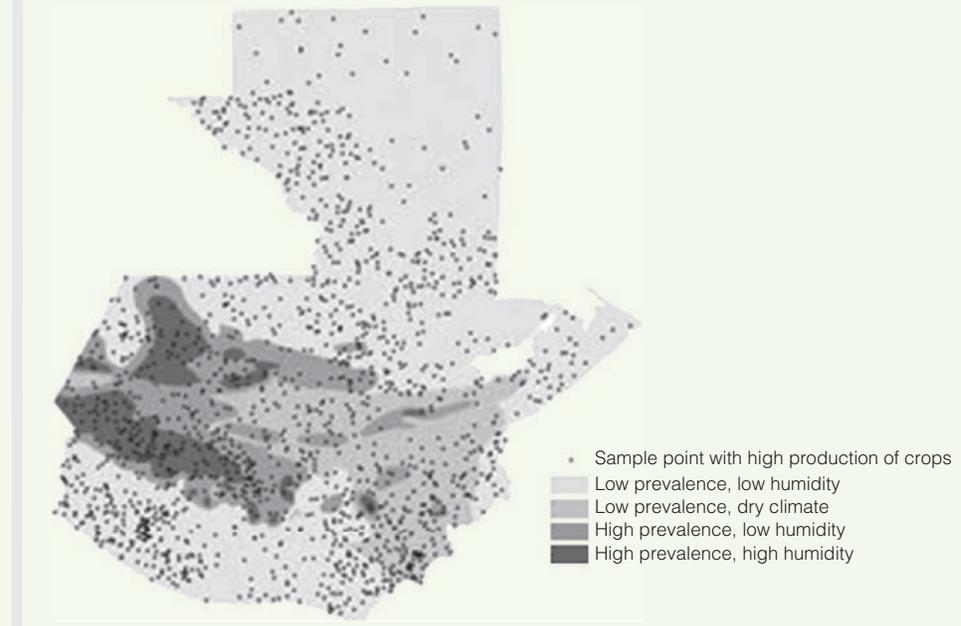
Source: Torres et al. 2015.

is a condition that develops in individuals living in areas with limited access to clean water and sanitation. It has been characterized by changes in the small bowel including bacterial overgrowth, inflammation, villus blunting, decreased surface area, nutrient absorption, and increased permeability, which increases access of bacteria or bacterial products to the circulation, including aflatoxins.

Sources: IFPRI 2012. Aflatoxin: Impact on Stunting in Children and Interventions to Reduce Exposure; Gates Foundation, 2013. Torres et al. 2015.

Figure B5.1.1: Aflatoxins and Climate in Guatemala, by Department, 2012
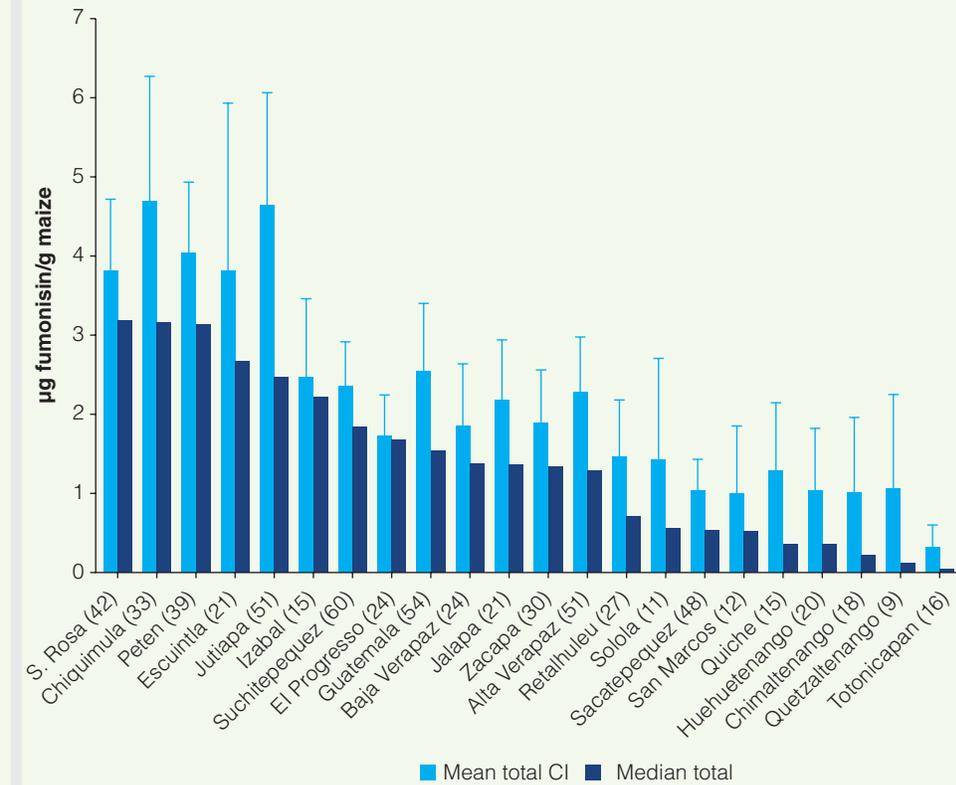
Source: Torres et al. 2015.
Note: CI = confidence interval.

The nutrition gaps across ethnic groups and geography are large although there has been some closing of the gap. Rates of malnutrition remain substantially higher among the indigenous population. Almost two of every three indigenous children suffer from stunting (61.2 percent) compared to one in three among the nonindigenous population (34.5 percent). However, the gap has shrunk slightly: since 2008–09, the decline in malnutrition among indigenous people has been greater than among the nonindigenous group (7 and 4.7 percent respectively). Malnutrition has declined slightly in almost all departments, but differences between departments continue to be large, with a ratio of almost three to one between the departments with the highest and the lowest levels of malnutrition. Izabal stands out with a stunning one-third decline in stunting in just six years, and it is hoped that further analysis will yield insights into how this was achieved and how malnutrition could be reduced nationwide.

Gaps in chronic malnutrition across groups closed, but this was often a result of a worsening situation for the children of the better-off population (figure 5.4). The urban-rural gap closed from 17 percent to 11 percent, mainly due to an increase in malnutrition rates in urban areas. Children living in the top wealth quintile and in households that have more educated heads of

Figure 5.3: Stunting Rates among Children Ages of 3–59 Months, by Department, 2008 and 2014
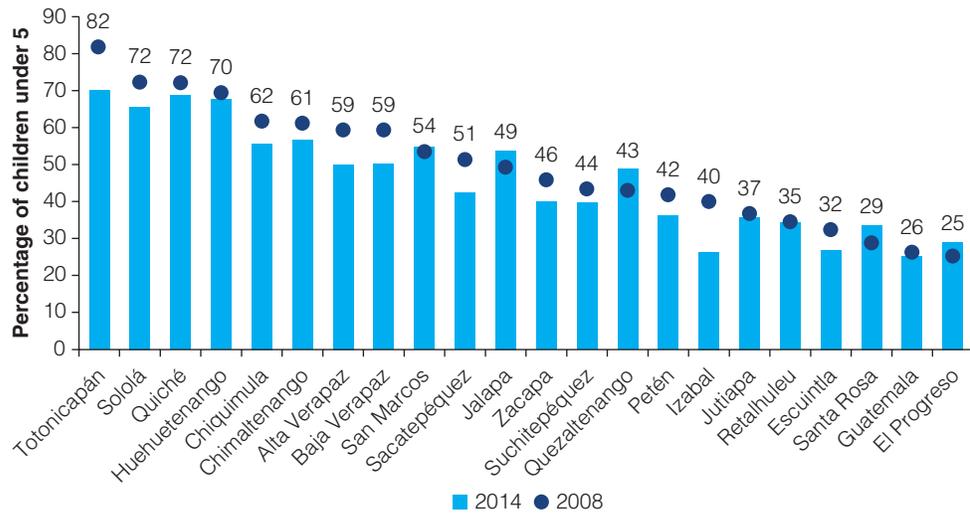
Source: Sanchez, Scott, and Lopez 2016. Based on data from ESMI 2008–09 and 2014–15.

Figure 5.4: Stunting Rates among Children Younger than 24 Months, by Subpopulation Groups, 2008–09 and 2014–15
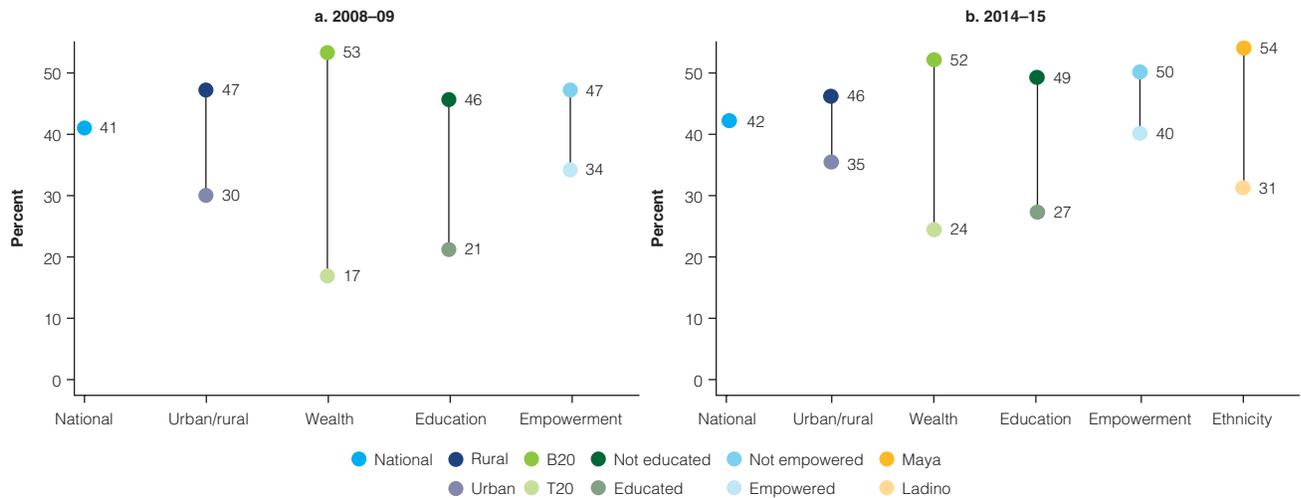
Source: Scott and Vinha, forthcoming.
Note: B20 = bottom 20 percent of the population; T20 = top 20 percent of the population.

households also saw an increase in malnutrition. Women's empowerment is linked, however, to lower malnutrition rates, whereas children of women with restricted decision-making ability had the highest rates of stunting.

Despite little progress in reducing chronic malnutrition, between 2009 and 2015, there was an improvement in children's access to factors that affect malnutrition. As laid out in the UNICEF framework on nutrition, a variety of factors affect malnutrition levels, including

WASH, food security, dietary diversity and care, and health care. An assessment of these dimensions, their impact on malnutrition, and the extent to which they have changed over time shows significant progress, although this has not translated into particularly better outcomes (Scott and Vinha, forthcoming). Looking at the three domains of adequacy that were constructed—food and child care, water and sanitation, and health care—shows a large improvement (figure 5.5).[7] In 2008–09, the greatest share of children had adequate levels of only one of the three dimensions. By 2014–15, the largest group of children had two dimensions in which levels were adequate.

The relationship of each of the three dimensions on malnutrition is positive (figure 5.6). Health care access appears to be the driving force, with higher coefficients than with food and care or with water and sanitation access.[8] This has changed since 2008–09, a period when the impact of the three dimensions was much more similar. Importantly, the combination of having adequate health care and adequate water and sanitation is associated with the largest change in the height-for-age z-score (chronic malnutrition). The importance of this combination is the same in both time periods.

Figure 5.5: Number of Dimensions with Adequate Levels of Nutrition in Percentage of Children Younger than 24 Months, 2008–09 and 2014–15
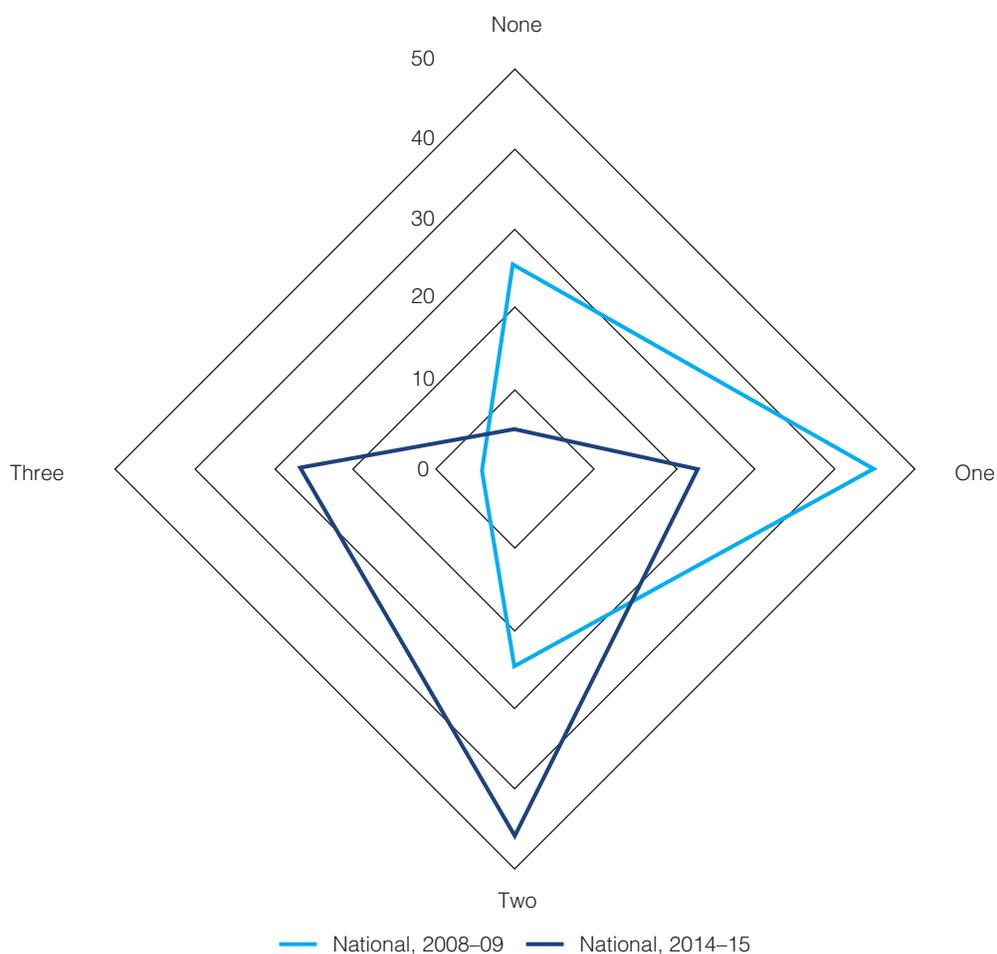
Source: Scott and Vinja, forthcoming.
Note: The three domains are food and care, water and sanitation, and health care in children younger than 24 months,.

Figure 5.6: Difference in Height-for-Age Z-Score for Children Younger than 24 Months, 2014
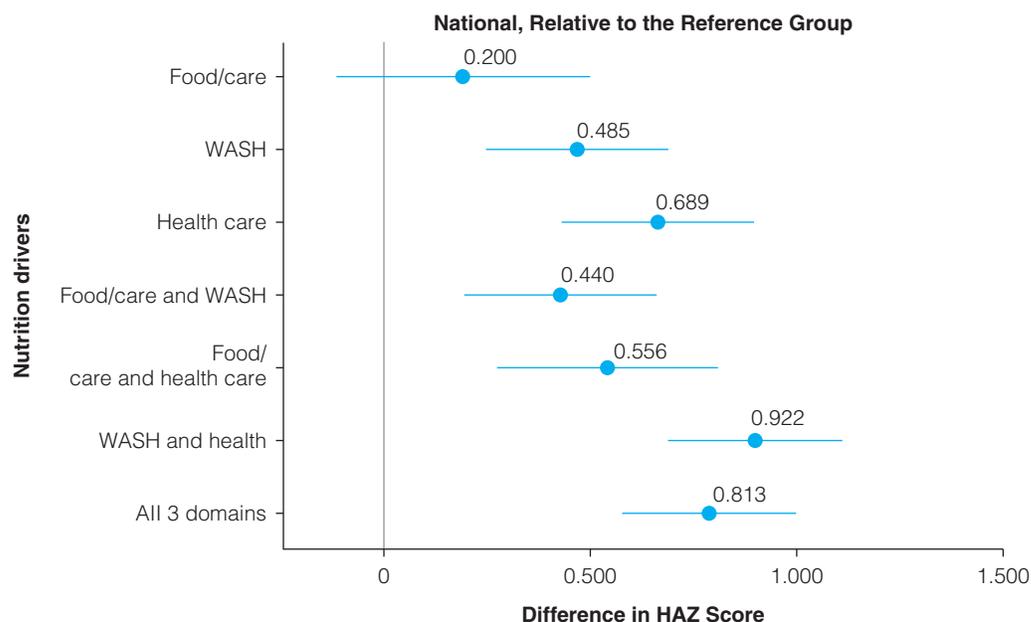
National, Relative to the Reference Group

Source: Scott and Vinja, forthcoming.
Note: The three domains are: food and care, water and sanitation, and health care. WASH = water supply, sanitation, and hygiene.

The effect of water supply and sanitation on malnutrition varies across children in different types of households (table 5.1). In rural areas and among the bottom 40 percent of the population, food security, dietary diversity, and breastfeeding practices are associated with significant decreases in malnutrition. In contrast, only water and health are important for the other household types examined here. In urban areas and for children whose mothers have more than seven years of education, none of the three dimensions are associated with lower malnutrition, suggesting that other household and location characteristics can mitigate the effect of inadequate access to quality water and sanitation.

Access to Water Supply and Sanitation on Health

Current estimates of water supply and sanitation quality show that only 15 percent of water supplies are disinfected and less than 5 percent of wastewater is treated before being released (Lentini 2010). However, water quality data for Guatemala are scarce and of limited reliability. Drinking water quality is governed by a series of regulations, primarily the law mandate "COGUANOR 29001-99 Rev. 1," which establishes permissible limits for physiochemical and bacteriological parameters in addition to providing standard methodologies for the evaluation of the latter. This regulation draws upon guidance developed by the American Public Health Association (APHA), the American Water Works Association (AWWA) and the World Health Organization (WHO). As the regulatory agency responsible for ensuring compliance with national drinking water quality standards, the Ministry of Health and Social Services (MSPAS) in 2013 issued technical specifications for the routine monitoring and control of all water quality parameters.[9] In particular, residual chlorine must be between 0.5 mg/L and 1 mg/L and must be monitored at a frequency of once per day for urban systems and once per week for rural systems.

Water quality tests highlight the serious risks to human health resulting from poor water quality. Approximately one-fifth of all drinking water systems registered in the national drinking water database (SIVIAGUA) were monitored from January to August 2016 for residual chlorine.[10]

Table 5.1: Access to Nutrition Determinants and Height-for-Age Z-Score, 2014–15

	National	Rural	Urban	Maya	Ladino	B40	Mother <7 years of education	Mother 7+ years of education
F/C	0.200	0.296*	-0.709	0.203	0.225	0.282*	0.260	–0.475
	(0.159)	(0.166)	(0.443)	(0.202)	(0.212)	(0.160)	(0.166)	(0.334)
W/S	0.485***	0.496***	0.237	0.360**	0.653***	0.447***	0.490***	–0.355
	(0.115)	(0.120)	(0.428)	(0.148)	(0.167)	(0.120)	(0.118)	(0.290)
H	0.689***	0.732***	0.333	0.500***	0.717***	0.650***	0.631***	0.068
	(0.125)	(0.138)	(0.417)	(0.174)	(0.178)	(0.126)	(0.132)	(0.320)
F/C & W/S	0.440***	0.524***	-0.072	0.408***	0.631***	0.494***	0.470***	–0.441
	(0.118)	(0.125)	(0.407)	(0.151)	(0.178)	(0.124)	(0.124)	(0.304)
F/C & H	0.556***	0.635***	0.026	0.323	0.755***	0.583***	0.601***	–0.366
	(0.139)	(0.147)	(0.464)	(0.210)	(0.194)	(0.151)	(0.147)	(0.333)
W/S & H	0.922***	0.891***	0.626	0.496***	1.019***	0.658***	0.715***	0.080
	(0.110)	(0.121)	(0.416)	(0.154)	(0.156)	(0.118)	(0.118)	(0.279)
All 3	0.813***	0.778***	0.540	0.625***	0.917***	0.760***	0.759***	–0.136
	(0.111)	(0.116)	(0.420)	(0.144)	(0.158)	(0.125)	(0.116)	(0.281)
Constant	-2.425***	-2.479***	-2.039***	-2.507***	-2.323***	-2.481***	-2.500***	–1.286***
	(0.101)	(0.102)	(0.411)	(0.131)	(0.146)	(0.098)	(0.100)	(0.272)
Observations	4,410	2,948	1,462	1,871	2,472	2,406	3,037	1,373
R^2	0.046	0.039	0.041	0.020	0.038	0.030	0.029	0.024

Source: Scott and Vinha, forthcoming.
Note: The three nutrition determinants are food and care (F/C), water supply and sanitation (W/S), and health care (H). B40 = bottom 40 percent of the population.
*p = .10; ** p = .05; *** p = .01.

Based on the reported tests, 54 percent of water systems were classified as having an imminent and serious risk to human health, requiring immediate corrective action, 16 percent were classified as unsatisfactory, three percent were classified as fair, and 27 percent were classified as excellent. However, the frequency criteria were not taken into consideration. Carrying out a more detailed analysis reveals that only 85 of 943 urban water systems, and 269 of 1,309 rural water systems, satisfied the monitoring requirements for frequency, and the reported results need to be reclassified (table 5.2). [11] Water quality classifications are commonly based on a rolling average, and thus the significance of regular monitoring cannot be overstated. However, it is impossible to assess whether failing to meet the monitoring requirements reflects a failure to chlorinate or a failure to report results, or both. Particularly noteworthy is that rural water systems were monitored at twice the frequency of urban water systems. Ultimately, however, it is abundantly clear that disinfection rates in Guatemala are exceptionally low.

In Guatemala, the proportion of the population treating drinking water at the household level has increased significantly.[12] Whether it is due to a lack of treatment centrally or a lack of confidence in such treatments, between 2000 and 2014, rates of household-level treatment rose from 62 percent to 81 percent (figure 5.7). Boiling water is the most prevalent form of household-level water treatment at 42 percent, while 12 percent practice chlorination and 3 percent use filtration. Approximately one quarter of the population practices other forms of water treatment.

Both the levels of household treatment and the dominant type of treatment vary geographically. Urban households prefer other treatment methods (39 percent), followed by boiling (31 percent), chlorination (11 percent) and filtration (4 percent), while 15 percent of households do not practice any form of treatment (figure 5.8). In rural areas, boiling is twice as prevalent as any other method (53 percent). High rates of boiling are not surprising given the vast number of people living in rural areas for whom boiling has long been a way of life. Interestingly, chlorination is used slightly more frequently in rural areas than urban ones. Almost one quarter of all rural households do not practice any form of treatment.

The quantity of water matters as much as water quality. Given the established links between the transmission of fecal-oral diseases and contaminated water, efforts to reduce the incidence of diarrheal disease have historically focused on improved drinking water quality. However, fecal-oral diseases are both waterborne and water-washed, and thus their elimination also relies on water availability. Evidence suggests that access to a more convenient water supply can have significant benefits. Specifically, Cairncross and Valdmanis (2006) reported that water supplies are more likely to have an effect on diarrheal disease when they lead to

Table 5.2: Monitoring for Residual Chlorine in Supply Systems, January to August 2016

Classification	Description	Number		% Total	
		Urban	Rural	Urban	Rural
Excellent	Drinking water samples apt for human consumption ≥ 95%	27	58	1.2	2.5
Fair	90% ≤ drinking water samples apt for human consumption < 95%	23	89	1.0	3.9
Unsatisfactory	60% ≤ drinking water samples apt for human consumption < 90%	2	21	0.1	0.9
Serious Risk	Drinking water samples apt for human consumption < 60%	33	101	1.4	4.4
		85	269	3.7	11.7

Source: Adapted from MSPAS-Guatemala 2016.

Figure 5.7: Rates of Household-Level Water Treatment, by Type, 2000 and 2014

a. 2000

Boiling ■ Filtration ■ Chlorination
Other ■ No treatment

Source: ENCOVI 2000.

b. 2014

Boiling ■ Filtration ■ Chlorination
Other ■ No treatment
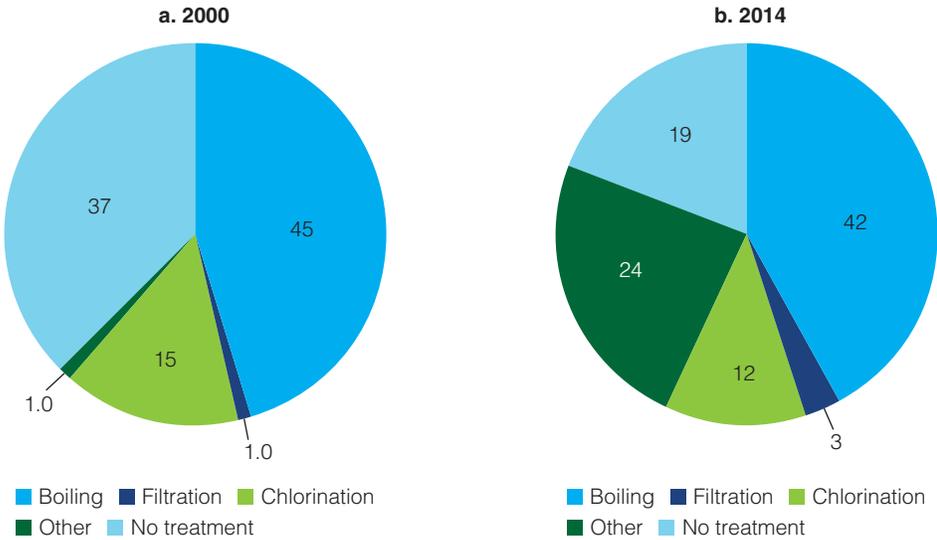
Source: ENCOVI 2014.

Figure 5.8: Household-Level Water Treatment, by Geographic Area, 2014

Boiling ■ Filtration ■ Chlorination ■ Other ■ No treatment
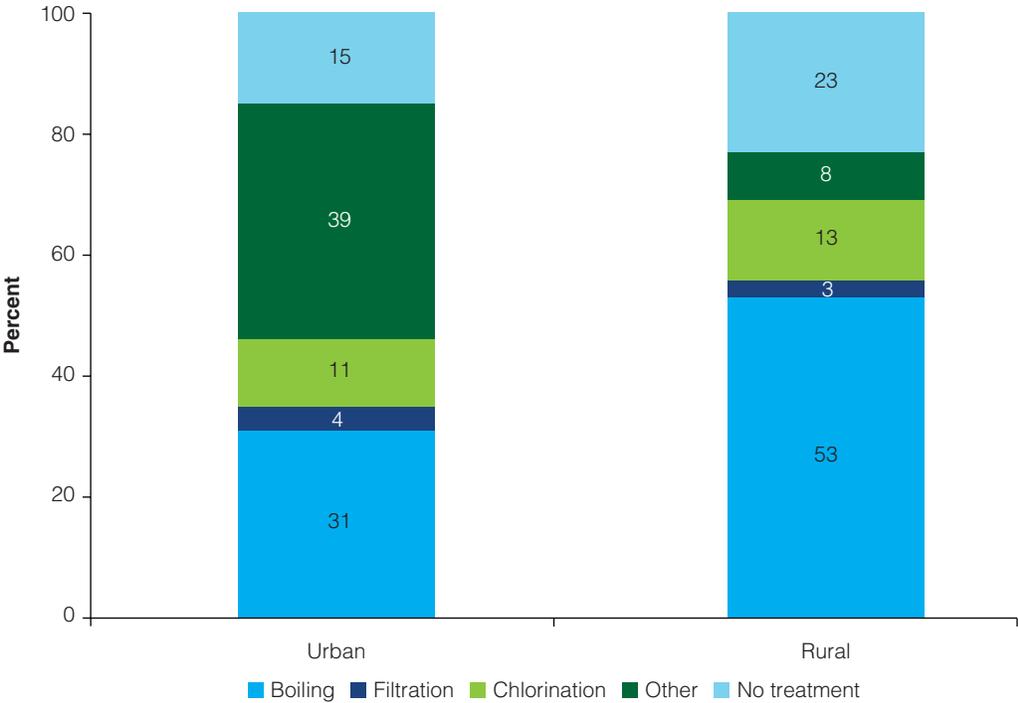
Source: ENCOVI 2014.

behavior change, independent of water quality, for example, replacing water sources that are more than 30 minutes away with household connections. Thus, positive impacts on health are more likely to be experienced in cases where less time is spent accessing water (Cairncross and Valdmanis 2006). Furthermore, hygiene promotion, specifically hand washing, also significantly reduces the incidence of diarrheal disease and has been associated with a reduction in respiratory illnesses (Rabie and Curtis 2006)[13]. Carincross and Valdmanis suggest these effects are independent and not additive. Therefore, given that water availability is a prerequisite for hand washing, it would stand to reason that water availability would have the greatest reduction on diarrheal disease (table 5.3) and potentially respiratory illnesses.

These findings are particularly relevant in Guatemala where one quarter of all people lack access to a water supply at home. On average, in 2014 the distance to the nearest water supply was 180 m requiring approximately 30 minutes per round trip. The vast majority, 95 percent, are conducted on foot. These figures can be predominantly attributed to rural households that are at a comparative disadvantage relative to their urban counterparts in terms of water-carrying activities. Not only are they less likely to have a household water connection and thus are more likely to carry water, they also have farther to travel (figure 5.9).

Levels of diarrhea and respiratory infections in children are high. Nationally, 20 percent of all people surveyed in 2014 reported having a child at home who experienced diarrhea in the month preceding the survey and 33 percent reported having a child suffering a respiratory infection (figure 5.10). Although there is some variation between groups—incidence of diarrheal disease is lower in urban areas and among nonpoor and nonindigenous groups—the differences are small. This indicates, somewhat surprisingly, that childhood disease does not discriminate appreciably by geographic area, poverty status, or ethnicity.

There is evidence of a relationship between the incidence of childhood disease and distance to water supply in Guatemala. One would expect disease rates to increase as the distance to a water supply increases, given that convenient access to water has been shown to impact health. Some evidence of this relationship exists at the departmental level. In many cases, the decline in the incidence of disease appears to have paralleled the decrease in distance to water supplies (figures 5.11 and 5.12). This may reflect a greater awareness of the link between hand washing and childhood health. Finally, if the determining factor in reduced diarrheal disease and respiratory infections is access to a more convenient water supply, sanitation, and hygiene, but not water quality, we would not expect to see a relationship between childhood disease and water treatment, and indeed, that appears to be the case (figures 5.13 and 5.14).

The reduction in diarrheal disease attributable to sanitation is less than for household water connections (table 5.3). Nevertheless, the relationship is straightforward and we would expect to see evidence of it when comparing a lack of improved sanitation to both variables of childhood health. However, although there appears to be a slight relationship between diarrheal disease and lack of improved sanitation, the relationship with respiratory infection is not evident (figures 5.15 and 5.16).

Table 5.3: Estimated Reductions in Diarrheal Disease by Intervention

Intervention	Reduction in diarrhea	Corresponding relative risk
Water supply		
Public source	17	1.20
Additional, for house connection	63	2.70
Excreta disposal	36	1.56
Hygiene promotion	48	1.92

Source: Reproduced from Cairncross and Valdmanis 2006.

Figure 5.9: Lack of Water on Premises and Distance to Water Supply, by Geographic Area, 2014

Legend:
■ Percentage of households with water on premises — Distance to water supply in meters
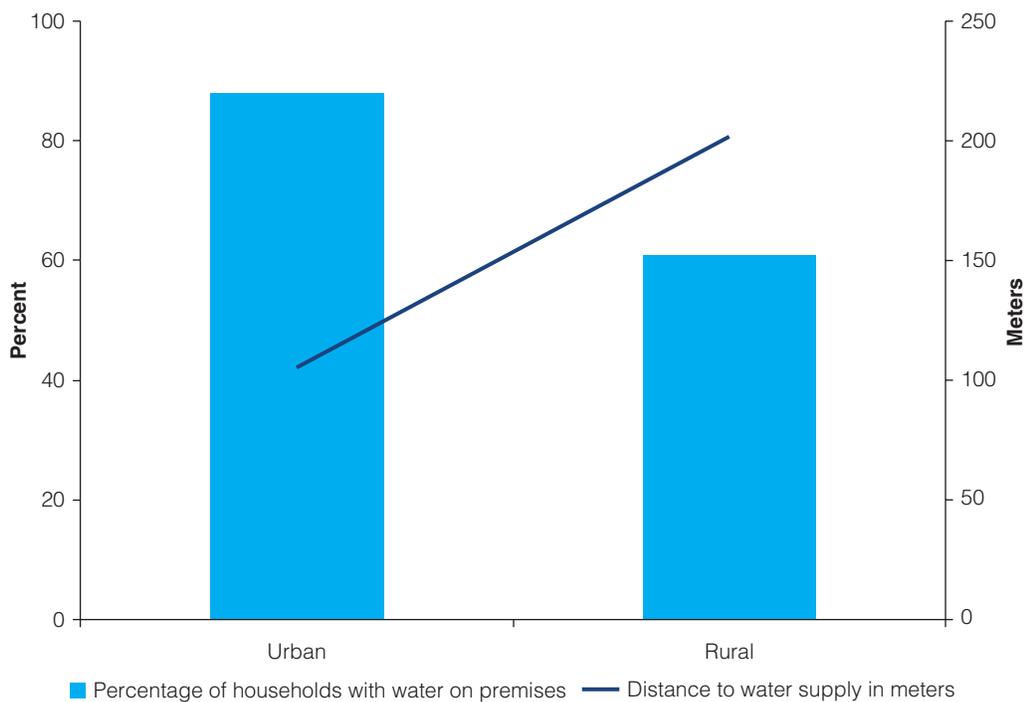
Source: ENCOVI 2014.

Figure 5.10: Incidence of Diarrheal Disease and Respiratory Infection, by Geographic Area and Socioeconomic Group, 2000 and 2014

Legend:
■ Urban ■ Rural ■ Nonpoor ■ Poor ■ Extreme poor ■ B40 ■ Indigenous ■ Nonindigenous
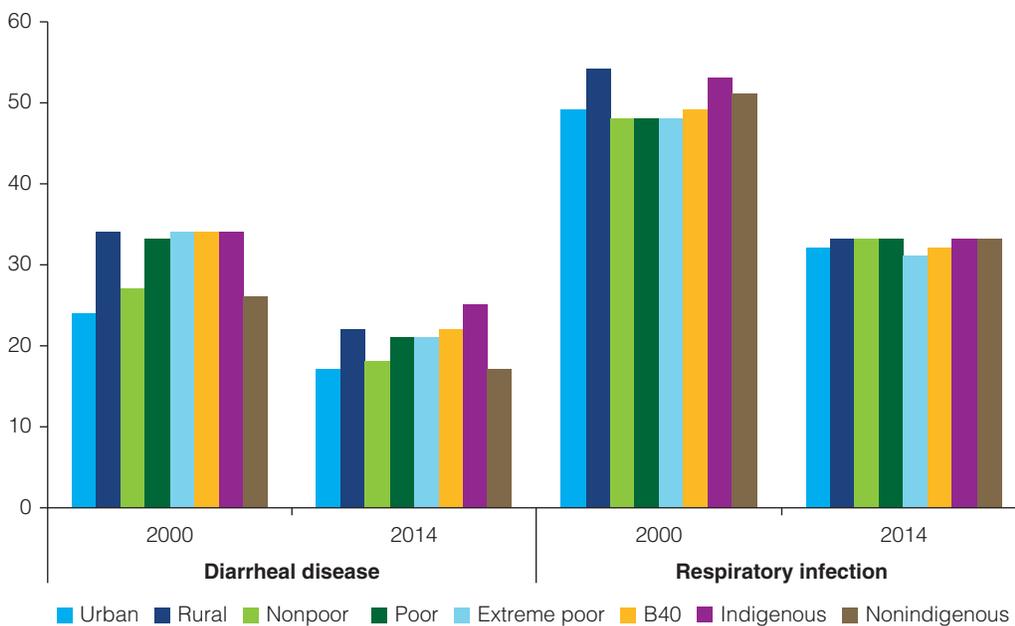
Source: ENCOVI 2000 and 2014.
Note: B40 = bottom 40 percent of the population.

Figure 5.11: Relationship between Incidence of Diarrheal Disease and Distance to a Water Supply, by Department
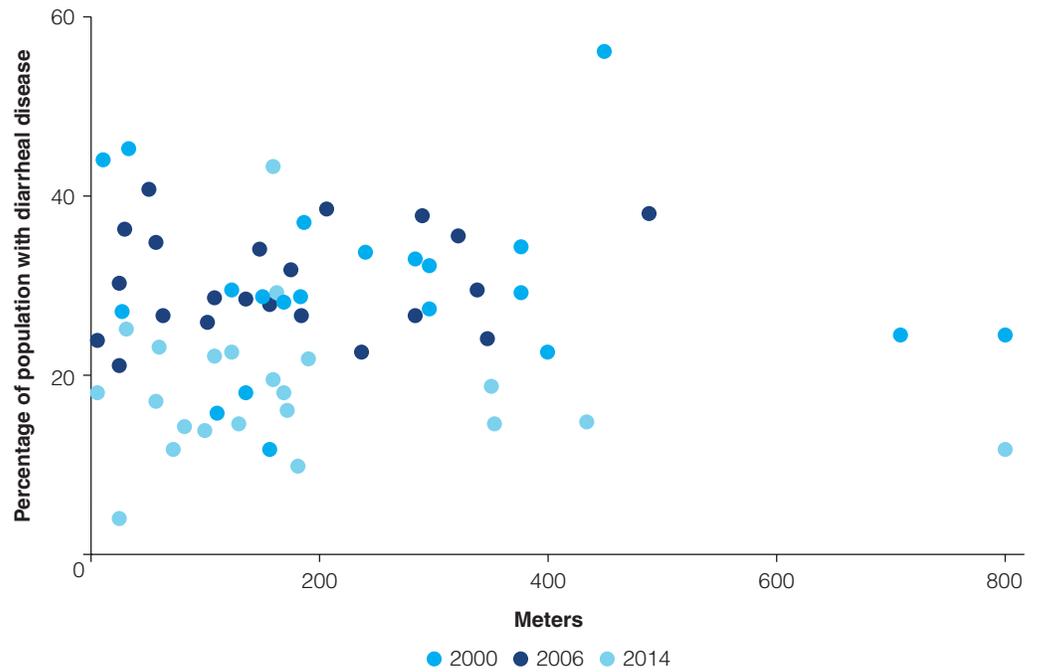
Source: Calculations ENCOVI 2000 and 2014.

Figure 5.12: Relationship between Respiratory Infection and Distance to a Water Supply, by Department, 2014

Source: Calculations ENCOVI 2000 and 2014.

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Figure 5.13: Relationship between Diarrheal Disease and Lack of Water Treatment
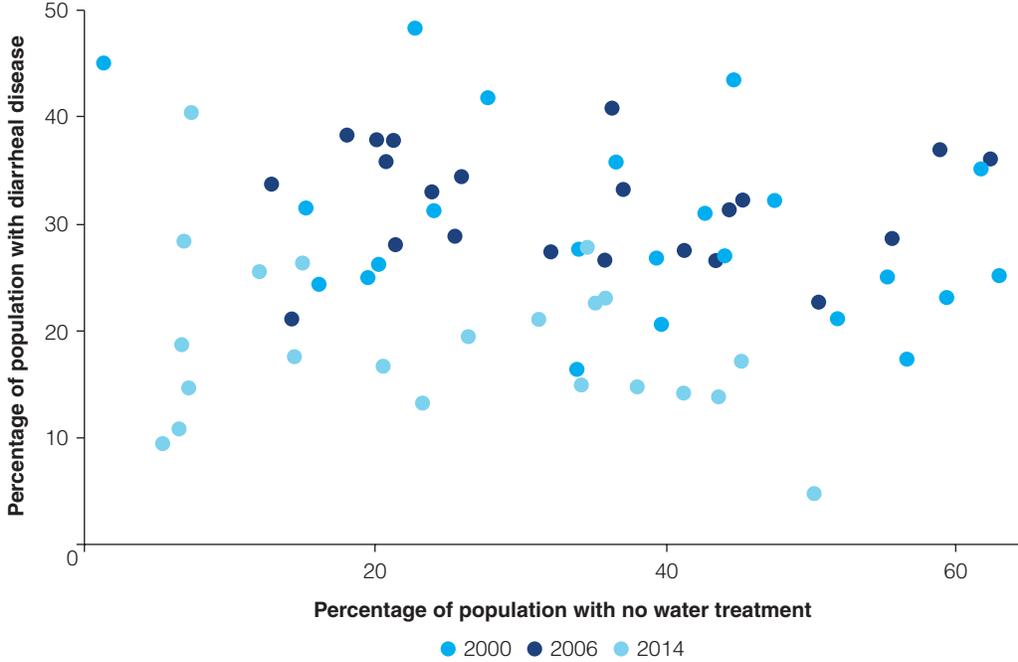
Source: Calculations ENCOVI 2000, 2006, 2014.

Figure 5.14: Relationship between Respiratory Infection and Lack of Water Treatment
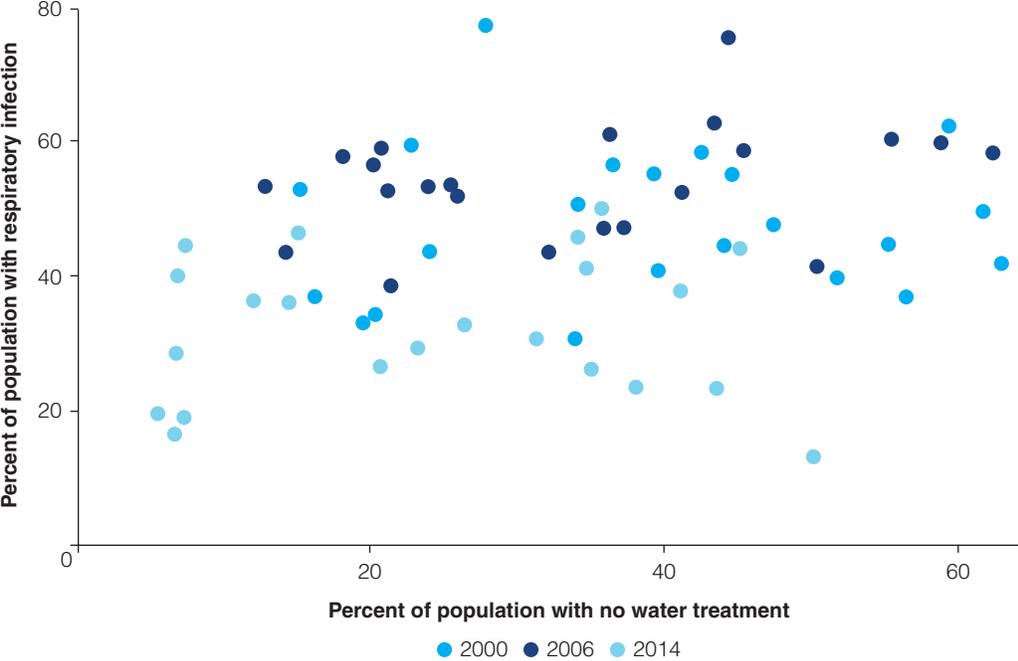
Source: Calculations ENCOVI 2000, 2006, 2014.

Figure 5.15: Relationship between Diarrheal Disease and Lack of Improved Sanitation

Percentage of population with diarrheal disease (y-axis)

Percentage of population with improved sanitation (x-axis)
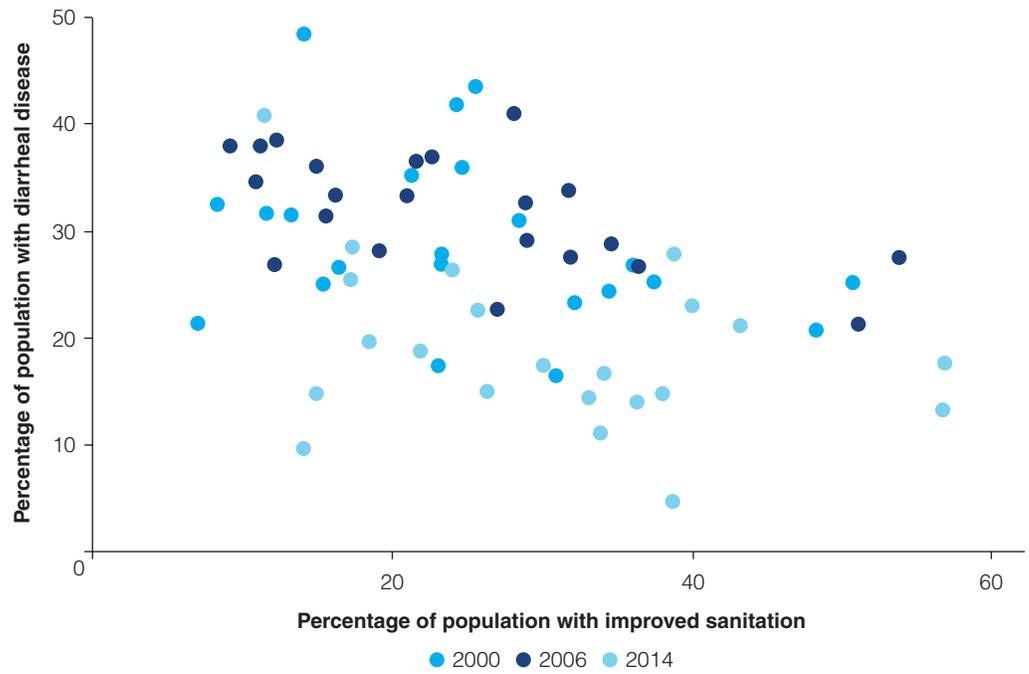
● 2000 ● 2006 ● 2014

Source: Calculations ENCOVI 2000, 2006, 2014.

Figure 5.16: Relationship between Respiratory Infection and Lack of Improved Sanitation

Percentage of population with respiratory infection (y-axis)

Percentage of population with improved sanitation (x-axis)
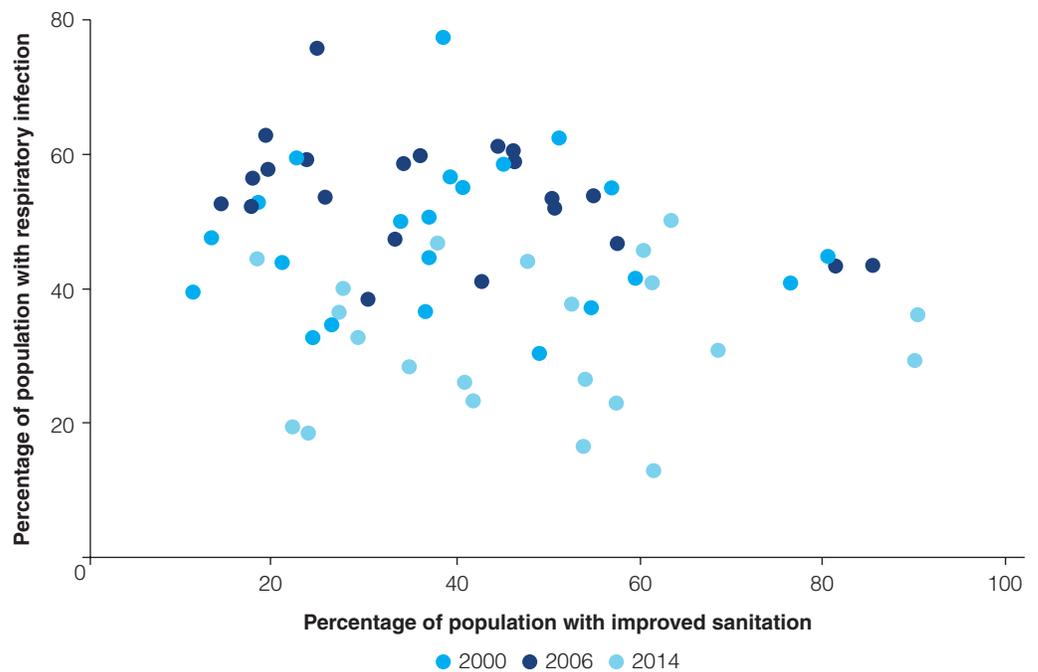
● 2000 ● 2006 ● 2014

Source: Calculations ENCOVI 2000, 2006, 2014.

Access to Water Supply and Sanitation as Predictors of Childhood Health

Incidence of diarrheal disease and respiratory infection in children is linked to a household's source of drinking water supply and type of sanitation. A linear regression (Loughnan et al. 2016) was performed to assess the predictability of drinking water source and type of sanitation on childhood disease. Water from a truck or barrel, water piped to a neighbor/public supply, and pour flush/composting toilets were found to be significant ($p<0.1$) predictors of diarrheal disease and to increase the likelihood of childhood diarrhea by 9.6 percentage points, 13.5 percentage points and 4.8 percentage points respectively. Rainwater, water from a truck or barrel, and pour flush/composting toilets were found to be significant ($p<0.1$) predictors of respiratory infection and increase the likelihood of childhood respiratory infections by 10.9 percentage points, 18.9 percentage points and 9.7 percentage points respectively. These findings are in keeping with expectations. However, lack of water treatment also surprisingly predicted an increase in respiratory infection of 3.4 percentage points.

One conclusion emerging from regression analysis on child anthropometric outcomes is that access to improved water has positive (yet not statistically significant) effects. The statistical significance was predominantly influenced by the small samples of child anthropometric information available in the surveys used. Whether one looks at the entire sample or at specific categories of the population, having access to an improved water source appears relevant in explaining shifts in child's health outcomes.

On the other hand, improved sanitation appears to be a rather strong predictor of child nutritional outcomes. In particular, the lack of access to improved sanitation increases the likelihood that a child is stunted by 5 to almost 10 percentage points, depending on the subsample considered, with the effect being strongest for children in the bottom 40 percent of the national wealth distribution. When the underweight factor is considered, the marginal effect of unimproved sanitation is more modest, about 5 percentage points, but is still statistically significant, regardless of the sample considered, whereas sanitation does not seem to be a significant determinant of wasting. It is interesting to notice that the effect of the lack of access to improved sanitation seems to be almost entirely driven by open defecation, rather than by other types of unimproved sanitation facilities.

In general, the effect of unimproved sanitation and open defecation seems to be consistently concentrated in rural areas and among households in the bottom 40 percent. With reference to gender lines, boys suffer from the lack of improved sanitation in terms of reduced height (which decreases by almost 0.5 cm on average) while girls have an increased likelihood of being underweight (which lacking improved sanitation raises the likelihood by approximately 5 percentage points). When it comes to age groups, older children (aged 25–59 months) are the most affected for stunting (whose likelihood increases by 7 percentage points), whereas infants (0–24 months) are 4 percentage points more likely to be underweight when lacking appropriate sanitation facilities.

In terms of time required to collect water, data were either lacking or too similar to be successfully evaluated through regression analysis. Health benefits from access to an improved drinking water supply are believed to be most beneficial when time to the source is greater than 30 minutes. In Guatemala, time to source in most cases is less than 30 minutes, and thus additional health benefits would not likely be experienced through just reducing time spent collecting water.

Access to Hygiene and Health

The Demographic & Health Surveys (DHS) 2014 survey, published after the bulk of the analyses covered herein were concluded, included critical information for Guatemala's SDG baseline, specifically, access to a place of handwashing with soap and water present. Nationally, 85 percent of the population met the SDG criteria for hygiene; however, only 48 percent of the population in the least wealthy quintile met the criteria. Lack of an appropriate place of handwashing is a severe obstacle to breaking the fecal-oral disease transmission chain and also exacerbates gender inequities in WASH. The proportion of the population that lacks an appropriate place of handwashing likely faces additional obstacles to personal hygiene (Loughnan et al. 2016). Specifically, based on the data presented in table 4.2, we can surmise that any menstruating women among the 12 percent of the extremely poor who open defecate are likely to struggle to find safe and convenient facilities as often as necessary to change and dispose of menstrual hygiene-management materials with privacy and dignity.

With regard to hygiene practices, unsafe disposal of child stools is negatively correlated with both child height and weight, but only seems to affect stunting among the three nutritional outcomes considered. In terms of subgroup analysis, the effect of unsafe hygiene practices seems to be mainly felt by older children, girls, and in households belonging to the top 60 percent of the national wealth distribution. This latter finding might come across as surprising, but is probably to be interpreted in keeping with the high extent of poverty of Guatemalan families documented elsewhere in this report. The result means that, in the top 60 percent group, children in households that do not have safe behaviors in terms of hygiene are particularly prone to having poor nutritional outcomes. This result, in turn, is likely to be due to the fact that households in the top 60 group with poor WASH practices are those located in the middle of the income distribution, and who (as mentioned before) happen to be significantly poorer than the top income quintiles in Guatemala—and therefore probably also more likely to have malnourished children.

Notes

1. The country is divided into eight large regions, each comprised of several departments.
2. The discussion on health services is taken from Sanchez, Scott, and Lopez (2016).
3. This section on changes and levels of malnutrition is taken from Sanchez, Scott, and Lopez (2016).
4. These figures are from the latest round of the Demographic and Health Survey (*Encuesta Nacional de Salud Materna-Infantil*, or ENSMI) carried out in 2014–15 (MSPAS et al. 2015).
5. Data on malnutrition from the World Development Indicators (WDI).
6. Marini and Gragnolati (2003) analyzed data from the 2000 ENCOVI and found that stunting rates grow with age. This is being confirmed by ongoing work (by Scott and Vinja) using data from the 2008–09 and 2014–15 ESMI.
7. Food and care were combined since the only available measures of childcare were those related to breast-feeding: separating this from the food variables was deemed not to be feasible.
8. See Scott and Vinja (forthcoming) for the full regression results.
9. AM 523–2013.
10. Data provided from MSPAS.
11. Fifty-six water systems were classified since both rural and urban systems were excluded from our analysis.
12. These numbers should be treated with caution. Households may misreport water treatment behavior due to a lack of understanding of questions, answering inappropriately, or based on a desire for additional services. Nevertheless, in the absence of official data they provide some insight into water quality at the household scale.

13. The purpose of this study was to conduct a systematic review of the effects of hand washing on respiratory infections. Several authoritative agencies, such as the Centers for Disease Control (CDC) and UNICEF, routinely cite reductions in respiratory infections related to hand washing of 16 percent to 23 percent, as reported in this study. However, by the authors' own admission, the studies that were evaluated were of a poor quality, and importantly for this report, were not related to developing countries. Nevertheless, hand washing was found to be associated with a reduction in respiratory illnesses, a general finding that is accepted as common knowledge.

References

Cairncross, S., and V. Valdmanis. 2006. "Water Supply, Sanitation, and Hygiene Promotion." In *Disease Control Priorities in Developing Countries* edited by D. T. Jamison, J. G. Breman, and A. R. Measham, 2nd edition, chapter 41. Washington, DC: The International Bank for Reconstruction and Development /World Bank: Available from: https://www.ncbi.nlm.nih.gov/books/NBK11755/. Co-published by Oxford University Press, New York.

ECLAC (United Nations Economic Commission for Latin America and the Caribbean). 2014. "Los Pueblos Indígenas en América Latina: Avances en el Último Decenio y Retos Pendientes para la Garantía de sus Derechos." ECLAC, Transpose with "ECLAC."

ENCOVI. 2000. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2000. Guatemala.

———. 2006. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2006. Guatemala.

———. 2014. Instituto Nacional de Estadistica. Encuesta Nacional de Condiciones de Vida 2014. Guatemala.

IFPRI (International Food Policy Research Institute); and Enteric and Diarrheal Diseases, Agriculture and Nutrition teams at the Bill & Melinda Gates Foundation. "Aflatoxin: Impact on Stunting in Children and Interventions to Reduce Exposure." 2012. Aflatoxin and Stunting Meeting, Washington, DC, February 1–2.

Lentini, E. 2010. "Servicios de Agua potable y Saneamiento en Guatemala: Beneficios Potenciales y Determinantes de Éxito." Comisión Económica para América Latina y el Caribe (CEPAL), Santiago de Chile.

Loughnan, L., R. Bain, R. Rop, M. Sommer, and T. Slaymaker. 2016. "What Can Existing Data on Water and Sanitation Tell Us about Menstrual Hygiene Management?" *Waterlines* 35 (3). http://www.developmentbookshelf.com/doi/full/10.3362/1756-3488.2016.019.

MSPAS. Encuesta Nacional de Salud Materno Infantil 2008 (ENSMI-2008/09). Ministerio de Salud Pública y Asistencia Social (MSPAS)/Instituto Nacional de Estadística (INE)/Centros de Control y Prevención de Enfermedades (CDC). Guatemala (2010).

Ministerio de Salud Pública y Asistencia Social (MSPAS), Instituto Nacional de Estadística (INE), ICF Internacional. 2015. *Encuesta Nacional de Salud Materno Infantil 2014–2015*. Ciudad de Guatemala, MSPAS.

Rabie, T., and V. Curtis. 2006. "Handwashing and Risk of Respiratory Infections: A Quantitative Systematic Review." *Tropical Medicine & International Health* 11: 258–67. doi:10.1111/j.1365-3156.2006.01568.x.

Sanchez, Susana M., Kinnon Scott, and J. Humberto Lopez. 2016. "Guatemala: Closing Gaps to Generate More Inclusive Growth." Systematic Country Diagnostic. Washington, DC: World Bank.

Scott, K., and Vinja, K. 2018. "Health Estimates for Guatemala." Forthcoming. World Bank, Washington, DC.

United Nations. 2015. *World Population Prospects. Key Findings and Advance Tables*. New York: United Nations.

Torres, Olga, J. Matute, J. Waes, Joyce Maddox, Simon Gregory, Allison Ashley-Koch, Jency Showker, K. A. Voss, R. T. Riley. 2015. "Human Health Implications from Co-Exposure to Aflatoxins and Fumonisins in Maize-Based Foods in Latin America: Guatemala as a Case Study." *World Mycotoxin Journal* 8 (2): 143–V59.

World Bank. 2015. "Guatemala Health System Functional Review." Health, Nutrition and Population Global Practice, Latin America and the Caribbean Region. World Bank, Washington, DC.

Chapter 6
Governance and Institutional Framework for Service Delivery in Guatemala

This section examines the service delivery constraints and potential solutions to improving WASH services to the poor and to the bottom 40 percent. Through an examination of the institutional and organizational arrangements for service provision, this section attempts to address why particular patterns persist, and what might be done to improve underlying institutional and administrative constraints to service delivery. This analysis was largely based on a desk review of available information. To complement the desk review, interviews were conducted with stakeholders in the central government and nongovernmental organizations (NGO) and relevant actors were consulted in two municipalities and two rural communities. In addition, main conclusions were discussed and confirmed during a workshop with sector experts in Guatemala. The analysis was constrained by the limited availability of secondary source information on the governance and political economy aspects of water supply and sanitation in Guatemala. Many of the problems identified here require additional research to confirm findings and explore possible solutions. Given these constraints and the Bank's recent limited engagement in the WASH sector in Guatemala, the analysis identifies problems affecting the WASH sector as a whole, and where possible, hones in on rural services. As noted before, Guatemala is predominantly rural, and gaps in coverage are more pronounced in rural areas, justifying the focus where possible on service delivery to rural areas.

The remainder of this section provides an overview of the governance and institutional architecture for WASH services and summarizes the findings of the analysis. The analysis applies three "lenses" to explore the ways in which political realities shape service delivery outcomes. Each lens focuses on three systemic concerns: (a) oversight and accountability, (b) intergovernmental arrangements, and (c) capacity. Finally, interventions are suggested to address some of the underlying issues identified. Given the complexity of the service delivery challenges at hand and the limited information available, the conclusions are preliminary and are intended to spark further reflection and analysis among Bank staff and other key stakeholders.

Governance and Institutional Structure

Reflecting the legacy of the civil war and recent political instability, Guatemala continues to face significant challenges with the quality of its institutions. According to the Worldwide Governance Indicators (WGI), Guatemala scores in the lowest quartile globally in three of six indicators (government effectiveness, rule of law, and political stability) with the rule of law indicator scoring in the lowest decile (figure 6.1, panel a). In all indicators, Guatemala is below the global median; only in the regulatory quality indicator does the country approach the Latin America and the Caribbean median (scoring in the 48th percentile). In terms of control of corruption, and voice and accountability, Guatemala is in the bottom third of the rankings. Moreover, the country has made no significant improvement in any of the six dimensions of governance in the past 20 years. The public institutions pillar of the World Economic Forum's (WEF) Global Competitive Index also show the weakness of Guatemala's institutions (figure 6.1, panel b). In nine of the twelve components of the institutions pillar, Guatemala ranks in the lowest

Figure 6.1: Guatemala's Institutions Are Lagging Behind and Not Improving

a. World governance indicators, 2014

b. Institutional indicators
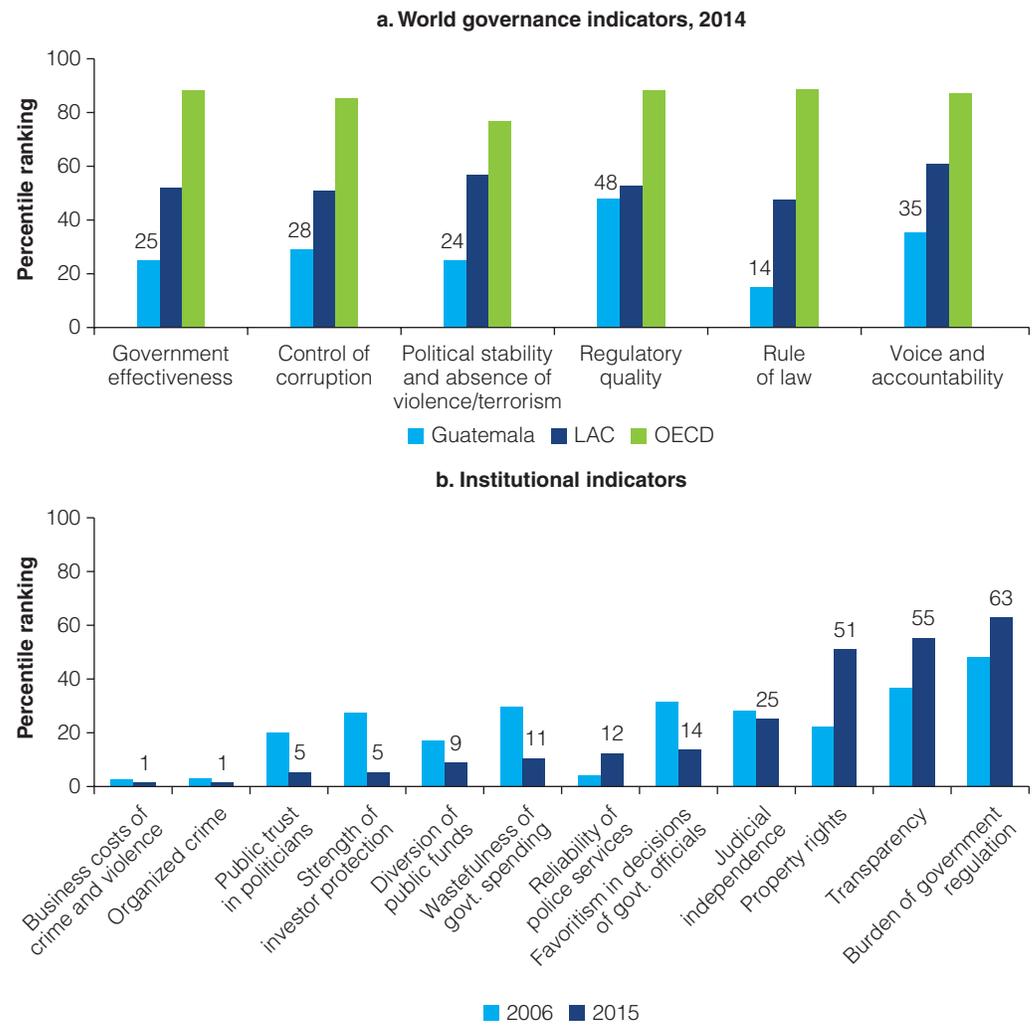
Sources: World Governance Indicators 2014; World Economic Forum 2006, 2015.
Note: LAC = Latin America and the Caribbean; OECD = Organization for Economic Co-operation and Development.

25th percentile in the world, and in five of those pillars (business costs of crime and violence, organized crime, public trust in politicians, strength of investor protection, and diversion of public funds) ranks in the lowest decile.

In the past 10 years, the percentile ranking of Guatemala's institutions appear to be deteriorating, rather than improving, for the majority of the indicators of institutional quality. In parallel, the index for municipal public services for 2013 shows the performance of 76 percent of municipalities (223 of 340) was either medium-low or low in terms of the provision of public services, which undoubtedly explains the gap in coverage and the poor quality of service in general.

Provision of Water Supply and Sanitation Services

Guatemala is a unitary state with three tiers of government: the central government; the departmental government with 22 departments; and local government with 340 municipalities. Departmental governments are headed by a governor appointed by the president of the republic, while local governments are led by a municipal council elected by popular vote. The mayor

(*alcalde*) presides over council sessions and exercises legal representation of the municipality. These levels of government are supplemented by the Development Councils System (DCS) (CS) linking them to the regional and community levels and the private sector. There is also a legislative branch embodied in the unicameral Congress of the Republic comprising 158 seats, 127 members elected directly in multi-seat constituencies within each of the 22 departments by simple majority vote, and 31 members directly elected in a single national constituency by proportional representation vote.

Guatemala's government has decentralized its service delivery role to municipal levels. In 2002, the General Law of Decentralization[1] was implemented to avoid the concentration of decision-making power in the executive branch for the formulation and execution of public policies. It targets the equitable distribution of public funds and the participation of local governments and communities.

The DCS was created in 2002 to support the decentralization process and to address the integration and articulation of government activities through a participatory approach at all levels of government and with the community and private sector. This system is composed of five council levels: the National Council (CONADUR) presided over by the President of the Republic; the Regional Council (COREDE) and the Departmental Council (CODEDE) that are presided over by the Regional Coordinator and the governors respectively, both appointed by the President; the Municipal Council (COMUDE) presided over by the mayor; and the Community Council (COCODE) presided over by the community. At all levels, there is representation of public institutions, organizations, communities, and the private sector. The system is designed to reflect principles of national, multi-ethnic and multi-cultural unity, integrating the community councils after the signing of the 1996 Peace Accords, and creating a permanent structure to provide for the participation and representation of all population groups, including indigenous groups, and all sectors that comprise the Guatemalan nation.

This system utilizes a participatory decision process to formulate national policies and to allocate investment resources through the budgetary process for urban, rural, and territorial development. The DCS utilizes a two-way system to develop policies, plans, programs, and projects. Project proposals are generated at the community level by the COCODE and are first prioritized by the COMUDE before being approved by each council level to allocate the investment funds of the associated budget line. In the same way, programs, and policies are generated considering the priorities of each council from the bottom up, which become national guidelines for the allocation of investments (for example, priority sectors) contributing to the determination of fiscal policy. The system also provides for follow-up and assessment of the execution of investments. COCODE function in urban and rural areas, and for those municipalities with more than 20 COCODE, a second layer of COCODE is created. The system includes Advisory Indigenous Councils to advise COCODE and COMUDE, and each COREDE, CODEDE, and COMUDE has a technical unit. The whole system is supported by the Presidential Executive Coordination Secretariat (*Secreatria de Coordinacion Ejecutiva de la Presidencia,* SCEP) and the Ministry of Planning (SEGEPLAN).

In this context, Guatemala's 340 municipalities are responsible for the provision of WASH services. The Constitution establishes that municipalities are autonomous institutions. The Municipal Code establishes and reaffirms this responsibility in relation to local public services stipulating that municipalities must regulate and provide public services in their respective jurisdictions. Specifically, they must establish, maintain, expand, and improve services, and they retain the power to determine and collect corresponding fees. In addition, the General Law of Decentralization outlines specific principles and objectives in relation to the efficiency and effectiveness in the provision of public service, universal coverage, and the improvement of the quality of basic services provided to the population.

The Health Code *(Código de Salud)* of 1997 assigns the development of rules and regulations governing the sector to the Ministry of Public Health and Social Assistance (MSPAS). Although the Health Code confers the responsibility of providing water supply and sanitation to

municipalities, it assigns the development of rules and regulations governing the administration, construction, and maintenance of drinking water services, and water quality monitoring (in coordination with municipalities and community councils), to the Ministry of Public Health and Social Assistance (*Ministerio de Salud Pública y Asistencia Social, MSPAS*) (Lentini 2010).

Each municipality has the power to establish its own management model of service provision. There are three models of WASH service provision in urban areas of Guatemala: direct municipal public management; delegated municipal public management; and private management.[2] In rural areas community-managed systems dominate. Although the municipalities are legally responsible for also providing WASH services in rural areas, communities generally build, operate, and maintain their own systems through drinking-water committees.[3]

Municipalities also have the responsibility of regulating service provision in their territories, following complementary regulations from national ministries, specifically, the MSPAS and the Ministry of Environment (MARN). As stated, the Municipal Code assigns responsibility for the regulation of WASH services to municipalities, including tariff-setting and temporarily intervening and revoking concession contracts in cases of poorly managed services (World Bank 2017), with the objective to provide efficient, safe, and continuous services. At the same time, municipalities must follow regulations determined by MSPAS and MARN regarding drinking water quality, sewage treatment and discharge, and environmental impact assessments.

Gaps and Duplications in Roles and Responsibilities

Guatemala lacks an integrated national sector policy to achieve the goals set to reduce gaps in WASH coverage. *Katun*, the national long-term development plan, which provides goals up to 2032, and was adopted by the current government, sets specific targets to improve coverage in water supply and sanitation. In addition, in 2013 a National Policy for Water and Sanitation was approved for 2013 to 2017. However, there are no mechanisms to coordinate interventions across institutions and municipalities involved in the sector to achieve these goals.

Due to a lack of sector policy, sector planning is undertaken through the direction of SEGEPLAN and the DCS through CONADUR. SEGEPLAN oversees national planning and establishes development and investment policies for all sectors. In this regard, it also oversees the DCS. Through the National System for Public Investments (SNIP), SEGEPLAN regulates the formulation and evaluation of investment projects, including those for water supply and sanitation. Therefore, SEGEPLAN, together with MSPAS and MARN, formulates regulations and approves the investments in water supply and sanitation.

The development of national regulations is incomplete at the central level and no single entity has been empowered to manage and coordinate the totality of sector policies. Under the health code, MSPAS has *de jure* responsibility for formulating sector policies to guarantee universal drinking water coverage, and for the administration, construction, and maintenance of drinking water services. However, in practice, MSPAS has not been able to effectively implement sector policy. This explains the gap in governance presented in table 6.1. As a central regulator, MSPAS has the responsibility for monitoring and establishing regulations for drinking water quality and also for establishing regulations for methods of sewage treatment, while MARN has the responsibility for the protection and efficient use of water resources and basins, and for establishing regulations for environmental impact assessment, sewage discharge, and industrial contamination.

The WASH sector lacks specific municipal regulations governing the processes of setting tariffs, coordinating financial contributions for the provision of WASH services, and regulating the performance of service providers. Tariff structures, financing, or subsidies, are not designed at

Table 6.1: Institutional Roles in the WASH Sector in Guatemala, by Function

Institution	Roles	Governing body	Planning	Financing	Regulation	Monitoring urban	Monitoring rural	Service provider urban	Service provider rural	Ta pre investment urban	Ta pre investment rural	Ta operation and maintenance urban	Ta operation and maintenance rural
National level	MSPAS				x	x							
	SEGEPLAN		x							x			
	CONADUR		x										
	MARN				x	x							
	INFOM			x									
	MINFIN			x									
	Public company							x				x	
Sub-national level	Municipality/OMP									x			
	Municipality/OMAS			x	x	x		x				x	
	Development councils			x									
	CAAP								x				
Private sector	Private company							x					
	NGOs			x							x		x

Source: World Bank 2016.
Note: Boxes marked with an "x" indicate institutional participation in the corresponding function. Arrows indicate functions with little to no institutional participation.

the municipal level, primarily because of political interests and as a result of limited technical and management capacity. The municipalities are responsible for maintaining the coverage and quality of water services, managing operations, collecting payment, and supervising the efficiency and quality of systems. However, these responsibilities are only partially executed in the urban area. In rural areas, drinking water committees (CAAP) manage the operation of WASH systems and collect payments, which generally cover only the minimum operating expenses.

The decentralization strategy failed to assign responsibility for the construction of WASH systems to a specific level of government, and therefore responsibility is currently shared between the central, departmental, and municipal governments. Moreover, Guatemala does not have a national institution responsible for ensuring quality control in the design, construction, and supervision of WASH systems. Systems do exist for tracking the formulation of projects (SEGEPLAN) and disbursement payments for execution, but these systems focus primarily on fiduciary monitoring, not technical matters.

Financing for the WASH sector is borne by municipalities, central government institutions, and the private sector, although responsibility for WASH infrastructure investments relies solely on municipalities. Municipalities can fund WASH projects from four sources: (a) the proportion of the 10 percent of the national budget that is allocated to municipalities by constitutional mandate;[4] (b) the transfers that are allocated to the municipalities through the DCS;[5] (c) the 1.5 percent of the Value-Added Tax;[6] and (d) their own resources collected by the municipalities. However, municipal tax revenue is low,[7] and as a result, transfers from the central government continue to form the majority of municipal income (World Bank 2013). At the central level, the Institute of Municipal Development (INFOM) has historically channeled important funding for the sector through the Executing Unit for Rural Systems Projects (UNEPAR) and executing units with external funding. INFOM is currently executing an important WASH project funded by the IDB and AECID. However, UNEPAR's remit has limited budget and resources to cover actual needs. In table 6.1, funding from external sources (loans and grants) are represented by the Ministry of Finance (MINFIN) and municipalities. In addition, an important number of NGOs provide funding and implement small-scale WASH projects, as well as providing technical assistance, mostly in rural areas.

The lack of presence and support for different functions in rural areas explains the lag in coverage and the poorer quality of drinking WASH services in these areas compared to urban areas where there is more support and stronger government presence (table 6.1). In fact, the provision of services by CAAP is the result of an absence of formal institutions attending the needs of rural communities. In addition, there is a lack of monitoring and technical assistance starting at the preinvestment stage and continuing through operation and maintenance, although it is supplemented in some cases by NGO. Both central regulators and municipalities support urban areas while municipalities are responsible for the entire municipality.

The current regulatory and management model includes gaps and duplications in roles and responsibilities at various levels of government (table 6.1). The most important gaps are the lack of direction at the national level and the lack of support for different functions in rural areas. The most important duplication in roles is in regulation of the sector, which is fragmented and incomplete at the national level and scattered at the local level, particularly given that each municipality is responsible for regulating the provision of WASH services in their jurisdiction without common guidance. Another important duplication involves the construction of WASH systems, which are undertaken by both central and local institutions. In general, there are no comprehensive technical assistance programs at the central level to strengthen management capacities for WASH services. These duplications of efforts make it difficult to assign accountability to each national agency that plays a role, which in turn has the effect of limiting improvements in the sector, especially in rural areas.

Challenges in Delivering WASH Services

The successful provision of public services to the poor is the result of institutional relationships in which actors are mutually accountable (World Bank 2003). In order to understand how and why problems persist with respect to WASH service delivery, the analysis applies three "lenses" to explore the ways in which relationships between key actors shape service delivery outcomes.

The first lens, **oversight and accountability**, identifies constraints affecting the types of relationships and balance of power between water users, policymakers and politicians, and service providers.[8] Problems in the relationships or negotiating capacity between actors can produce deficiencies in service provision. The second lens, **intergovernmental arrangements**, identifies constraints related to the authority and power at different levels of government to undertake assigned functions. Finally, the third lens focuses on the **capacity** of different actors and organizations involved in rural water provision. The results of the analysis show how problems in each category are interrelated, which describes the complex context for the current provision of WASH services in Guatemala.

The Oversight and Accountability Lens

The two main factors affecting accountability relationships between users, providers and the state are the lack of regulation of service providers and the lack of access to performance information. The short route of accountability relies on consumers' direct engagement with service providers, while the long route relies on citizens exercising their "voice" through elections and the government's "compact" with service providers. In the Guatemalan context, the extent of decentralization places the focus of the long route on municipal authorities who have responsibility for service provision. The nature of these relationships, including the interests, incentives, and power of the actors involved, help to shape behavior that contributes to the identified outcomes of service delivery.

In Guatemala, clients do not have significant scope for exercising the short route of accountability, client power, particularly in rural areas.[9] In rural areas, community-managed systems dominate. Although municipalities are legally responsible for providing WASH services in rural areas, communities generally build, operate, and maintain their own systems through drinking-water committees (CAAP). This makes it difficult to distinguish between "citizens/clients" and "service providers" in the rural sector and represents a constraint in and of itself. For example, CAAP are simultaneously agents of the community and also agents of the providers.[10]

In many cases, the most direct way to ensure service providers are accountable to clients is to ensure that exit options exist. However, in practice, exit options exist only in urban areas for wealthier segments of the population who can construct their own drinking water system or purchase bottled water. In rural areas, few such alternatives exist.

There is limited information on the standards and levels of service that clients can expect to receive. Since regulations are incomplete, the responsibility for understanding services and monitoring delivery is borne by citizens. This situation is particularly difficult in Guatemala because there are no regulatory contracts between the government and service providers. Regulators do not establish transparent management standards for service providers, and in turn, service providers do not inform users of results or products, which affects client power.

Without regulatory contracts between service providers and the government, or information systems to inform users about their compliance, the long route of accountability will not yield the results of improving the coverage and quality of WASH services.[11] In Guatemala, citizens elect the president and the municipal council to carry out, among other things, the responsibilities of the central and municipal governments for the management and regulation of WASH services, including decisions on tariffs and subsidies, operation, maintenance, and investment.

However, although Guatemala has a culture of community participation, the lack of information about sectoral performance in general, and the quality of WASH services, hinders the potential in the water sector for accountability of government results for both the central and municipal governments. On the government's side, accountability to the citizens on policies and executed programs is limited. The low rankings of Guatemala on the voice and accountability dimensions of the Worldwide Governance Indicators (WGI) reflects this dynamic.

Citizens do not have information to evaluate performance of WASH services in terms of quality and coverage, and do not exercise this right in elections through the democratic system. Without information on performance and physical goals for each sector, it is not possible for citizens to raise their voice effectively. Insufficient information on the provider's performance limits the users' voice on the conditions of service delivery. There are no geo-referenced or updated information systems that accurately track the coverage and quality of WASH services. Although there are systems in place, they are not updated in each municipality, thus limiting the capacity of decision-makers to accurately identify and prioritize critical investments. In addition, although the Municipal Code stipulates that Municipal Planning Offices (OMP) must maintain an inventory of social and productive infrastructure and the coverage of public services, this inventory has not yet been developed.

Moreover, municipal councils often prioritize road infrastructure over WASH investments. Municipal councils (COMUDE) generally leave it up to the central government to finance and execute WASH projects and sometimes change the priorities of selected projects that have DCS funding in order to garner the support of community representatives.

The government's oversight of service providers (compacts) is very limited. In Guatemala, municipal councils delegate provision of WASH services (if not directly provided) to public enterprises[12] or to private/community providers, which in the former case are decentralized entities.[13] However, oversight/regulation at the central and municipal levels is minimal (if oversight exists), which limits the power of the compacts. There are parameters at the central level for the establishment of new systems with an emphasis on the allocation of the investment, but for the operation and sustainability of the systems there is only occasional monitoring of drinking water chlorination. For example, approximately one-fifth of all drinking water systems registered in the national drinking water database (SIVIAGUA) were monitored for residual chlorine during the period January to August 2016, and even here, the accuracy of the monitoring results is questionable ("Access to Water Supply and Sanitation on Health" section in chapter 5) (MSPAS 2016).

In addition, at the municipal level there is no difference between the provider and regulator of the service. Given that there is no government regulation of service providers (regardless of the type of provider), commensurately there is no accountability of service providers to the government. At the municipal level, standards of service and levels of quality have not been defined and there is no notification of the expected products or results ("rules of the game") to be delivered by service providers. Without contracts specifying commitments made, there is no accountability for the providers, and consequently, no information is provided on results to be able to evaluate the services. Many municipalities do not have guidelines or the capacity to regulate services. Even though water quality and residual water treatment is included in several regulations, these are not commonly included in regulatory contracts between the municipalities and service providers.

Compliance with drinking water quality and wastewater discharge standards is only partially monitored. The central government, through departmental delegates of MSPAS and MARN, is responsible for monitoring drinking water quality and wastewater discharge. However, although there are penalties for failing to comply with national drinking water and wastewater standards, environmental monitoring is neither explicit nor effective and there are insufficient financial and human resources at the departmental level for MSPAS and MARN to be able to fulfill their respective duties.

In conclusion, both the short and long routes of accountability in the WASH sector in Guatemala are dysfunctional, and there is no accountability between actors in the sector. When the short route is weak, as is the case for rural communities and especially the bottom 40 percent, the long route should be strengthened in order to ensure the provision of sustainable WASH services. Critically, because the short route in Guatemala is weakened as a result of extremely limited client power, strengthening the long route is even more indispensable for these groups.

The Intergovernmental Arrangements Lens

Existing intergovernmental arrangements for the strategic planning, regulation, and management of WASH services have significant gaps and duplications in roles and responsibilities at both the central and local levels, limiting the government's ability to achieve better results. The analysis under this lens considers the strength of current institutional arrangements between different levels of government and entities within government, building on the preceding analysis of the decentralization process and the analysis of institutional roles by functions.

The decentralization of functions to departments has been more of a deconcentration of central offices without the necessary financial and human resources to coordinate and supervise functions, rather than a genuine transfer of decision-making authority (devolution) to the local level. It should be noted, however, that the DCS has stimulated greater participation of local stakeholders (public, private, and social) in the decision-making process. However, despite fiscal decentralization, assigning 10 percent of the general budget of the Republic to municipalities has been inadequate, and municipalities assign a larger part of their budget to capital investments than the central government does, 26 percent versus 17 percent respectively in 2015.[14] Additionally, despite the legal mandate and the measures agreed upon in the Municipal Development Plans approved by the Municipal Development Councils (COMUDE), these are not always included in the annual municipal budget, given that budget allocations are assigned at higher council levels within the DCS.

The main constraint of the institutional arrangements framework that prevents the WASH sector from advancing consistently on different fronts is the lack of an empowered governing body to assume national policy leadership and to create tools for planning, budget, and monitoring and evaluation. The insufficient results of the MSPAS in applying sector policy and in implementing regulations to obtain efficient provision of WASH services, is usually justified with the health crisis. The health crisis creates pressures for institutional focus in curative health rather than in preventive actions related to WASH. The analysis considers that having a stronger governing authority would enable better coordination among central agencies for regulation, approving investments, and executing projects in the sector.

Incomplete regulations at the national level, and scattered regulations at the municipal level where 340 regulators operate without national guidelines, prevent the provision of high quality, sustainable services, which predominantly affects the poor. The functions of regulation and control of services are not assigned in a comprehensive and consistent manner, except for those that are carried out with the supervision of MSPAS and MARN. However, these only cover partial aspects related to drinking water quality and wastewater treatment and discharges, mostly in urban areas. At the central level, there is no regulation of the performance of service providers leaving municipalities to effectively regulate themselves for services they provide in urban areas and for services that CAAP provide in rural areas. However, as presented before, CAAP do not receive major support from governmental institutions, including the municipalities, and must provide the services themselves, from pre-investment technical assistance to the operation and maintenance phase.

There is no national WASH agency responsible for the design, construction, and supervision of WASH projects. MSPAS has the responsibility to issue regulations for the construction of water supply and sanitation systems. Historically, INFOM, through UNEPAR, previously

played an important role in designing and supporting the implementation of rural systems. However, at the present time, UNEPAR does not have enough resources to continue to play this role or to provide technical assistance to municipalities. In this regard, the standards followed are a combination of requirements by SEGEPLAN, MSPAS, and MARN, most of which deal with compliance with the SNIP for budget allocations. However, there is no coordinated supervision to ensure that the standards are followed congruently or in line with the technical needs of systems.

Institutional coordination for the functions of direction, regulation, and execution in the WASH sector between MSPAS and other agencies—MARN for regulation, INFOM for execution, and SEGEPLAN for planning—continues to be very weak and scattered. The lack of coordination between these central agencies constrains the provision of WASH services. These problems are evident as early as the preparation stage during pre-investment studies, and make it difficult for municipalities to meet the requirements of each agency to gain their approval. The formalities set in terms of requirements and timing are not always integrated or coordinated, which becomes a burden to municipalities whose projects then often do not get approved on time, are delayed, and in some cases become outdated and obsolete in the process. This lack of coordination is believed to stem primarily from the absence of an empowered national WASH authority.

The legislation does not clearly define the responsibilities of each government level, which causes overlapping and gaps in functions at all government levels. There are too many disconnected administrative units, programs, and projects that are scattered in different ministries, and which exercise different authority in different territorial areas. This situation has evolved as a result of the problems caused by the vagueness of the legislation and the operational problems in the existing entities. Just as there is no entity responsible for establishing uniform policies and investment plans for the WASH sector, it is unclear which entities are to be held responsible for provision and regulation of the services. Similarly, there are multiple actors involved in pre-investment, construction, and oversight, which adds to the lack of proper coordination.

The lack of comprehensive planning at the municipal level to meet the demands of the rural sector and the lack of municipal support to CAAPs are the principal challenges at the subnational level in the WASH sector. Even though municipalities have the responsibility for the provision of WASH services in all of their territory, rural areas are commonly neglected. The municipal planning offices (OMP) are not generally involved with planning in rural areas, and not every municipality has a municipal water office (OMA). However, they should provide coordination in the WASH sector, provide technical assistance to rural communities, provide service in urban zones, and provide regulatory services. CAAP do not form part of the formal municipal arrangements for the provision of WASH services. As such, CAAP operate alone through the different stages from pre-investment design to construction to operations and maintenance. Consequently, it is common to find technical designs that do not comply with proper technical standards, including dimensioning, and once operational, do not have the capacity to achieve the expected results.

As a result of municipal autonomy, there are difficulties for the central government in ensuring that municipalities comply with new legislation for the provision of WASH services. The environmental legislation and regulations promoted by the central government and complied with by municipalities have not worked as expected. For instance, the municipal code does not include coordination mechanisms between the central government and municipalities. The best example of this is the general failure to comply with legislation that required all municipalities to have a wastewater treatment plant. As a result, the timeframe within which municipalities had to comply was extended, but measures or action plans to support or guide municipalities in meeting this requirement were never prepared.[15] The central government should be able to have mechanisms in place to establish national guidelines and regulations for the sector that can be enforced and complied with by municipalities.

The Capacity Lens

Capacity constraints exist at all levels of government along the service delivery chain. The institutional framework is the consequence of the weaknesses of the Guatemala decentralization process that failed to generate an intermediate level of government (*Departamentos*) with adequate capacity to coordinate policies between the central and municipal governments and between the different sectors of the central government that work in each department.

The main capacity constraints at the central level have been exposed by a lack of an empowered sector authority and by incomplete regulations at the central level for the provision of WASH services by municipal service providers. MSPAS does not have the capacity to establish national policies and guidelines to organize the WASH sector, or to implement coordinated planning and interventions utilizing equity criteria. As a result, it is difficult to accomplish sector goals for coverage and quality, mostly for the rural poor. Furthermore, national regulators have not been able to make municipalities comply with national regulations. These two problems generate most of the constraints at all levels for the delivery of WASH services.

Insufficient capacity of the departmental governments limits coordination between the central government and the municipalities for both project approval for budget allocations, and service provision. The ministerial delegates and their territorial equipment and logistical resources are insufficient at the departmental and regional levels, which adversely affects the results of the decentralization process. The Water and Sanitation Unit of MSPAS should provide technical and legal assistance to 29 health areas in oversight procedures, but lacks the resources to work in municipalities, especially in rural areas.[16] In cases where quality monitoring of drinking water is undertaken, only residual chlorine and bacteriological indicators are evaluated, because the budget is insufficient to monitor all 19 water quality indicators. With respect to MARN, its territorial coverage is too limited to carry out supervision of both urban and rural areas. SEGEPLAN delegates, of which there are only a few per department, need to review all project proposals for approval in the SNIP while at the same time they are monitoring existing projects underway to approve disbursements. It should be noted that these three institutions cover various sectors in addition to WASH.

Municipalities with limited technical expertise struggle to comply with established criteria for validation of WASH investment projects limiting their ability to extend services for the present and the future. Small municipalities lack the specialized professionals needed to comply with the environmental, sanitation, and the SNIP requirements. This adds to the existence of general municipal institutional weaknesses in planning and coordinating the process of preparing pre-investment studies. Municipal Planning Offices (OMP) and communities consider the criteria that must be met for approval of projects, especially the environmental impact studies required by MARN, to be too demanding. The high rate of under-execution in the WASH sector is evidenced by the bottlenecks in the pre-investment phase, such as the abovementioned requirements for approval, as well as the capacity to carry out bidding processes, and execute projects. It also underscores the lack of a national plan for medium- and long-term investments in the WASH sector. The level of execution of WASH investments did not exceed 50 percent in the past three years, and was only 17 percent in 2015 (table 6.2.)

The capacity of municipalities to meet aspects of sustainable WASH services, such as quality, quantity, and continuity,[17] is weak, and there are no comprehensive technical and financial assistance programs designed to assist them or to assist CAAPs. The institutional capacity of municipalities does not allow them to generate legal and political tools to guarantee equitable access, to assess the proportional value of consumption, or to develop or utilize the tools of conservation and sanitation of water sources. CAAPs are not adequately institutionalized, and municipalities do not provide the technical assistance required to effectively assist CAAPS in prioritizing projects, or in improving service delivery and accountability. In this context, communities do not have the capacity to generate sustainable and efficient WASH systems.

Table 6.2: Public Investments in WASH Programs (Allocated versus Executed)
Percent

Institution	2013		2014		2015	
	Asigned/ Programmed[a]	Executed/ Asigned	Asigned/ Programmed[a]	Executed/ Asigned	Asigned/ Programmed[a]	Executed/ Asigned
SCD	67%	49%	58%	63%	70%	20%
INFOM	45%	9%	58%	26%	30%	8%
Total	50%	31%	56%	50%	54%	17%

Source: World Bank based on SEGEPLAN.
a. Programmed resources include projects approved by the SNIP and pending.

At present, there is no capacity at central and local levels to produce geo-referenced and updated information systems to plan and monitor the provision of WASH services. At the central level, the SIVIAGUA database is limited in terms of the number of indicators collected, compared to the number required by legislation, and in terms of the number of systems assessed. In addition, there are no integrated systems that meet the requirements of all actors involved in regulating the provision of WASH services. At the municipal level, even though the Municipal Code provides that the OMP should have an inventory of the social and productive infrastructure and information about the coverage of public services, these data have not been developed or collected.

The ability of poor communities to pay for sustainable WASH services is low, which limits cost recovery tariff structures. The debate surrounding the affordability of WASH services for poor communities is not unique to Guatemala. In urban areas in Guatemala, it is not uncommon to see low tariffs that do not cover a system's operation and are instead subsidized by municipalities, primarily out of political interest. In rural areas, where services are not subsidized, communities pay tariffs for the provision of the services that they provide through the CAAP. In some cases, the rates cover potential repairs. This shows that well-informed communities can organize themselves to provide the resources needed to deliver sustainable WASH services. However, communities need guidance and information to better understand the need to pay for services and to establish how much they need to pay for high quality, sustainable services.

Concluding Remarks

The regulatory and management model of the WASH sector is dysfunctional, with gaps and duplication in the roles and responsibilities assigned to actors at various levels of government. As discussed, the WASH sector has limited resources available to carry out its responsibilities in a decentralized manner, a condition that affects both the regulatory agencies and the municipal governments. Municipalities regulate, and to some extent exercise oversight functions, with limited technical expertise and few resources. As a judge and party, it cannot be accountable to itself. Notwithstanding these issues, although this situation has limited the sector's development and undermined its sustainability, this decentralized approach and participatory design to delivering community-led solutions offers opportunities that should be leveraged moving forward.

Notes

1. *Ley General de Descentralización* (*Decreto* No 14-2002).
2. Direct municipal public management is the predominant model. Delegated municipal public management (public municipal companies) is used by the municipalities of

Guatemala, Quetzaltenango, Flores, San Benito (associated), San Marcos, Coban, and Huehuetenango. Private management, commonly used in small-scale undertakings to supply condominiums or commercial and industrial clients, has declined overall in recent years.

3. Private nonprofits with their own legal registration, independent of the municipality.
4. Ninety percent must be allocated to social and infrastructure projects, and up to 10 percent is available for operating costs.
5. The DCS is funded by 1 percent of the value-added Tax (IVA PAZ) that must be allocated to infrastructure programs and projects.
6. Seventy-five percent must be allocated to capital expenditures and up to 25 percent is eligible for operating costs.
7. The single property tax (Impuesto Unico Sobre la Renta (IUSI)), covers 75 percent of total municipal tax revenue.
8. The oversight and accountability lens is drawn from the framework developed in the World Bankís *World Development Report* (WDR) for 2004 (World Bank 2003).
9. Client power is the accountability relationship between the Citizen/Client and the service provider, which is known as the short route of accountability. The short route of accountability relies on the ability and practice of clients to directly engage with the service provider and hold them accountable for results.
10. It should be noted that rural water provision in Guatemala does not fit neatly into the WDR 2004 framework precisely for this reason. Water users (through CAAP) play an important role in service provision.
11. The long route of accountability is the accountability relationship between the client/citizen and the service providers through their relationship with the government ("voice" and "compacts") and relies on citizens exercising their "voice" and the "compact" between the state and provider.
12. Of which there are only six in the country.
13. There is no information about the performance of service providers, either public or private (CAAP), so no conclusions can be made regarding their performance.
14. According to data from MINFIN and SEGEPLAN.
15. The original legislation (A*cuerdo Gubernativo* 234-2006) approved in 2006, gave municipalities 10 years to build wastewater treatment plants. In 2015, this deadline was extended for an additional two years to May 2017.
16. The Water and Sanitation Unit has five engineers for the 29 delegations.
17. As gathered by the Index for municipal public services for 2013 quoted before.

References

Daniel Kaufmann, Natural Resource Governance Institute (NRGI), and Brookings Institution. *World Governance Indicators 2014*.

El Congreso de La Republica de Guatemala. 2002. "Ley de los Consejos de Desarrollo Urbano y Rural." Decreto Numero 11–2002. Ciudad de Guatemala.

Lentini, E. 2010. "Servicios de Agua potable y Saneamiento en Guatemala: Beneficios Potenciales y Determinantes de Éxito." Comisión Económica para América Latina y el Caribe (CEPAL), Santiago de Chile.

Ministerio de Salud Publica y Assistencia Social (MSPAS). 2016. *Informe condiciones de los servicios de agua potable*. MSPAS.

Sanchez, Susana M., Kinnon Scott, and J. Humberto Lopez. 2016. "Guatemala: Closing Gaps to Generate More Inclusive Growth." Systematic Country Diagnostic. Washington, DC, World Bank.

SEGEPLAN. 2015. *Ranking de la Gestión Municipal 2013*. http://ide.segeplan.gob.gt /sinittablero/http://ide.segeplan.gob.gt/sinittablero/

World Bank. 2003. World Development Report 2004 : *Making Services Work for Poor People*. Washington, DC: World Bank.

———. 2003. World Development Report 2004. Making Services Work for Poor People. Washington, DC, World Bank and Oxford University Press.

———. 2013. *Towards Better Expenditure Quality: Guatemala Public Expenditure Review*. Report 78000, Central America Country Management Unit, Poverty Reduction and Economic Management, Latin America and the Caribbean. World Bank, Washington DC.

———. 2016. *World Development Indicators (WDI)*. World Bank, Washington DC.

———. 2017. "Análisis de Pobreza y la Prestación de Servicios de Agua y Saneamiento en Guatemala: Retos y Oportunidades." Programa de Agua y Saneamiento. World Bank, Washington DC.

World Economic Forum (WEF). 2006. *The Global Competitiveness Report 2006–2007*. Geneva: World Economic Forum.

———. 2015. *The Global Competitiveness Report 2015–2016*. Geneva: World Economic Forum.

Chapter 7
Efficiency of the Water Supply and Sanitation Sector

The provision of safe drinking water and sanitation involves issues of cost and continuity of service in addition to water availability and quality. Water scarcity, for example, is commonly discussed in terms of physical (or absolute) and economic water scarcity, whereas economic water scarcity can be further described as a function of infrastructure and governance (Mejía 2014). The primary objective of this chapter is to analyze recent fiscal developments in Guatemala's WASH sector within the context of a broad infrastructure investment program for growth and poverty reduction, with a view to offering insights for improving public investments to attain the SDGs.

The Role of Spending and Institutions

The effective allocation of resources in Guatemala is undermined by a lack of strategic planning and historical underinvestment reflected in a national budget that fails to meet expectations and lacks equity criteria, compounded further by low budgetary execution in recent years. Consequently, the four WASH subsectors suffer from low performance in the quality of services, access, and protection of water resources. Moreover, the limited technical capacity of service providers and the virtually nonexistent monitoring by the central government in both rural and urban areas has led to a proliferation of unsustainable services. This is especially true in rural areas where sanitation is the most important challenge confronting the WASH sector in Guatemala today.

Spending patterns affect the government's ability to provide universal access to basic services (Cabrera, Lustig, and Morán 2014). Typically, governments use fiscal policy to redistribute spending to poorer segments of a population with the goal of lowering poverty and inequality and equalizing opportunities. In Guatemala, however, the fiscal system fails to do this. This is due, in part, to very low levels of collected revenue, which puts considerable limits on potential spending. Notwithstanding this tight budget envelope, the fiscal system does little to close income gaps or remove inequalities. Fiscal policy (direct and indirect taxes and transfers) has no effect on national inequality as measured by the Gini coefficient. Overall, fiscal policy has led to an increase in poverty in Guatemala.

The vast bulk of public investment is allocated to community development (both urban and rural, and road transport, which together account for about 80 percent of total capital expenditures (figure 7.1). Overall infrastructure spending has decreased despite high investment needs. Guatemala has relatively limited road infrastructure coverage, and its electricity coverage ranks among the lowest in Latin America (figure 7.2). Furthermore, Guatemala's quality of infrastructure, as measured by the World Economic Forum's Global Competitiveness Report (World Economic Forum 2015), deteriorated between 2010 and 2015. Frequent natural disasters have inflicted additional damage to the country's infrastructure, further adding to the financial strains.

Spending levels in Guatemala are below those of all of its Central American neighbors. For example, spending as a share of GDP is less than one-half the levels of Costa Rica and Panama, countries with much higher GDPs than Guatemala. Spending on key sectors for development is too low. For example, Guatemala spends a significantly lower amount on education as a share of GDP than its peers do. Also, levels of spending on health are too low

Figure 7.1: Capital Expenditures by the Central Government, 2010–14

Legend:
- Community development
- Road transport
- Other
- Environmental protection
- Housing
- Agriculture
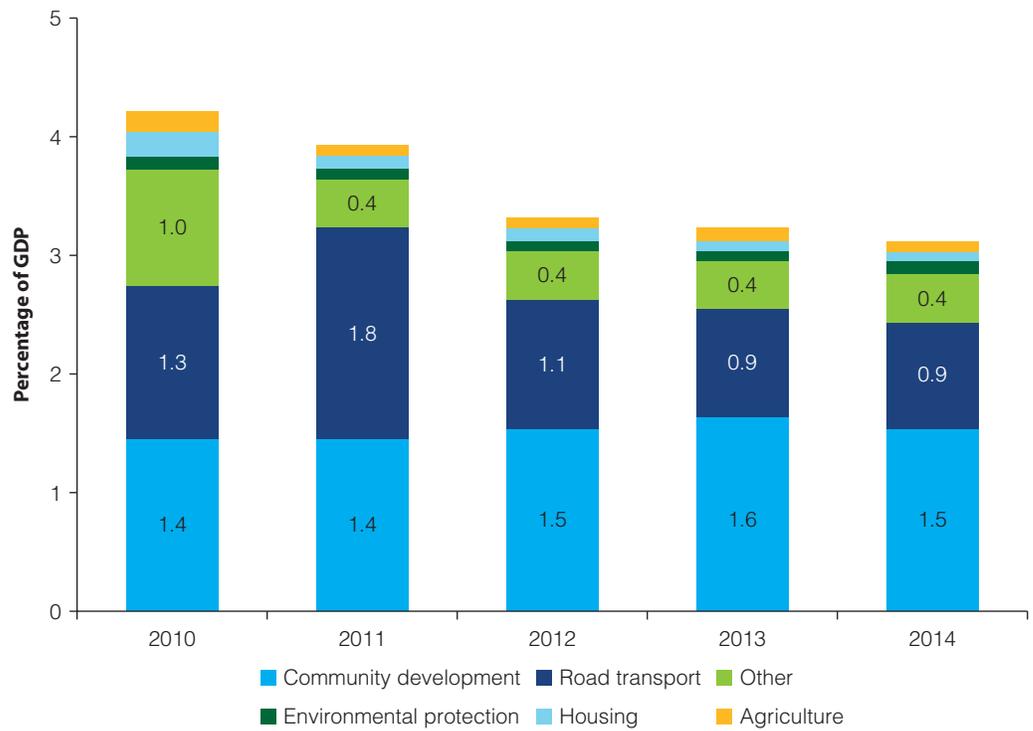
Source: Calculations based on data from Ministry of Finance of Guatemala.

Figure 7.2: Infrastructure Investment in Latin America and in Guatemala

a. Latin America

Country	Total infrastructure investment (% of GDP), 2012
Costa Rica	5.5
Uruguay	5.1
Nicaragua	4.9
Bolivia	4.5
Peru	4.5
Brazil	4.1
Mexico	3.3
Panamá	3.3
Argentina	2.9
Chile	2.8
Colombia	2.5
El Salvador	2.3
Ecuador	1.6
Guatemala	**1.6**
Paraguay	1.5

b. Guatemala

Legend:
- Public
- Private
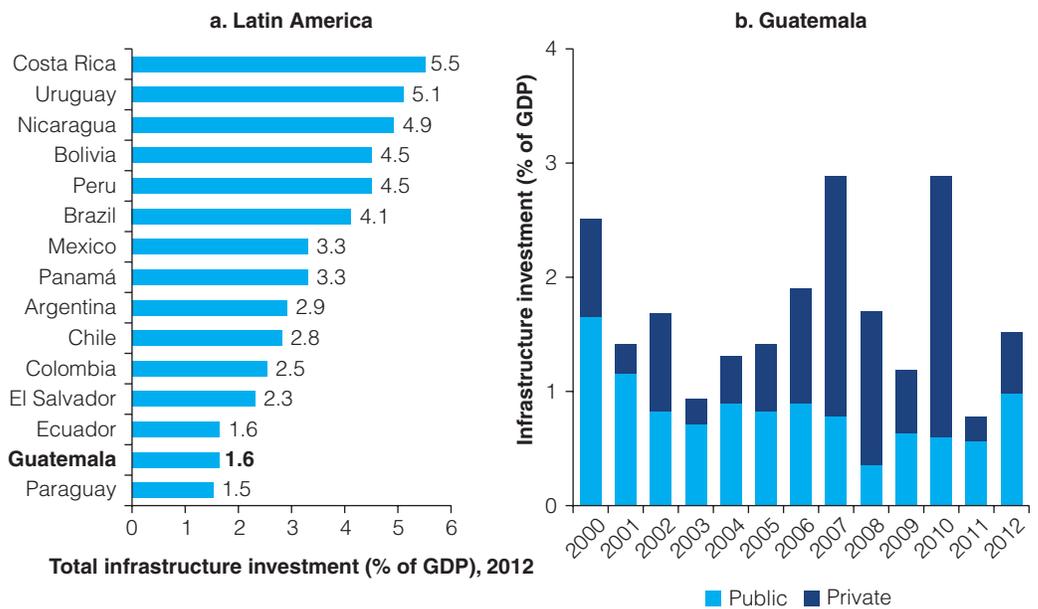
Source: CEPAL 2014.
Note: Infrastructure investment includes transport, energy, telecommunications, and water and sanitation.

to provide adequate health care to the population and are among the lowest in Central America. Guatemala has increased social protection spending in the past seven years, mainly through cash transfers and subsidies. However, there is still substantial leakage to the nonpoor, and the absolute amount spent on social assistance is dwarfed by social security spending, which mainly benefits those in the top quintile (figure 7.3).

Guatemala's weak institutions compound the negative effects of inadequate social spending and further limit the ability of the line ministries to provide quality services. The manner in which budgets are determined provides little room for empirically-based policymaking (World Bank 2013). At the same time, the budget process itself creates considerable uncertainty. In 2011, the variation in the composition of the executed budget compared to the original allocation was double the international standard. The institutions within each sector are fragmented and have limited oversight. The fragmentation of systems increases costs. Institutions have weak monitoring and evaluation systems and this affects the costs and quality of the services provided and limits accountability. Institutional fragmentation is mirrored in their information and monitoring systems. In the social sectors, for example, there are elements of a strong monitoring system, but no coordination mechanism.

A low tax burden is one of the main constraints for promoting development in Guatemala (Chakeri 2016). As early as 1950, Guatemala had the lowest tax revenue as a percentage of GDP in Central America (6.7 percent) (Schneider 2012), a ranking that continues today. Another consequence of the low tax burden is that the government has a limited amount to spend on the provision of public goods and services. The tax-to-GDP ratio increased from 8.8 percent of GDP in 1995 to over 12 percent in the mid-2000s but has since fallen back to 10.8 percent in 2014. Total central government expenditures increased from 10.3 percent of GDP to 13.4 percent in the same period (figures 7.4 and 7.5), with the social sectors accounting for a significant share of this increase.

Figure 7.3: Public Spending by Consumption Quintile, 2015
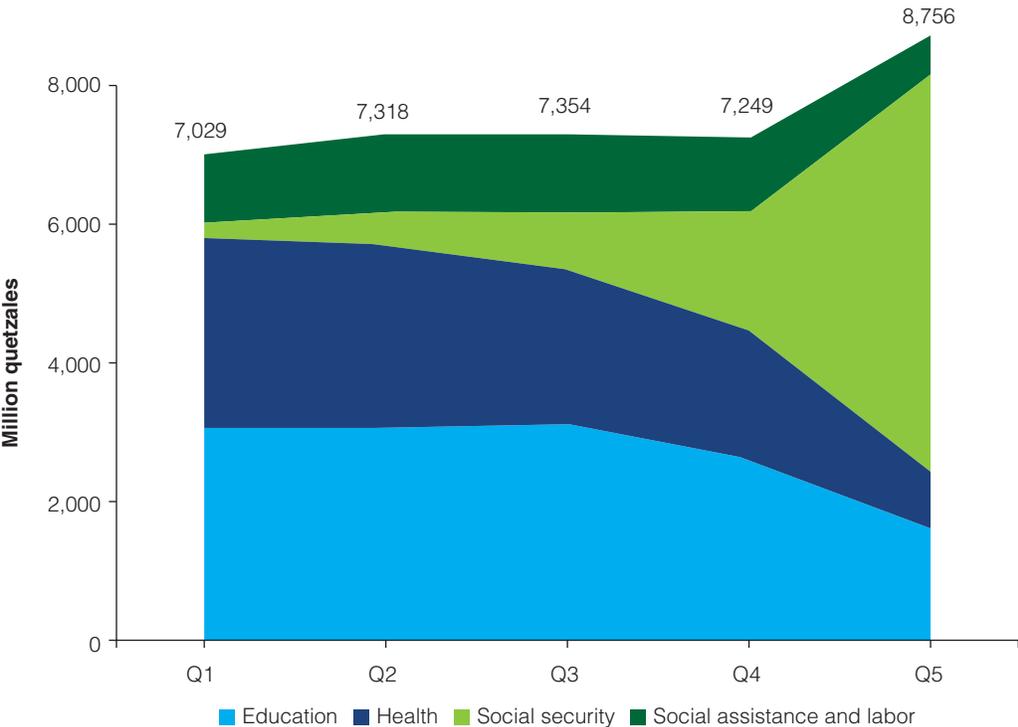
Source: Calculations based on the 2014 ENCOVI.

Figure 7.4: Guatemala's Tax Burden Compared with Selected Countries in Latin America and the Caribbean, 2013
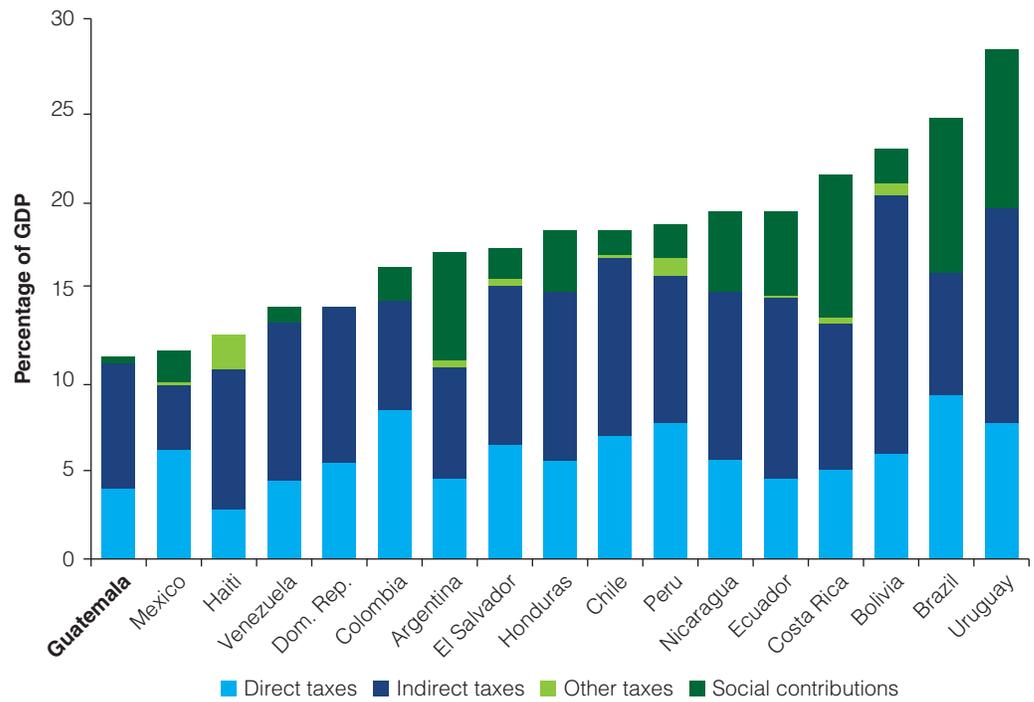

Source: CEPAL—CEPALSTAT.

Figure 7.5: Public Sector Spending and Revenue as a Percentage of GDP, 1995–2013
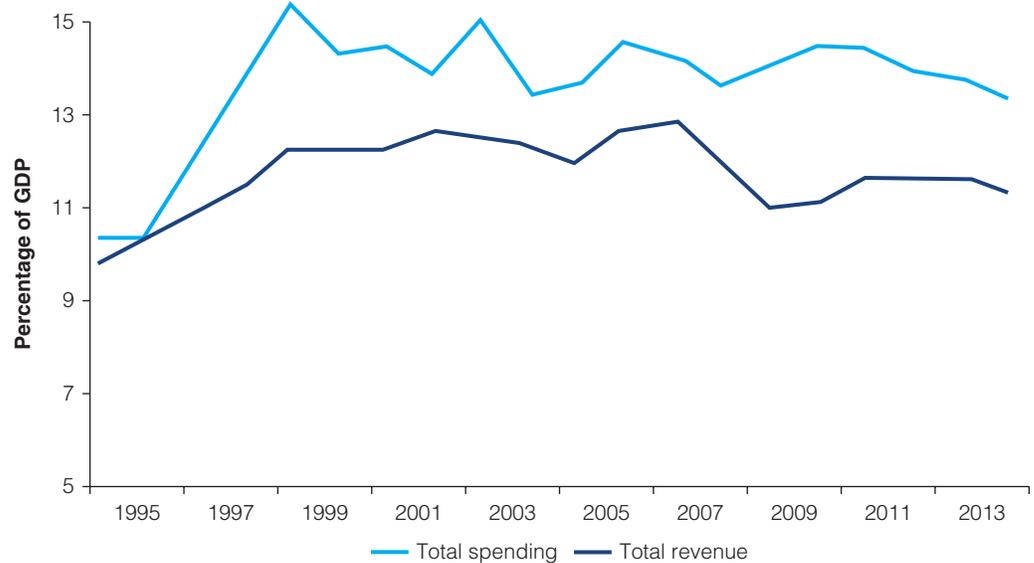
Source: Ministry of Finance, Central Bank of Guatemala.

Analysis of the Water Supply and Sanitation Sector in Guatemala

The sector analysis suggests the sector policy framework has mainly favored the water subsector, particularly in urban areas. However, despite a long-term national plan, planning is "unsatisfactory" in all subsectors, lacking comprehensive strategies to deal broadly with the problems affecting the WASH sector at different levels of intervention (World Bank 2017). Without strategic planning and sector investment, the allocation of resources becomes complex, reflecting a budget that does not meet expectations and lacks criteria of equity in its allocation, problems which are compounded by the low budget execution of recent years. This is reflected in the results at the level of the four subsectors (that is, rural water, urban water, rural sanitation, and urban sanitation) which show low performance in terms of quality of services, and of access to and protection of water resources (World Bank 2017). Finally, there is evidence of low operational and management capacity of both rural and urban providers, which limits the sustainability of services. Moreover, the almost nonexistent central government support, particularly in rural areas, points to rural sanitation as one of the most important challenges facing the sector in Guatemala today (World Bank 2017).

Investment in the Water Supply and Sanitation Sector in Guatemala

Public investment in the WASH sector reveals deficiencies in the national policy for the development of the WASH sector in the medium to long term, including limited sector planning tools, the lack of a well-defined budget, and the lack of a subsector investment plan.

The majority of investments in WASH are carried out by the DCS, which implemented on average 68 percent of total investments in WASH during the period 2010–2015, while INFOM and other entities represented 16 percent each. Notably, although INFOM carried out 38 percent of WASH investments in 2010, its share declined significantly in subsequent years, averaging only 12 percent of total WASH investments over the period 2012–15 (World Bank 2017).

Some of the most significant constraints to access to WASH in Guatemala are: the absence of a well-defined and effective legal and institutional sector framework to provide guidance and define roles and responsibilities; the lack of capacity and resources in rural areas; and the challenge of maintaining and better directing financial resources to those groups that have been historically neglected (that is, rural areas and indigenous groups). Thus, achieving more equitable provision of WASH services in Guatemala will require refocusing efforts and increasing available resources to aid the provision of WASH services in rural areas, while developing a broader strategy to address the medium-to-long run sustainability of services.

Information and data on financing and expenditure in the WASH sector in Guatemala are difficult to acquire, especially given the fragmented set of institutions across different levels of government responsible for the provision and administration of WASH services and policies. As a result, the quality of data presented may be suboptimal (box 7.1). Nonetheless, the following section offers an analysis of public expenditures in the WASH sector in Guatemala.[1]

Total Government Expenditure in the Water Supply and Sanitation Sector

Investments in the WASH sector in Guatemala averaged close to US$178 million (about US$48 million in real terms) per year between 2010 and 2015 (figures 7.6 and 7.7). As a result of decentralization implemented in 2002, municipal governments now execute the largest share

Box 7.1: Spending Data Limitations

Several strategic government agencies, such as the National Ministry of Finance (MINFIN), the National Statistics Institute (INE), and the General Secretariat for Planning and Programming (SEGEPLAN), regularly publish reports and provide data and information on social services such as health, education, and water. In 2008, the Guatemalan Congress passed the Law for Free Access to Public Information, which is a constitutional provision that guarantees Guatemalans freedom of information to data on the budget and national revenues. However, there are severe constraints regarding the quality, timeliness, and availability of data. The multiplicity of actors and overlapping roles that followed decentralization has made it harder to ensure the quality and reliability of data collected. For example, when analyzing expenditure data from different sources but for the same concepts, the numbers are different. Moreover, service providers at rural levels may have data for some years, but not for others. Likewise, there are gaps in operation and maintenance data. This makes public oversight at the national and subnational levels difficult and also makes analyzing expenditures in the WASH sector difficult.

Figure 7.6: Total Nominal Expenditures in WASH, 2010–15
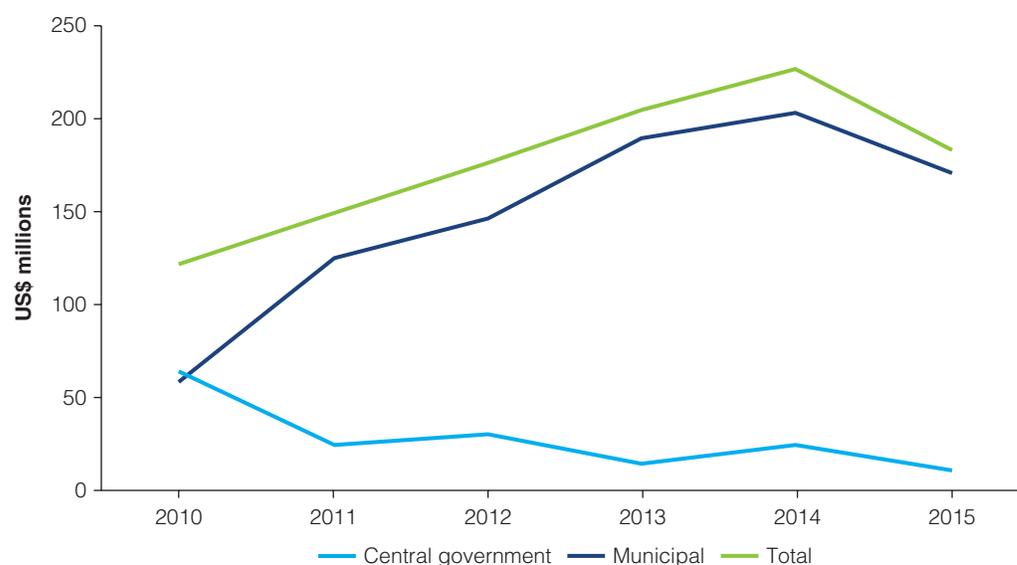
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted.

of total water and sanitation expenditures. From 2011 onwards, the gap in expenditures between central and municipal governments (and decentralized entities)[2] increased dramatically (figures 7.6 and 7.7). Figure 7.7 shows total expenditure in real terms between 2010 and 2014. Notably, there is a six-fold increase in capital expenditures in the WASH sector. However, despite this increase, the sector is still spending little in comparison to other sectors (for example, education and health), and in relation to what is likely necessary to meet the SDGs.

Figure 7.7: Total Real Expenditures in WASH 2010–15
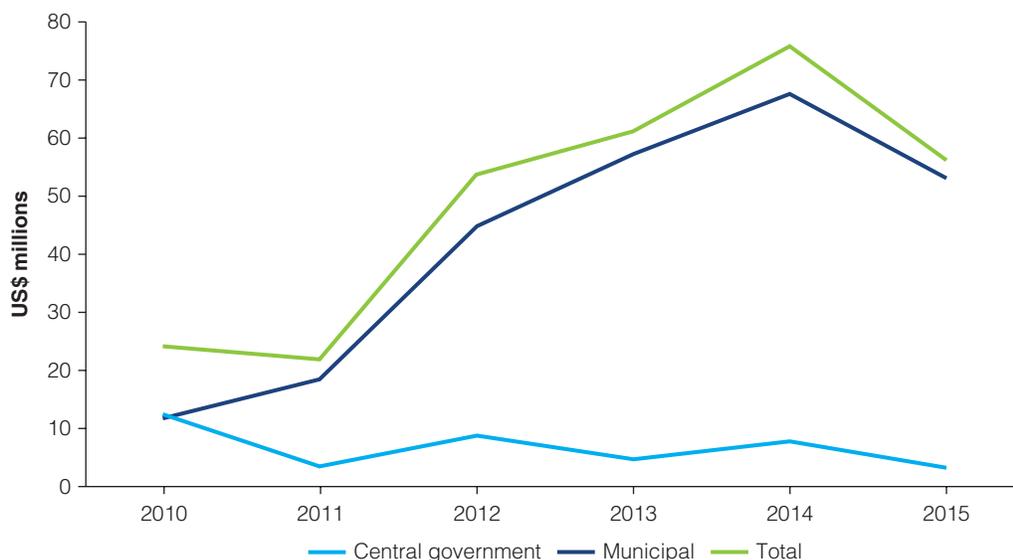
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted. Base year = 2001.

Figure 7.8: Total Expenditures in WASH as a Percentage of GDP, Disaggregated into Capital and Recurrent, 2013–15
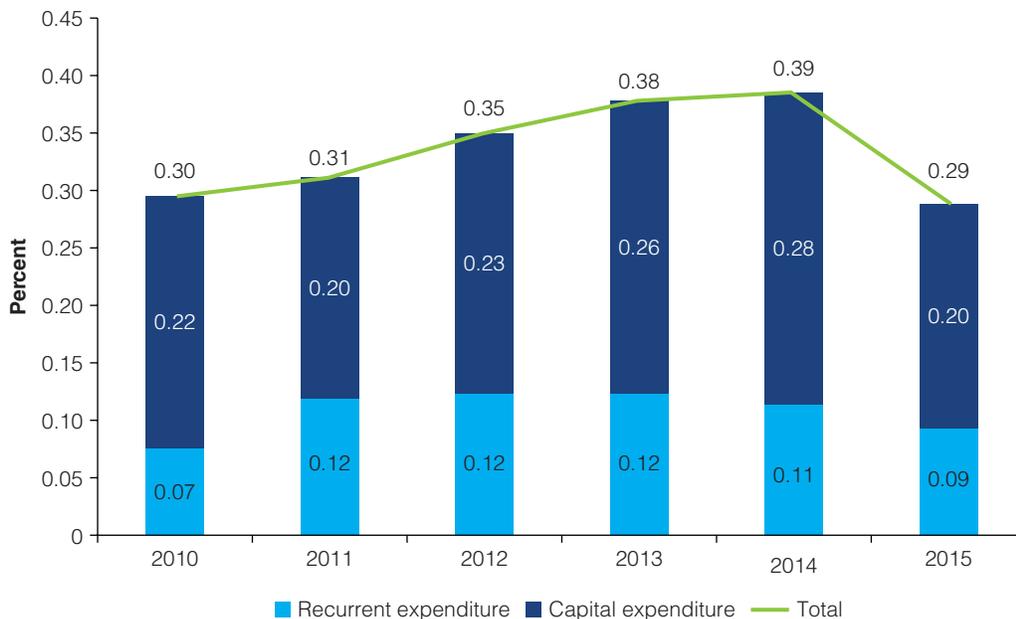
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted.

Total expenditures in the sector averaged 0.34 percent of GDP between 2010 and 2015, with capital expenditures averaging 0.23 percent of GDP and recurrent expenditures averaging 0.11 percent (figure 7.8). During this period, total government expenditures on water supply and sanitation was driven mostly by capital expenditures, but has been insufficient to meet the needs of the sector.

Figure 7.9: Total Expenditures in WASH as a Percentage of GDP, Disaggregated into Central and Municipal, 2010–15
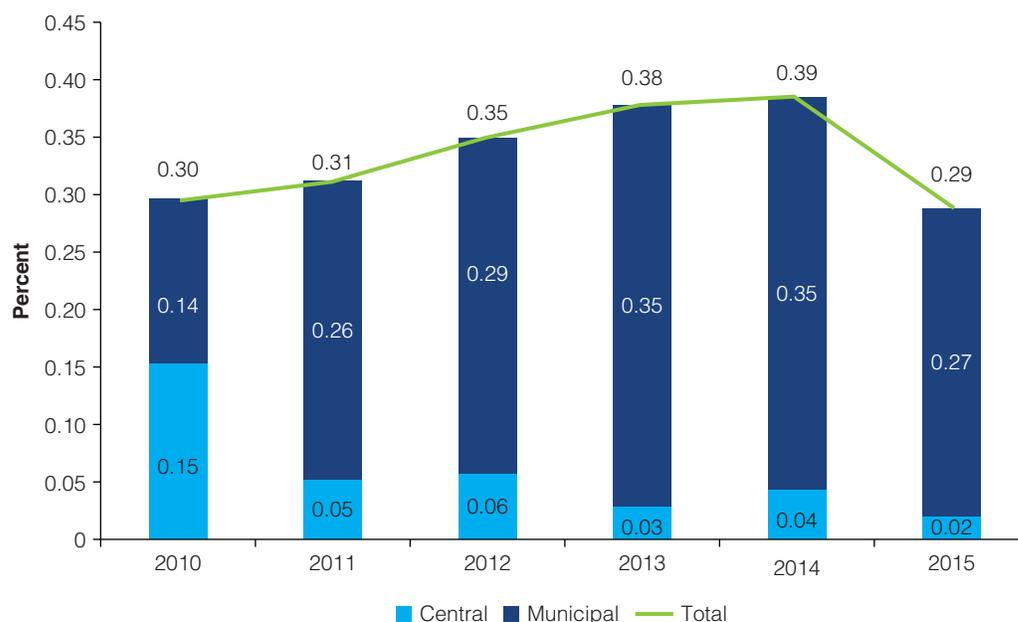
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted.

When disaggregating total expenditures into central and municipal components, it becomes clear that municipal governments executed the largest portion (figure 7.9). Between 2010 and 2015, municipal government expenditures averaged 0.28 percent of GDP, while central government expenditures only averaged 0.06 percent of GDP. The central government's total expenditures in WASH dropped from US$62.9 million in 2010 to US$10.8 million in 2015, in nominal terms, a reduction of about 80 percent in five years (figure 7.10). In real terms, this represents a reduction of about 73 percent in five years.

Capital investments in WASH are biased toward infrastructure at the potential expense of the mid- to-long-term sustainability of services. Guatemala's investment in capital expenditures between 2010 and 2015 averaged about 0.23 percent of GDP (figure 7.8). However, this number is below the level of capital investment of Guatemala's well-performing regional peers, for example, Brazil (0.27 percent) and Mexico (0.29 percent). Moreover, in 2015, capital investment fell to 0.20 percent of GDP, lower than the regional average required. In 2016, the drop in capital investment for the WASH sector was even larger. Similarly, the central government has greater levels of capital expenditures than recurrent expenditures. This corresponds to the municipal governments' expenditures on water supply and sanitation, where capital expenditures have outgrown recurrent expenditures by almost two-fold in the last few years (figures 7.12 and 7.13). Furthermore, the difference between central and municipal expenditures aligns with the division of responsibilities between tiers of government as a result of decentralization policies in the provision of WASH services (figure 7.9). The low levels of recurrent expenditures (both at the central and municipal tiers of government) confirms the emphasis on capital expenditures in Guatemala's WASH sector in recent years and may also be an indication of the neglect of operation and maintenance impacting the overall sustainability of services. In particular, average total expenditures in the WASH sector by the central government amounted to only 0.058 percent of GDP (figure 7.11) between 2010 and 2015, with average capital expenditures being about 0.056 percent, and the average recurrent expenditure representing only 0.002 percent of GDP.

Figure 7.10: Total Nominal Central Government Expenditures in WASH,
Disaggregated into Recurrent and Capital, 2010–15
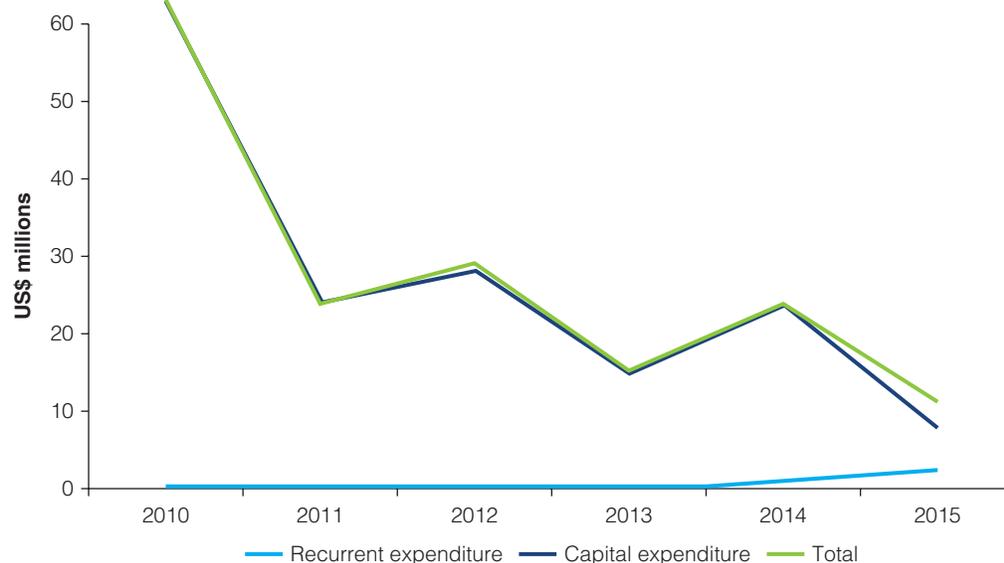
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted. Data on Recurrent Expenditure missing for 2010, 2011, 2013.

Figure 7.11: Total Central Government Expenditures in WASH as a Percentage of
GDP, Disaggregated into Capital and Recurrent, 2010–15
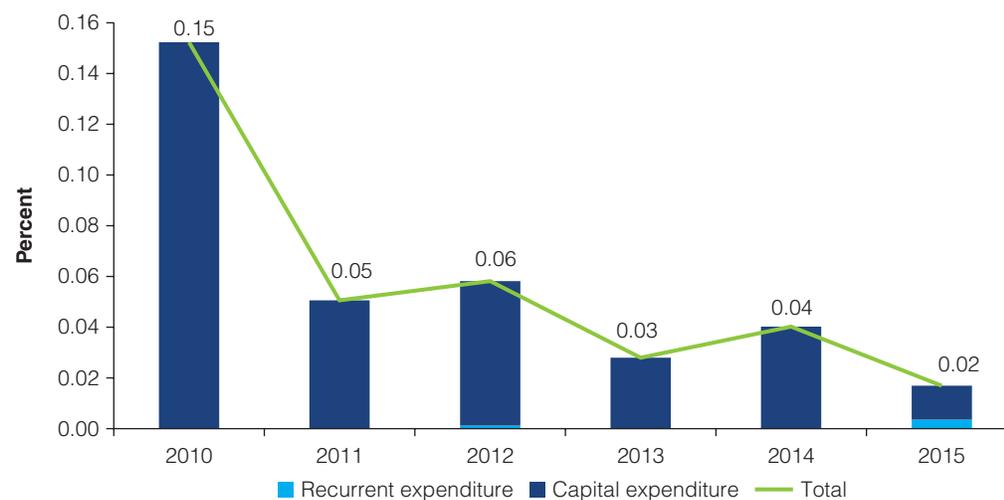
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted. Data on Recurrent Expenditure missing for 2010, 2011, 2013.

**Limited investment in the sector will make it difficult to achieve the SDGs. The investment
needed in Latin America and the Caribbean to achieve the SDGs (targets 6.1 and 6.2) is
estimated to be about US$14 billion per year, or approximately 0.23 percent of the regional
GDP per year (Hutton and Varughese 2016).**[3] The global average capital cost of achieving
the SDGs is estimated to be 0.39 percent. For the Latin America and the Caribbean region,

Figure 7.12: Nominal Total Expenditures by Municipal Governments in WASH, Disaggregated into Capital and Recurrent, 2010–15
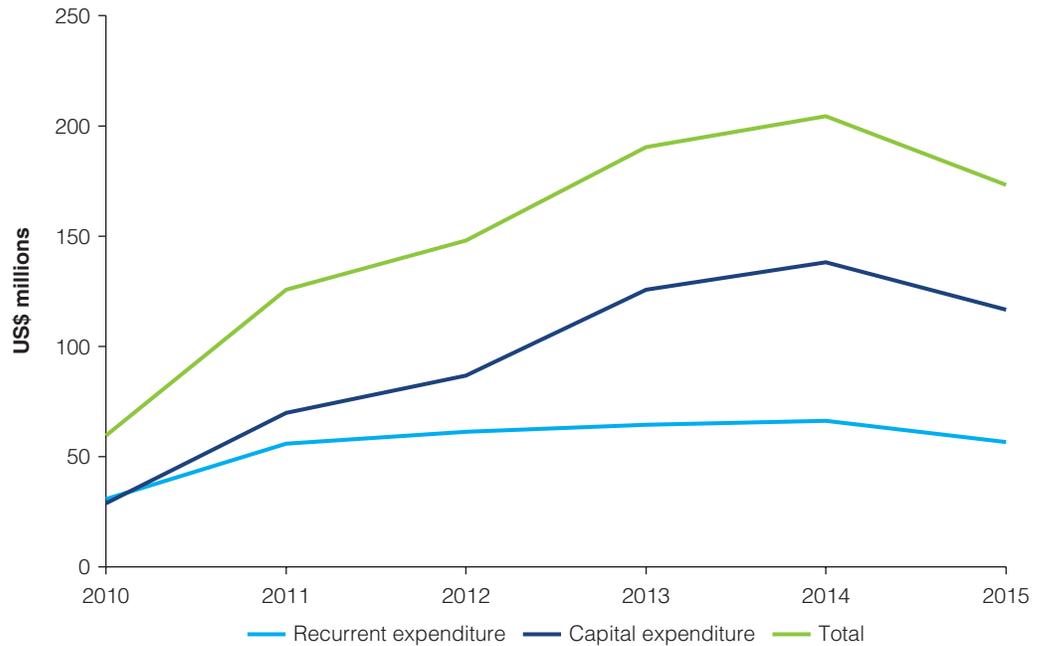
Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted.

Figure 7.13: Total Expenditures by Municipal Governments in WASH as a Percentage of GDP, Disaggregated into Capital and Recurrent, 2010–15

Sources: SICOIN 2010–15; WDI 2016.
Note: Actual expenditures, not budgeted.

Guatemala's Water Supply, Sanitation, and Hygiene Poverty Diagnostic
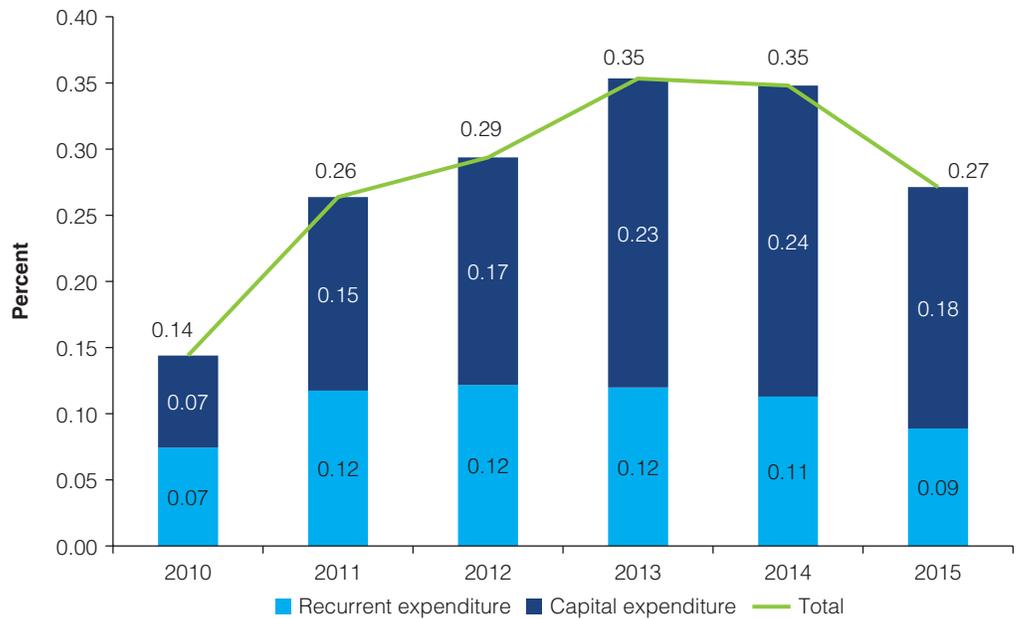
however, the average level of investment needed is approximately 0.23 percent and ranges from 0.10 percent to 0.39 percent (Hutton and Varughese 2016).[4] The sensitivity analysis to calculate the regional average of 0.23 percent of GDP assumes five percent economic growth in the region. If economic growth is less than five percent, this number will necessarily increase; to the contrary, if economic growth is greater than five percent, this number will decrease. Given the fact that Guatemala's growth in GDP averaged 3.67 percent between 2010 and 2015, (that is, below five percent), the capital costs required to achieve the SDGs is therefore higher than the regional average of 0.23 percent, and Guatemala should aim to invest upwards of the regional range, for example, 0.39 percent of GDP, to successfully achieve the SDGs.[5]

Universal coverage requires more than capital inflows: financial and institutional strengthening and technical assistance programs will be needed to ensure that capital investments translate into sustainable services. Given that public investments are already heavily focused on capital investments, this is especially relevant to Guatemala. The lower levels of expenditures by the central government and the lack of an institutional and legal framework to effectively support the WSS sector may help explain some of the failures of the WSS sector in Guatemala, and government efforts should be focused in this direction. These efforts should encompass support for the broader classification of SDGs. For example, financial and institutional strengthening will enable targets related to water quality, sustainability, and water resource management (targets 6.3, 6.4, and 6.5) to be addressed. At the same time, providing technical assistance and engaging local communities in improving water supply and sanitation management will help meet targets 6.7 and 6.8. Ultimately, a holistic approach to addressing gaps in the WSS sector in Guatemala should be adopted.

Total Municipal Expenditures in the Water Supply and Sanitation Sector

Municipal Governments (and decentralized entities) spent an average of US$150 million per year in nominal terms, (in real terms it was 42 million dollars per year) in the WASH sector between 2010 and 2015. The amount of expenditures undertaken by municipal governments on water supply and sanitation has sharply increased in a relatively short period of time. Total expenditures in WSS by municipal governments rose from US$59.5 million in 2010 to US$173.1 million in 2015, in nominal terms (figure 7.12). In other words, total nominal expenditures by municipal governments more than tripled in five years. In real terms this increases went from US$11.5 million in 2010 to US$53 million in 2015 an almost 5-fold (4.6 to be accurate) increase in five years.

Moreover, in recent years, the difference between capital and recurrent expenditures executed by municipal governments has grown (figures 7.12 and 7.13). In 2010, current and capital expenditure were practically the same. Since then, the difference has grown with municipal governments spending more in capital than recurrent expenditures.[6] The average total capital expenditures for municipal governments in the WSS sector between 2010 and 2015 was 0.17 percent of GDP, and the average recurrent expenditures represents about 0.11 percent of GDP (figure 7.13).

In summary, the average total expenditures of municipal governments in the WSS sector between 2010 and 2015 amounted to about 0.28 percent of GDP, with average capital expenditures being about 0.17 percent and average recurrent expenditures representing 0.11 percent of GDP. In contrast, the average total expenditures of the central government in the WSS sector between 2010 and 2015 amounted to about 0.058 percent of GDP, with average capital expenditures being about 0.056 percent and average recurrent expenditures representing 0.002 percent of GDP (figure 7.11). The sum of total municipal (0.28 percent) and total central government (0.058 percent) expenditures shows the total expenditures in the sector, which equals 0.34 percent of GDP on average between 2010 and 2015.

Figure 7.14: Average Total Government Expenditures as a Percentage of GDP for Selected Sectors, 2010–15
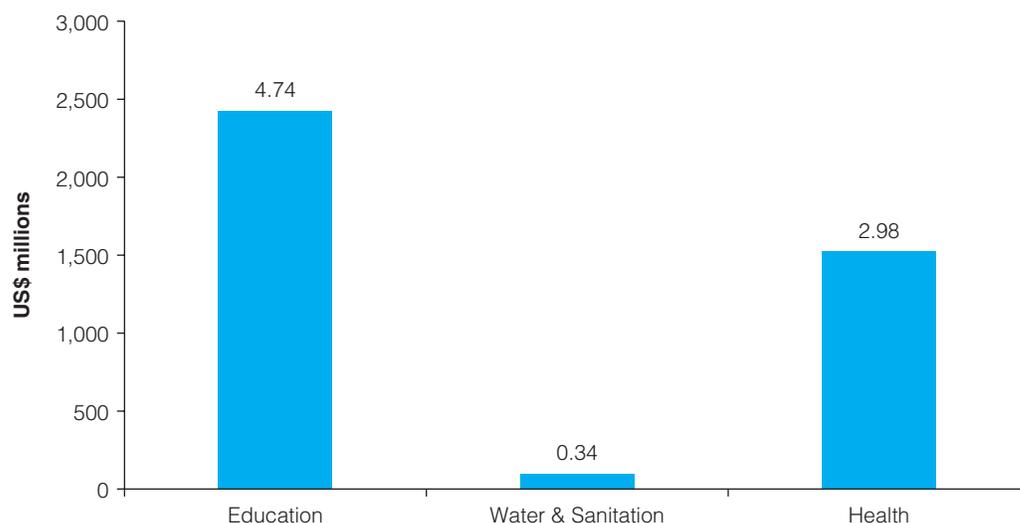
Source: BOOST, 2010–15 for Education and Health. SICOIN 2010–15 for WASH sector. Actual expenditures in nominal values.

Total Government Expenditures in Education, Health, and Water

There is a great disparity in expenditures (and therefore investment) between the WSS sector and other public sectors in Guatemala. When comparing WASH sector expenditures with other government sectors, WASH expenditures account for a significantly smaller share as a percentage of GDP (figure 7.14). For example, the average total expenditure for education and health as a percentage of GDP between 2010 and 2015 was 4.74 percent and 2.98 percent respectively, almost 14 times and 9 times greater than total expenditures in water supply and sanitation.

Budget Execution Rates in Guatemala

Budget execution rates show a certain level of inefficiency in spending in water supply and sanitation in Guatemala, a factor that further constrains the sector. Capacity limitations at different administrative levels may be among the critical factors affecting the progress of physical implementation and consequently budget utilization. A number of problems need to be improved to enhance budget execution, including operational and management capacity, transparency in the allocation of resources, and a larger participation by the central government in assisting less-developed service providers, among others. Moreover, for the majority of service providers, user fees do not cover the full costs of delivery, and thus WASH services are subsidized. Depending on how much cost recovery there is, and how budget shortfalls are financed, this could also affect how the budget is executed.[7]

Figure 7.15 illustrates budget execution rates by comparing original or planned budgets versus actual or executed expenditure. Data on WASH show the budget execution rate for the period 2010–16 averaged about 74.3 percent. In other words, about one quarter of the original budget allocated to water supply and sanitation was not executed (25.7 percent). This number was even larger in 2015 and 2016 and averaged 36.5 percent; that is, one third of the budget

Figure 7.15: Budget Execution Rates (Percentage) for WASH, 2010–16
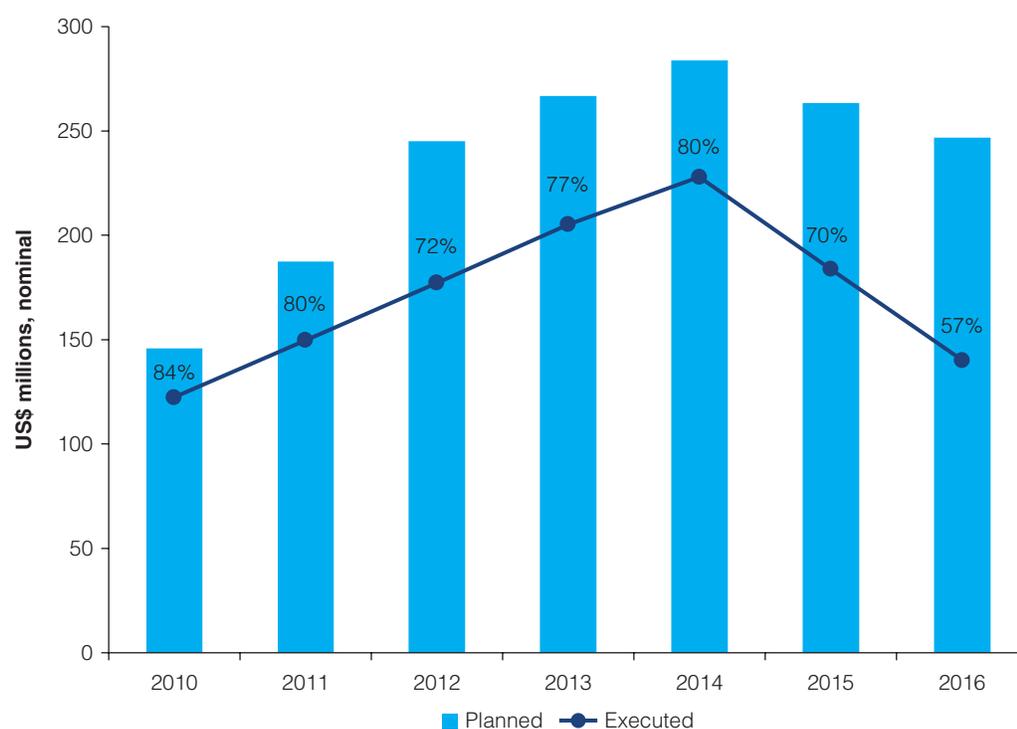
Sources: SICOIN 2010–2016.
Note: Data for 2016 are until December 21st, 2016. Fiscal year runs from January 1st to December 31st.

allocated to WASH was not executed. These numbers imply there might be important factors at the organizational level that affect the under-execution of the budget destined to the WASH sector, and therefore the variation in the quality and quantity of public service delivery in Guatemala.

This inefficiency in spending may be explained by the decentralization policies being applied without further support, monitoring and guidance, particularly in those areas with fewer resources and less human capital. Put differently, the inefficient budget execution rates may be a result of low operational, technical and management capacity of both rural and urban service providers, which prevents them from delivering sustainable services, as well as the almost nonexistent support of the central government, especially in rural areas.

Equity in Finance: urban versus rural funding, and disaggregated WASH expenditures. In spite of the legal mandate, measures agreed to in municipal development plans do not always materialize in municipal annual budgets. While Guatemala is aiming to provide access to WASH services for all, evidence suggest that funds are mainly directed to urban areas and for improved drinking water, whereas the underserved are mainly concentrated in rural areas and primarily lack access to improved sanitation.[8] A more equal distribution of services between urban and rural areas, and between access to drinking water and improved sanitation, is required to help address some of the equity issues surrounding access to WASH services in Guatemala. Furthermore, as ethnicity and poverty have been shown to predict access to improved drinking water and sanitation, special attention will need to be given to these sectors of the population that are frequently the most disadvantaged.

Converting Financial Resources into Sustainable Services

The results of the public expenditure and governance analyses highlighted common findings that reveal bottlenecks that prevent the sector from converting financial resources into sustainable services. The most relevant findings for public expenditure purposes include the following:

- The model of governance, regulation, and management of the sector is dysfunctional, with gaps and duplicities in the roles assigned to different actors at different levels of government. This prevents adequate inter-institutional coordination and equity criteria for the adequate and efficient targeting of investments, which would otherwise contribute to improvements in the WASH sector.

- In recent years, there has been significant under-execution of the resources/budget allocated to investment in WASH, mainly because of a lack of support from the central government to municipal and community service providers for the proper design, operation, and management of sustainable services.

- Resource allocation criteria favors service providers or communities with greater capacities.

- There are no geo-referenced or updated information systems that accurately track access and quality of WASH services, limiting the capacity of decision makers to adequately prioritize investments.

- There is limited interest in collecting fees for the purposes of cost-recovery. Consequently, service providers are less accountable to customers.

- Insufficient information on the performance and standards of service providers limits the ability of users to hold providers accountable for service delivery.

Concluding Remarks

The level of expenditures in the WASH sector in Guatemala is insufficient. Total expenditures in the sector averaged 0.34 percent of GDP between 2010 and 2015, a fraction of the total expenditures committed to health and education. During the same period, capital expenditures in Guatemala averaged 0.23 percent of GDP; however, this number is below the level of capital investment of Guatemala's well-performing regional counterparts, such as Brazil and Mexico. Moreover, Guatemala's average growth in GDP of 3.67 percent between 2010 and 2015 is less than the five percent growth needed to achieve the SDGs at current levels of capital expenditures. Thus, Guatemala will likely need to commit levels of capital expenditures toward the higher end of the regional range[9] to successfully meet the SDGs. Compounding efforts, capital investment in Guatemala fell to 0.20 percent of GDP in 2015 and appears to have remained below average in 2016. The level of efficiency in expenditure and management capacity should be enhanced. As illustrated by the unsatisfactory level of budget execution rates, it is important to improve effective expenditure of the budget allocated to the WASH sector, as well as to overcome capacity limitations, in order to maximize the quality of the delivery of public service in Guatemala.

Notes

1. Data on public expenditure used in this analysis come from the BOOST database for Guatemala (2010–15), information provided by the Ministry of Public Finance

(SICOIN) (2010–15), the BOOST Guatemala database, and the World Development Indicators (WDI).

2. Expenditure executed by decentralized entities has been included in these calculations, and include data from INFOM, EMPAGUA, and IGSS when available.

3. Thus, the global annual capital costs of meeting SDG targets 6.1 and 6.2 are US$114 billion overall costs, of which the Latin America and the Caribbean region accounts for 12 percent of the global costs of meeting the targets, about US$14 billion per year (Hutton and Varughese 2016).

4. Ranges are based on the variables adjusted in the sensitivity analysis. Hutton and Varughese 2016.

5. A sensitivity analysis for Guatemala would need to be calculated to arrive at a more accurate number.

6. Again, this aligns with the division of responsibilities between tiers of government according to decentralization, as mentioned above.

7. It is worth highlighting the importance of doing a more detailed analysis on water pricing policies and water tariff structures in Guatemala. This knowledge will likely be of importance, as it will help to better understand the resource mobilization constraints that are commonly identified as major impediments to the rapid expansion and improvement of water services.

8. MAPAS Regional Synthesis, 2015.

9. The average level of capital expenditures required to meet the SDGs regionally is 0.23 percent of GDP and ranges from 0.10 percent to 0.39 percent. A sensitivity analysis for Guatemala would need to be calculated to arrive at a more accurate number.

References

Cabrera, Maynor, Nora Lustig, and Hilicías Morán. 2014. "Fiscal Policy, Inequality and the Ethnic Divide in Guatemala', Commitment to Equity." Working Paper 20, Tulane University, New Orleans, Louisiana.

CEPAL (Comisión Económica para América Latina). 2014. Centroamérica: Estadísticas del Subsector Eléctrico 2013. Estudios de Investigaciones, Santiago de Chile: CEPAL.

Chakeri, Jasmin. 2016. "Guatemala – Public Expenditure Update." Mimeo. World Bank, Washington, DC.

Hutton, G. and M. Varughese. 2016. "The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene." World Bank, Washington, DC.

Mejía, A. 2014. "Scarcity in Latin America and the Caribbean: Myths and Reality." In *Water for the Americas: Challenges and Opportunities*, edited by A. Garrido and M. Shechter, Abingdon-on-Thames, UK: Routledge.

Schneider, A. 2012. *State-Building and Tax Regimes in Central America*. Cambridge University Press.

World Bank. 2013. *Towards Better Expenditure Quality: Guatemala Public Expenditure Review*. Report 78000, Central America Country Management Unit, Poverty Reduction and Economic Management, Latin America and the Caribbean. World Bank, Washington DC.

———. 2017. "Análisis de Pobreza y la Prestación de Servicios de Agua y Saneamiento en Guatemala: Retos y Oportunidades." Programa de Agua y Saneamiento. The World Bank Group, Washington, DC.

WEF (World Economic Forum). 2015. *The Global Competitiveness Report 2015–2016*. WEF, Geneva. http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report _2015-2016.pdf.

Chapter 8
Conclusions and Recommendations

Addressing the needs of the most vulnerable will require strong political leadership, a clear vision, a well-developed strategy, and the appropriate mechanisms to execute the plan. Interventions in water and sanitation in Guatemala are currently prioritized through a variety of multisector arrangements designed to reduce chronic malnutrition, which is a national priority. However, for years, programs and investments in the WASH sector have not been executed at the required level, and current initiatives have not been effective in reducing chronic malnutrition. Importantly, Guatemala would benefit from having a consolidated national water authority and a national program to strengthen institutions at all levels of government focused on specific interventions to address current weaknesses in the provision of services, particularly in the area of rural sanitation and hygiene.

There are many areas of opportunity for improving the governance of the WASH sector and for increasing access to sustainable services in Guatemala. This report summarizes critical recommendations into six areas, described below, designed to lay the foundations for continued improvement moving forward. Many of the recommendations address deeply embedded institutional constraints that must be overcome, which may take more time to discuss. An action plan must then be agreed upon and implemented. However, some constraints may be easier to tackle which can yield important results. These include: improving funding mechanisms to facilitate project execution; supporting the development and implementation of improved information systems; and promoting awareness of the benefits of improved hygiene practices and access to sustainable WASH services.

1. **Major reforms to the institutional sector framework are needed at the national and subnational levels to ensure adequate execution and oversight of public policies and regulations.** Three aspects deserve particular attention and warrant further analysis to determine the best course of actions to improve the current scenario:

   - **An empowered national sector authority is necessary to overcome many of the identified constraints and bottlenecks to the provision of sustainable services.** The sector needs to function in a more coordinated and consolidated manner, and adhere to a sector policy that guides all national and subnational interventions, in order to achieve the sector goals of improving the quality and coverage of services for all. The question of why MSPAS has not played an effective role thus far should be analyzed in detail, and the conditions needed for MSPAS, or another institution or body, to assume this role should be carefully evaluated.

   - **Harmonized regulations and effective oversight are needed to ensure greater accountability and improved performance of service providers.** Incomplete regulation at the central level and disorganized regulation at the municipal level without national guidelines shifts regulatory responsibility to the municipalities, fails to encourage accountability, and increases the risk of low quality and unsustainable services. In general, the capacity of municipalities to plan, provide, and monitor services is weak. Specific guidance is needed to better organize resources and to provide sustainable services. Moreover, general standards for service providers with respect

to their rights, duties, and obligations, including opportunities and mechanisms for accountability, citizen participation, tariffs, and social audits, must be developed.

- **Strengthening the organization and capacity of service providers in rural areas is essential to addressing the needs of the most vulnerable.** Rural areas must be better integrated into the municipal planning process. In addition, the role of CAAP must be integrated into the sector's institutional framework to guarantee that they receive adequate support throughout and beyond a project's lifecycle. Targeted technical assistance could help improve local capacity, particularly to operate and maintain systems and to improve service delivery. Public-cooperative-community models for the administration, operation, and maintenance of water supply and sanitation systems could be explored. Municipal service laws should be amended to recognize the importance of preserving civil memory by limiting changes in municipal civil servants engaged in technical and policy roles that often occur pursuant to general elections.

2. **Reducing geographical disparities and achieving the SDGs will require a dedicated sector policy that clearly defines the provision and quality of services in rural areas, with a particular emphasis on rural sanitation and hygiene.** Living in a rural area significantly limits access to safer drinking water and sanitation. However, regulatory and legal frameworks prioritize urban areas, leading to the absence of a dedicated sector policy that clearly addresses the provision and quality of services for rural users. National data mask disparities at the local scale, where distinct patterns of access to WASH services persist. A better understanding of specific political and socioeconomic constraints at local scales is needed to inform policy and to overcome the major gaps in local access, especially in poor, rural, or indigenous communities. Specifically, a more detailed analysis of the drivers affecting access to WASH services and their links to poverty and health should be undertaken at the departmental or municipal level to help identify, develop, and implement policies and programs designed to address the needs of the rural population. Furthermore, given the significant gap in access to improved sanitation in rural areas, and the resulting strong links to poverty and health, this subsector should also be evaluated in greater detail.

3. **Combatting childhood disease will require a multisector approach to improved hygiene and rigorous research to better understand the effects of aflatoxins on chronic malnutrition.** Lack of an appropriate place for hand washing with soap and water is a severe obstacle to breaking fecal-oral disease transmission routes, increases acute respiratory infections, and impacts gender inequities in access to WASH services. Increasing access to places of hand washing, particularly in poor, rural communities, while increasing awareness of disease transmission routes and the importance of treating drinking water at home, could help reduce the incidence of diarrheal disease and respiratory infections underpinning malnutrition in children. However, despite concerted efforts by the government, there has been little progress in reducing overall chronic malnutrition. This supports the increasing body of evidence that suggests chronic malnutrition may be associated with consuming aflatoxin-contaminated food and further evidence that suggests aflatoxins may be widespread in Guatemala. Conceivably, an already-compromised digestive system combined with limited access to improved WASH services may exacerbate susceptibility to aflatoxin poisoning. Further research in this area is urgently needed. Such endeavors should be supported by a consolidated multisector approach to interventions already targeting practices of improved health and hygiene, such as the World Bank-supported Guatemala Nutrition and Health Project, *Crecer Sano*.

4. **Providing sustainable delivery of public[1] services and meeting the SDGs will require increased levels of investment and greater budget execution.** Current levels of investment and budget execution will likely limit Guatemala's ability to meet the SDGs. Thus, from the public expenditure perspective, a two-pronged approach is necessary:

- **Maximize public investment and increase funding for recurrent expenditures, such as operational and maintenance capacity, and for asset replacement and renewal.** There is a great disparity in expenditures (and therefore investment) between public sectors in Guatemala as a share of GDP. At a level of 0.34 percent, expenditures in the WASH sector was almost 14 and 9 times less than total expenditures in either education or health from 2010 to 2015. A larger share of public resources directed to the WASH sector will be required to help Guatemala move closer to achieving the SDGs, with recent evidence suggesting that this desired number could be upwards of 0.39 percent of GDP.

- **Improve spending efficiency and reform the budget execution architecture.** Budget execution rates for the period 2010–16 indicate that one quarter of the budged allocated to the WASH sector was not executed. Thus, it is important to improve the effective expenditure of the budget allocated to the WASH sector, as well as to overcome capacity limitations to efficient spending, in order to maximize the provision of quality public service delivery in Guatemala. In this context, the national investment system must be reviewed to ensure that weak municipalities are not excluded from the allocation of investment funds earmarked for the sector. The SEGEPLAN guidelines for the formulation of water supply and sanitation projects should be reviewed to ensure that small projects are not burdened with the same requirements as larger projects. Requirements from MSPAS y MARN should also be reviewed to make sure that requirements by the three institutions are congruent. In priority areas, dedicated technical assistance should be provided throughout and beyond the project cycle so that pre-investment studies are prepared as needed and that projects are fully executed. This would help guarantee that services are expanded to the most vulnerable and also guarantee that low capacity communities are not unduly penalized because of past poor performance.

5. **Increasing accountability within the sector and improving decision-making to better inform policy will require access to timely, relevant, accurate, and transparent information.** Strengthening and consolidating SIGSA and SIVIAGUA (the Health Management Information System and the Water Quality Monitoring System) to better respond to the needs of the sector would be a good first step and could proceed in a number of ways:

- Expanding databases to include information on water availability, quantity, and quality, in addition to systems and service delivery, would improve oversight and enable decision making to mitigate pollution and impacts from climate change, especially in rural areas. This should include targeted technical assistance to departmental inspectors, municipalities, CAAP, and service providers (including water vendors) designed to address the widespread lack of water treatment and to enhance water quality monitoring programs. Additional human resources and increased funding to strengthen capacities at all levels and to support timely data collection activities and updating of the systems will be needed.

- Different ICT-based applications have been used for citizen/client engagement solutions to inform governments, government agencies, and service providers by providing proactive feedback from customers/citizens about their experience as water service users. Some schemes have also been used for supervision purposes at project levels and with transparent objectives. In line with this objective, the database's compatibility with the Information System for Rural Water and Sanitation (SIASAR), officially adopted by FOCARD-APS (*Foro Centroamericano y República Dominican de Agua Potable y Saneamiento*) as the regional information system of choice, and which has already been implemented in four countries in Central America and seven countries across Latin America and the Caribbean, could also be explored.

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6. **Increasing the public's willingness-to-pay (WTP) will require a measureable increase in access to services and improved performance.** The systemic culture of nonpayment for services affects the sustainability of the WASH sector. However, the public does pay for services, and those with less access to improved services in rural areas are the ones who generally pay the most through poor health and low quality of life. The benefit-cost ratio of water supply and sanitation interventions in Latin America and the Caribbean has been estimated at 5.2 (7.3 for sanitation and 2.4 for water supply), and thus the case for providing improved services is compelling. Furthermore, studies suggest that average WTP for water increases when improvements in access are greater. Specifically, WTP has been shown to increase 2.5 times for access to piped water versus access to improved water in some of Latin America's most vulnerable countries.[2] In short, the economic imperative for increasing access to improved WASH services is strong, and leveraging success can increase WTP and lead to improved sustainability overall within the sector.

Notes

1. Increased private sector participation could potentially benefit the WASH sector through, for example, performance-based contracts designed to improve service delivery, Public Private Partnerships, delegated management, and so forth. However the lack of available information precluded an assessment of the private sector's current role in the WASH sector in Guatemala and a detailed analysis would be required prior to drawing meaningful conclusions.
2. Average WTP was estimated to increase from US$18.81 for access to improved water to US$48.69 for access to piped water. This is compared to estimated costs of US$3.10 and US$13.45 respectively in Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, and Peru (Van Houtven et al. 2017).

Reference

Van Houtven, G., S. Pattanayak, F. Usmani, and J. C. Yang. 2017. "What Are Households Willing to Pay for Improved Water Access? Results from a Meta-Analysis." *Ecological Economics* 136, 125–35. doi:10.1016/j.ecolecon.2017.01.023.