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Water and Sanitation in Belize

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Abstract

In the last decade, Belize has seen major improvements in access to water, but it is behind in achieving universal access to improved sanitation facilities. Belize has also made progress in terms of the disposal of solid waste in the central and western regions, including in the largest urban area, Belize City. Despite these developments, there is a need to further improve the performance of these sectors, especially in terms of wastewater collection and treatment in urban areas throughout the country and solid waste collection and final disposal in the northern (Corozal and Orange Walk districts) and southern (Stann Creek and Toledo districts) regions of the country. This Technical Note was prepared to support the policy dialogue between the Inter-American Development Bank and the Government of Belize. It provides an analysis of the current situation of the water and sanitation and solid waste sectors in Belize, and makes recommendations on immediate actions to assist in further improving coverage and the quality of the services provided.

JEL Codes: Q25
Keywords: water and sanitation coverage, wastewater collection and treatment, water utilities, rural water systems, solid waste management, solid waste collection and disposal, landfills

Table of Contents

Acronyms and Definitions

BWS	Belize Water Services Limited
CDB	Caribbean Development Bank
DoE	Department of the Environment
EBITDA	Earnings before interest, taxes, depreciation, and amortization
GoB	The Government of Belize
IDB	Inter-American Development Bank
MDG	Millennium Development Goal
MFFSD	Ministry of Forestry, Fisheries, and Sustainable Development
Ministry of Labor	Ministry of Labor, Local Government, Rural Development, and National Emergency Management
MNRA	Ministry of Natural Resources and Agriculture
Ministry of Public Utilities	Ministry of Energy, Science and Technology, and Public Utilities
NRW	Nonrevenue water
OFID	OPEC Fund for International Development
PUC	Public Utilities Commission
SIF	Social Investment Fund
SWMAA 2000	Solid Waste Management Authority Act of 2000, Chapter 224
SWMA	Solid Waste Management Authority
SWMP	Solid Waste Management Project
Town Councils Act 2000	Town Councils Act, Chapter 87, Revised Edition 2000
Village Councils Act 2003	Village Councils Act, Chapter 88, Revised Edition 2003
VWB	Village water board
WASA	Water and Sewerage Authority of Belize
Water Industry Act 2003	Water Industry Act, Chapter 222, Revised Edition 2003

1 Justification

The relationship between poverty, health, and access to water and sanitation services is widely confirmed in the technical literature of the subject and has been recognized by the international community. People who consume polluted water become trapped in a vicious circle of disease, low productivity, and greater poverty. Ensuring access to water and adequate sanitation services is one of the most efficient ways to break this cycle. For this reason the Millennium Development Goals, adopted by 189 countries in 2000, include the targets of decreasing by half the number of people without access to water suitable for human consumption and providing adequate sanitation services by 2015 (IDB, 2007).

Belize has plentiful surface and groundwater resources and is thus unlikely to suffer from water supply shortages in the foreseeable future. With this ready availability of water resources, Belize's water supply coverage levels are comparable to and even better than those of other countries in Central America and the Caribbean. According to Belize's Ministry of Health, in 2009, 97 percent of Belize's population had access to an improved water source. Elsewhere in Central America, coverage ranges from 79 percent in Nicaragua to 97 percent in Costa Rica.

In 2009, 97 percent of the population in Belize had access to an improved drinking water source, which is a significant improvement for Belize when compared to the figure for 2000, which was 92 percent. These statistics from 2009 also indicate that approximately 81 percent of the population use improved sanitation facilities (85 percent in urban areas and 80 percent in rural areas). However, despite these improvements, both water and wastewater services face constant institutional challenges in operations, maintenance, and finance.

In relation to sanitation, it is important to note that sewerage coverage is limited mostly to a few urban areas. In rural areas, access to sanitation primarily involves the use of pit latrines and septic tanks. As for sewerage collection and treatment, only 11 percent of Belize's population (in Belize City, Belmopan, and San Pedro) has access to sewerage services, which include both wastewater collection and treatment. It is important to expand and improve wastewater treatment and collection for the following reasons: the maintenance of public health, the safety and preservation of the environment, and continued economic growth and stability. (Poor sanitation has a detrimental effect on tourism, which comprises a significant portion of the country's economy.)

One of the key challenges facing the Government of Belize (GoB) to improving the situation in the water and sanitation sector is that the country's population of approximately 340,000 people is distributed across a large number of communities. Over one-third of the population lives in about 190 villages and communities, each with less than 4,000 inhabitants. None of these villages and communities has network-based sanitation services due to the high costs of building and operating such small systems. This includes key tourism areas such as Caye Caulker, Placencia, Punta Gorda, Hopkins, Dangriga, San Ignacio, and Santa Elena, which rely on the maintenance of a clean environment to attract tourism. The small size and number of water and sanitation systems also means that it is difficult to adequately staff the service providers (village water boards) with the technical assistance and financial resources necessary to ensure the sustainability of the systems.

Solid waste management is another sector that the GoB has identified for improvement. Until recently, solid waste collected in cities and towns throughout the country was discharged in open or partially controlled dumps. These facilities lacked technical and environmental controls and operated without adequate equipment and sufficient cover material. In coastal areas, the inadequacy of waste disposal practices is a matter of concern due to the environmental vulnerability of the islands, the occurrence of natural disasters, and the proximity of these islands to coral reefs.

Improvements in solid waste management have already taken place in Central Belize and on Ambergris Caye and Caye Caulker. As part of the previous Country Strategy with Belize 2008–12, in 2009 the Inter-American Development Bank (IDB) approved funding for the Solid Waste Management Project (SWMP) with co-financing from the OPEC Fund for International Development (OFID) and the GoB. This project resulted in the construction of a sanitary landfill at Mile 24 of the George Price Highway. This new landfill, which began operations in August 2013, will benefit San Pedro and Caye Caulker, which are major tourism destinations as well as the main urban areas in the districts of Belize and Cayo.[1] Dumpsites in the Western Corridor (Belize City, San Ignacio, and Santa Elena) and on the islands of Ambergris Caye and Caye

[1] The areas that benefit from this project include Belize City, San Pedro, Caye Caulker, Santa Elena, San Ignacio, and Benque Viejo. By the second half of 2014, Belmopan and Burrell Boom are also expected to benefit from the sanitary landfill and the closure of open dumps, as well as from the construction of transfer stations in these two locations.

Caulker are being closed and replaced by transfer stations, from which solid waste will be safely transported to the Mile 24 Regional Sanitary Landfill.

Despite these improvements, there are still significant issues that the GoB must address in order to make advances in the solid waste sector, which include improving collection, transportation, and final disposal in the southern regions (Stann Creek and Toledo districts) and in the north (Corozal and Orange Walk). In regards to the strategic development of the sector and its links with tourism Belize has prioritized the following: improving the management of special wastes such as cruise ship waste; hazardous waste, and medical waste; ensuring the financial sustainability of the solid waste sector; and educating the public about the importance of the proper disposal of solid waste (including recycling).

2 Analysis of the Water and Sanitation and Solid Waste Sectors in Belize

2.1 Institutional Framework for Water and Sanitation and Solid Waste

In Belize, there are two service providers, one for the urban areas and one for the rural areas. Urban areas are covered by Belize Water Services Limited (BWS), the only licensed water and sanitation service provider in Belize; its 25-year license was issued in 2001. The ownership structure of BWS is mixed, with the GoB as the majority shareholder (83.2 percent), and with the Belize Social Security Board and the general public as minority shareholders (10 percent and 6.8 percent, respectively). Appendix A provides more information on the creation and ownership of BWS. The rural water sector in Belize is governed by the Village Councils Act Chapter 88 (hereafter, the Village Councils Act), which establishes the structure of the village water boards (VWBs), which are the entities that provide water services in rural Belize. The VWBs are intended to be financially autonomous and independent from village councils, and they are responsible for overseeing the day-to-day management and operation of rudimentary water systems (RWS) in their village (or, in some cases, VWBs provide service to multiple villages)[2]. There are seven members in each VWB. The Minister of Labor appoints five members in

[2] More specifically, Article 43:05 (1) of the Village Councils Act of 1999 states that water boards are responsible for the following: (i) all operations and maintenance activities necessary for the uninterrupted service of water toits village or community (ii) regulating pumping hours to ensure uninterrupted and continuous water supply; (iii) Keeping proper records and accounts of its activities; (iv) undertaking the expansion of the water supply system as needed; (v) carrying out disconnection procedures; (vi) collecting user fees; (vii) laying water pipes ; and (viii) effectively and efficiently undertaking any other function related to the supply of water.

consultation with the village council and the area representative, and the other two are the village council chairman and the council member.

The Solid Waste Management Authority Act of 2000 (SWMAA 2000)[3], the most important legal instrument governing the solid waste sector, establishes the structure and functions of the Solid Waste Management Authority (SWMA), a corporate body with an independent legal status within the Ministry of Natural Resources and Agriculture (MNRA). The SWMA is responsible for providing arrangements for the collection and disposal of solid waste within a service area. One of the SWMA's main responsibilities is to assist local councils and their sanitation departments with a range of activities, including the following: design and enforcement of regulatory requirements for solid waste management systems; legal support and advice on drafting and renewal of contractual agreements with service providers; design and implementation of waste separation programs at the source; and advice on marketing strategies for waste recycling. Prior to 2008, SWMA was not a strong institution and was understaffed. However, starting in the fiscal year 2008–09, and as part of the GoB's commitment to improve the performance of the sector, SWMA received more adequate resources to help it fulfill its mandate. At present, SWMA functions with a fully staffed team of professionals and a board of directors. SWMA is currently executing the IDB and OFID-financed SWMP.

The Town Council Act Chapter 87 of 2000 (hereafter the Town Council Act 2000) and the Village Council Act also govern the residential and commercial solid wastes. The Town Council Act 2000 establishes the structure and duties of the town councils in Belize and assigns town councils the responsibility for coordinating and managing the collection and removal of all garbage material from all residential or commercial areas in its town. At the village level, Section 23 of the Village Council Act provides that the council may enact by-laws for the cleanliness of streets and other public places.

The legal framework managing hazardous, industrial, and medical waste is less developed than the framework governing residential and commercial waste. The key law governing hazardous and industrial waste is the Environmental Protection Act, the 1992 law that established the Department of the Environment (DoE), which is responsible for enforcing the Act. The Solid Waste Management Plan, developed in 2001, presents a staged approach for

[3] The SWMAA 2000 focuses on residential and commercial solid waste, which defines solid waste as waste that "includes garbage and refuse but shall not include derelict vehicles, construction waste material, limbs of trees, soil, lumber, packaging materials and chemical by-products."

improving all types of solid waste management in Belize. Key actions include strengthening the SWMA (a proposed plan for developing landfills, sanitary landfills, and transfer stations), the implementation of a public education program, and the development of rules to govern the disposal of industrial and medical waste. In 2013–14, the SWMA plans to update the Solid Waste Management Plan.

2.2 Water and Sanitation in Urban Areas

As mentioned above, BWS is the sole provider of water and wastewater services in all major urban areas and contiguous villages in Belize, and provides service in all major urban areas, including Belize City and Belmopan,[4] serving approximately 59 percent of Belize's population. BWS operates 9 offices, 12 water distribution systems, and 3 sewerage systems (Belize City, Belmopan, and San Pedro Town). According to their annual report of 2011–12 (BWS, 2012), BWS provides water services to approximately 48,104 customers (or 216,468 individuals) in Belize's urban and surrounding areas. It also offers experience in developing, operating, and maintaining sewerage systems. However, its largest service gap in the urban areas is in the collection and treatment of wastewater.

Box 1: Assessing the Performance of Water Utilities

The performance of water utilities can be assessed by looking at different measures such as the efficiency of investment and of operations and maintenance. In water utilities, investments in new assets should occur when absolutely necessary. A key element to avoid unnecessary investments is the daily maintenance of pipe networks, which are essential to ensure the long-term operation of assets. (well maintained pipe networks account for as much as 70 percent of the value of a water utility).

One indicator used to measure the efficiency of investments is a value called nonrevenue water (NRW), which is the difference between water produced and water sold to customers. NRW captures both physical and commercial water losses, thus providing a measure of the commercial performance of the utility, which is key to its financial sustainability. Recent studies recommend a NRW value of less than 23 percent for water utilities in developing countries.

Another way to assess the performance of a water utility is to measure the efficiency of operations and maintenance, which is the lowest cost use of inputs in daily operation. One such indicator is the number of staff per 1,000 connections. A high value for this indicator shows an inefficient use of staff. The average for developed countries is 2.1 employees per 1,000 connections.

Source: Tynan and Kingdom (2002).

[4] BWS provides water service in Belize City, Hattieville, Corozal, Orange Walk, Belmopan, San Ignacio, Benque Viejo, Dangriga, Punta Gorda, San Pedro, Caye Caulker, Forest Home/Elridge.

BWS functions well and has made significant improvements in operational performance over the last decade, reducing NRW from 52 percent in 2002 to 27 percent in 2012, which is now amongst the lowest in the Latin American and Caribbean (LAC) region (see Table 1). In 2012, NRW increased from 26.7 percent (2011) to 27.0 percent (2012). BWS states that this increase is due to efforts to increase water pressure and improve the continuity of the water supply. BWS' highest losses are in Belize City, which is supplied by river intake—a relatively inexpensive source of water. BWS plans to reduce NRW to 23.7 percent in 2014–15 (BWS, 2009).

In terms of staff, BWS has an acceptable ratio of 5.2 staff per 1,000 connections (2012), which, as shown in Table 1, is lower than the ratio for similar utilities in the region. Its staff per thousand connections ratio decreased significantly from 2002 (6.7) to 2005 (5.3). Since then, it has stayed between 5.0 and 5.3. Though this ratio decreased in the last decade, it is more notable that the overall staff cost as a percentage of operating expenditures decreased from 38.7 percent in 2005 to 34.9 percent in 2012 and that revenue per employee increased from BZ$123,377 in 2005 to BZ$143,607 in 2012.

The average tariff per 1,000 US gallons has increased approximately 24 percent since 2002, contributing to BWS' strong financial performance. The largest increases occurred in April 2004 (15 percent) and April 2010 (11 percent). Following an April 2012 decision from the Public Utilities Commission (PUC), BWS' average tariff decreased by 7.2 percent. The company also performs strongly in commercial practices, and estimates that its collection rate is approximately 90 percent of billed accounts.[5] In relation to metering, BWS is in a solid position with 100 percent metering of its customers,[6] which is above the LAC average (see Table 1).

[5] Information provided by BWS in an email dated 7 January 2013.
[6] Information provided by BWS in an email dated 3 January 2013.

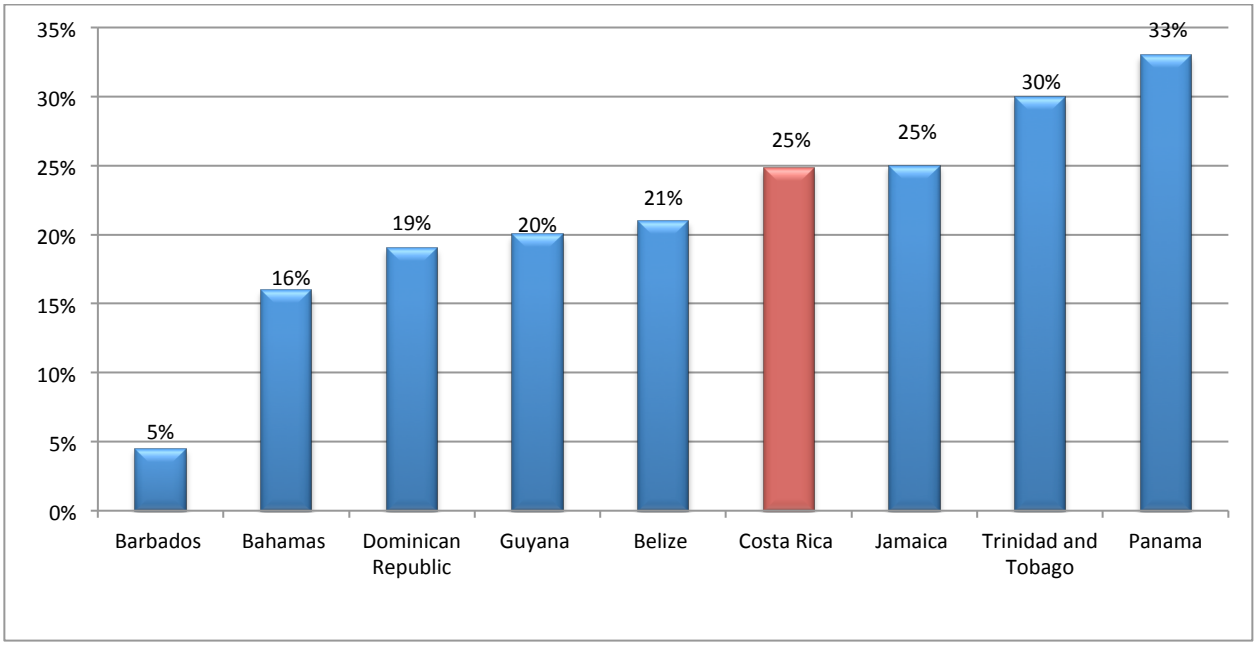
Table 1: Water Supply Indicators In Selected Countries (Urban Areas)

Country	Access to improved source of drinking water	NRW	Employees per 1000 connections	Metering
Bahamas [a]	98%	50%	6.6	100% [c]
Barbados	100%	40%-45%	7.8	96%
Belize	***98%***	***27%***	***5.3***	***100%***
Costa Rica	100%	51%	5.6	95%
Dominican Republic [b]	87%	58%	9	28%
Guatemala [c]	98%	41%	7.6	86%
Guyana	98%	64%	3.2	36%
Jamaica	98%	63%	4.1	70%
Panama	97%	48%	5.1	51%
Suriname	97%	45%	7	100%
Trinidad and Tobago	98%	50%	12.5	4%

Source: Authors' elaboration.
[a] New Providence, [b] Santo Domingo, [c] Guatemala City

BWS has approximately 10,121 sewage connections and provides wastewater services to 21 percent of its customers. This value is very low, and while it is similar to other countries in the region (see Figure 1), it is important to address the demand for sewerage as soon as possible as it poses risks to public health, clean water resources, and tourism.

Figure 1: Percentage of Urban Population Connected to Wastewater Collection Systems



Source: Authors' elaboration.

Sewerage services are only provided in the following three areas: Belize City, Belmopan, and San Pedro. The treatment facilities in Belize City and San Pedro provide secondary treatment, while the facility in Belmopan provides only primary treatment. Belize Water Services Limited does not provide any sewerage services in any of its other service areas nor does it provide collection or treatment of septage from septic tanks. In 2014, BWS plans to start construction on a wastewater treatment plant on the Placencia Peninsula, which is funded by the IDB and the Global Environment Facility.[7] This project will provide wastewater service to the second largest area of tourism growth, which includes 3,000 inhabitants and 7,000 tourists. Also, starting in 2014, BWSL plans to upgrade the wastewater treatment plant in Belmopan and expand the wastewater collection network, thus improving the figures for population with access to wastewater collection and treatment.

While BWS recognizes the need to expand and improve the sewer systems, it states in its BWS Business Plan Review Report 2010–2015 that the main focus is on water; this is due to the extremely high cost of sewerage services (BWS, 2009). Given the importance of wastewater collection and treatment in areas that rely heavily on tourism, BWS and the GoB should consider developing a strategy for sewerage collection and treatment.

As for BWS' financial performance, its operating margin increased from 21 percent in 2002 to 33 percent in 2012. During this period, BWS' operating margin reached a low of 21 percent (2002) and a high of 40 percent (2010). This success is due in part to two tariff increases (15 percent in April 2004 and 11 percent in April 2010). In April 2012, the PUC decreased BWS' tariff by approximately 7.2 percent, which should lead to a decrease in BWS' operating margin in the 2012–13 fiscal year.

For the period 2010–15, BWS' operations and performance targets are guided by its Five-Year Business Plan (2010–215), which prioritizes the following: (i) ensuring that the company secures the investment necessary to meet the needs of population growth; (ii) handling emergency and disaster situations; (iii) providing a fair return to shareholders; and (iv) ensuring the overall viability of BWS (BWS, 2009). To meet these objectives and improve the performance of the urban water and sanitation sector, BWS must make the necessary capital

[7] A first step in the development of the sewerage system is the transfer of the water assets from the Placencia Water Board to BWS. Currently, a Cabinet Paper has established the transfer of the assets, but the assets have not yet been transferred due to community opposition.

expenditures, expand coverage for sewerage services, and continue to meet the performance targets set in the business plan.[8]

Despite its improved performance over the last decade, BWS must face several challenges to increase the quality and coverage of its services, including the following:

- *The lack of a clear plan for expanding sewerage services, especially in tourist areas.* To improve coverage of sewerage services in Belize, the GoB should establish clear objectives for the urban sewerage sector, and BWS should develop a Master Plan for expanding sewerage coverage. This will allow BWS to prioritize its investments and allow the GoB to better understand the costs and benefits of increasing coverage and consider potential sources of funding to cover those costs. Of special importance are the tourist areas of the country such as San Pedro, Caye Caulker, Hopkins, Placencia, and Punta Gorda, which rely heavily on the cleanliness of their coastal areas to attract tourists.
- *The lack of funding necessary for capital investments.* BWS was not able to make capital expenditures planned in the BWS Business Plan Review Report 2010–2015 (BWS, 2009). It did not have enough cash on hand nor did it have the capacity to finance the capital investments.
- *The lack of specific targets for quality of service and for coverage of both water and sewerage.* Though the BWS has established primary targets in business plan (BWS, 2009), it is missing key indicators that should be considered when setting tariffs. It is expensive to improve service quality and expand coverage, and tariffs should reflect such enhancements. Establishing, monitoring, and reporting these indicators will allow BWS to demonstrate its improved service standards and to ask for a tariff that reflects these improvements.
- *The need to improve procedures for monitoring and testing water quality and the quality of wastewater discharge.* BWS should improve its procedures and capacity for monitoring and testing water and wastewater quality. This requires stronger laboratory capability and more transparent procedures for reporting test results.

[8] The performance targets in the business plan include targets for profits, capital expenditures, and overall NRW. Key indicators missing from the plan include collection rate, indicators measuring quality of service, and separate coverage targets for water and sanitation.

2.3 Water Supply and Sanitation in Rural Areas

The rural population of Belize is served primarily by the VWBs (27 of the 194 villages in the country are served by BWS and 132 by VWBs). Approximately 101,093 individuals in rural Belize (87 percent of the rural population) have rudimentary water systems that are run by these VWBs. There are only approximately 117 VWBs, as some service multiple villages. The Ministry of Labor, Local Government, Rural Development, and National Emergency Management (hereafter the Ministry of Labor) govern the VWBs.

The rural population of Belize lacks adequate water supply and sanitation services. Moreover, the quality of the services offered is poor. This is due to the lack of a clear sector strategy and regulation, the weak institutional structure of the sector, and the poor governance framework of the VWBs. In many areas, despite the increases in coverage, the operating performance does not meet the needs of its customers. While information on the performance of VWBs is limited, there are operational and financial indicators that demonstrate their poor performance. In a study of Belize's rudimentary water systems (RWS), the Ministry of Labor (2012) presents information about the poor operational performance of VWBs.

- While there are 92 VWBs that have chlorinators, only 44 of them are chlorinating water (38 percent).
- Only 42 of the 117 VWBs in Belize have metered systems (36 percent).
- Approximately 44 percent of the VWBs have collection rates below 60 percent, and efficiency is generally very poor amongst most.
- The vast majority of VWBs lack the financial resources required to maintain and expand the rural water systems.

None of the village water systems run by the VWBs have sewerage or any form of wastewater treatment. In rural areas, pit latrines and septic tanks are the most common forms of sanitation infrastructure, and homeowners construct their own systems (UNDP, 2011). The Ministry of Labor, the United Nations Development Programme (UNDP), the Ministry of Health, the Social Investment Fund (SIF), and the United Nations Children's Fund (UNICEF) are collaborating on a pilot project designed to improve sanitation in rural areas. The project provides training on how to educate communities to improve sanitation practices and construct

improved sanitation units. It will also review legislation to ensure that the draft Village Councils Act and Water Boards Act are compatible with the Ministry of Health's regulations for water quality. The improved sanitation units, funded by SIF, have an approximate cost of US$125,000 (UNDP, 2012).

The poor performance of VWBs is due, in part, to poor management. The Ministry of Labor (2102) found that only 54 percent of VWBs had enough active members to meet quorum. In addition to this, the report conducted by the UNDP (2011) identifies the poor management of the VWBs as a sector bottleneck, and states two reasons for the poor performance. First, VWB members do not have the technical skills necessary; and second, they are not sufficiently committed to quality service delivery in the communities.

The financial performance of the VWBs varies significantly across Belize and between districts. The Ministry of Labor (2102) presents information on the financial performance of the VWBs at the district level and illustrates the differences in performance. For example, the Stann Creek Water Board has earnings before interest, taxes, depreciation, and amortization (EBITDA), of approximately BZ$1.88 million, while the Orange Walk Water Board has an EBITDA of negative BZ$91,000. The inefficiencies of the VWBs can be seen in their tariff structures. Approximately 64 percent of the VWBs charge flat rates for water service. The majority of the VWBs with flat rates charge BZ$10.00 (US$5.00) per month, but the flat rates range from BZ$3.00 (US$1.50) to BZ$17.50 (US$8.75) (Ministry of Labor, 2012).

Though several of the VWBs are able to cover their operating expenses, they are not financially viable; VWBs are not able to cover necessary maintenance costs and capital expenditures. It is estimated that the GoB provided subsidies of approximately BZ$25 million (US$12.5 million) to cover capital investments by the VWBs between 1997 and May 2012 (approximately US$0.85 million per year). Approximately 30 percent of this investment has been in the rehabilitation, upgrade, and extension of RWS. The UNDP (2011) observes that VWBs are often unable to organize and finance needed repairs. The lack of chlorination further supports the observation that the VWBs are not able to make the necessary capital, and often operating, expenditures.

As for the challenges of the water and sanitation sector in rural areas, major reforms are necessary to ensure that the citizens of Belize's rural areas receive adequate water and sanitation services. These challenges include the assessment of the need for restructuring the sector and for

making extensive capital expenditures. The Ministry of Labor is developing a strategy for the sector. To be effective, the strategy must address the following issues:

- *The lack of adequate planning systems.* The rural water sector in Belize lacks a clear strategy. The sector needs a strategy that sets out the Ministry's plan for expanding water services to underserved areas and for introducing sewerage and improved sanitation systems to larger villages. It is also important to take a clear policy position on when it is appropriate to merge VWBs or to hand responsibility for water services in specific villages over to BWS (currently, this is done on an ad hoc basis, without forward planning).
- *VWBs are not financially sustainable***.** Many of the VWBs are not able to recover the costs of providing service, and few, if any, are able to make the necessary capital expenditures. As a result, VWBs are dependent on unreliable subsidies from the GoB. Their weak financial performance is due to several factors, including the fact that the tariffs are below the cost of providing service (Ministry of Labor, 2012), and there is no transparent structure that governs how water tariffs are set.
- *The institutional framework governing the sector is incomplete.* The institutional framework lacks key policies and regulations that are necessary to ensure the success of the sector, such as: (i) a methodology for setting tariffs, (ii) assignment of responsibility for the sewerage sector to a government entity, (iii) a policy that states when VWBs should be licensed by the PUC, and (iv) a policy that states if, when, and how VWBs should be transferred to BWS.
- *The governance structures of the VWBs are weak*. The Village Councils Act 2003 does not ensure that members of the VWBs have adequate technical skills, nor does it have provisions to ensure that members actively participate and that the VWBs can meet quorum. It also fails to protect the selection of VWB members from political interference—members only serve three-year terms and can be removed at will.
- *The sanitation coverage in rural areas is poor.* The lack of sanitation coverage in rural areas has not been addressed. In order to improve access to improved sanitation in rural areas, the GoB must designate an entity that is responsible for rural sanitation. In this regard, the GoB should assess the need to transfer water and sanitation to BWS, at least in those areas where wastewater collection and treatment are essential.

The GoB must set targets for coverage and develop a strategy for expanding access to sanitation. It is also likely that the GoB will need to make considerable capital expenditures in order to improve access.

2.4 Solid Waste Management in Belize

Historically, solid waste management in Belize has not met the needs of the population. Until recently, the poor performance of the sector has been a risk to the environment, the health of Belize's citizens, and the tourism industry. The main reasons for the poor performance of the sector have been the lack of clear objectives, a poorly defined institutional structure, and the lack of financial resources. Though there is limited information about the sector's performance, there is a clear consensus in the GoB that the sector must be strengthened. However, over the last five years (and as part of the IDB Country Strategy with Belize for 2008–12), major improvements have been made in the solid waste sector. These improvements are the result of the investments taking place in Belize's Western Corridor and on the islands of Ambergris Caye and Caye Caulker as part of the SWMP (a US$14.9 million project approved in 2009 with financing from the IDB, OFID, and the GoB). The SWMP created the basis for significant improvements in the sector by strengthening the SWMA, the main entity responsible for project implementation and for improving the infrastructure of solid waste transfer and final disposal. The project is scheduled for completion in 2014.

Investments related to this project started in 2010 with the closure of areas in the Belize City dumpsite located at Mile 3. As a result of these closures and the improved daily operation of the dumpsite under SWMA, there has not been a major fire at this dumpsite since 2010. In 2012, construction of a regional sanitary landfill started at Mile 24 of the George Price Highway, which connects Belize City and Belmopan. The new landfill, which began operations in August 2013, benefits Belize's northern islands and the districts of Belize and Cayo.[9] In addition open dumpsites in the Western Corridor (Belize City, San Ignacio, and Santa Elena) and on the islands of Ambergris Caye and Caye Caulker are being closed and replaced by transfer stations, from

[9] The areas that benefit from this project include Belize City, San Pedro, Caye Caulker, Santa Elena, San Ignacio, and Benque Viejo. By 2015, Belmopan and Burrell Boom are also expected to benefit from this sanitary landfill and from the closure of open dumps and the construction of transfer stations in these two locations.

which solid waste will be safely transported to the Mile 24 Regional Sanitary Landfill.[10] Furthermore, prospects for improvement in the sector are evident in the GoB's commitment to include Belmopan and Burrell Boom in this project.

2.4.1 Service Coverage

In Belize, solid waste collection is inadequate. Studies conducted in 2011 show that solid waste generation in San Ignacio, Belize City, San Pedro, and Caye Caulker varies between 0.99 and 1.24 kilogram per capita per day (Hydroplan, 2011). Assuming a generation of one kilogram per capita per day, the solid waste generated in Belize is approximately 120,000 tons per year. According to a census conducted in 2010 in Belize, only 55 percent of the population disposed of residential solid waste through municipal collection or through private garbage trucks. While these figures are improving in the Cayo and Belize districts as part of the SWMP, it is important to note that in 2010, over 30 percent of the population of Belize disposed of residential solid waste in environmentally harmful ways, including the dumping of waste on land, burning waste, and dumping waste in rivers, seas, or ponds (SIB and UNFPA, 2012). Table 2 provides a detailed description of how residential solid waste was collected in Belize in 2010, prior to the works financed by the IDB.

2.4.2 Operational Performance

There is limited information on the performance of the solid waste sector. Article 14 (3) of the SWMA establishes a target level of service quality for Belize; it states that the residential solid waste collection service should be provided at least twice per week. The SWMA has noted that the majority of municipalities offer collection twice a week for households and daily collection for commercial establishments, markets, and institutions. Currently, there is no official program for minimizing or recycling solid waste in Belize. However, as part of the SWMP, incentives are provided to increase the rates of recycling. Additionally, private sector institutions have entered

[10] The transfer stations in San Ignacio, Santa Elena, and in Belize City started operating in August 2013. The final closure of these dumpsites is underway and will be completed in the third quarter of 2013. For San Pedro and Caye Caulker, it is expected that by 2014 the dumpsites will have closed and the transfer stations at these two sites will become operational.

the market for recycling, but on a small-scale basis, especially with the recent passage and implementation of the Returnable Containers Act.[11]

The SWMA notes that unreliable waste collection systems and the open dumping of waste are prevalent countrywide and that the current performance of the sector poses adverse impacts on human health and safety, marine and terrestrial environments, and aesthetic value. In addition, there is limited planning in the solid waste sector—as of 2010 only 22 percent of the municipalities in Belize had solid waste management plans (IDB, 2010). In relation to the tourism sector, the Ministry of Tourism, Civil Aviation, and Culture and the Belize Tourism Board (2011), in the *National Sustainable Tourism Master Plan for Belize 2030*, identify "insufficient waste disposal" as a key constraint on growth. For each major tourist destination, the Master Plan described the problems caused by improper waste disposal, such as environmental damage, health hazards, and visual pollution. Table 2 provides a detailed description of the solid waste problems in Belize, and Table 3 explains how they affect tourism.

Table 2: Residential Solid Waste Disposal in Belize, 2010 *(percentage of the population)*

	Dump on land	Take to dumpsite	Compost	Burn	Throw in river, sea, or pond	Bury	Municipal collection	Garbage truck–private	Other	Don't know/not sure
Corozal	1.9	23.5	0.2	**36.5**	0.0	0.5	**27.3**	8.6	0.0	1.5
Orange Walk	2.7	21.4	0.2	**39.4**	0.1	0.4	**32.2**	2.4	0.1	1.1
Belize	3.3	4.0	0.1	**13.9**	0.4	0.7	**66.0**	11.1	0.2	0.4
Cayo	1.4	6.3	0.3	**27.2**	0.0	0.9	**51.4**	10.0	0.3	2.2
Stann Creek	2.8	10.0	0.2	**22.4**	0.1	2.9	**45.4**	14.4	1.2	0.5
Toledo	4.4	11.8	1.0	**52.0**	0.1	2.8	**21.4**	5.8	0.4	0.3
Total	2.7	10.5	0.3	**27.1**	0.2	1.1	**47.5**	9.3	0.3	1.0

Source: SIB (2011).

[11] The Returnable Containers Act, No. 12 of 2009, provides for, among other things, a deposit on the sale of beverage containers and for a refund for the return of those containers.

Table 3: The Effects of Solid Waste Problems on Tourism

Location	Comments in the Tourism Master Plan on Solid Waste and Wastewater
Belize City	▪ "The largest environmental challenge facing the city is that of solid waste management. Improperly stored garbage and illicit dump sites throughout the city are eyesores and have often drawn negative comments by visitors."
Placencia and Dangriga	▪ "The improper disposal of solid waste has negative impacts on the surrounding Caribbean Sea and the recreational waters of Placencia. Many substances in common domestic waste have the potential to negatively affect the environment due to their chemical properties." ▪ "Solid waste management and the control of littering is one of the major challenges facing Dangriga."
Cayo	▪ "The towns of San Ignacio and Santa Elena have made significant efforts to address issues associated with littering. However, there remain hot spots, primarily in open lots that are being used as illicit dumpsites." ▪ "The burning of garbage as a means of management of the dumpsite is an environmental health concern."
Corozal	▪ "There is no separation of the solid waste. Garbage burning is also common, but because the dumpsite is away from populated areas, environmental health concerns are not considered a priority." ▪ "It should be noted that with the advent of disposable plastic containers, there has been an increase in roadside littering."
Orange Walk	▪ "Many illegal dump sites are outside of the town's boundaries; this may be due to a lack of a vehicle to drive to the town dump, lack of civic pride, or a lack of a collection service."
Punta Gorda	▪ "Liquid waste disposal is unregulated and consists of septic tanks and some pit latrines in the outskirts of town." ▪ "For both the solid and liquid waste problems faced by the town, it is arguable that a lack of planning and management led to poorly located housing and on-site waste treatment systems such as the development of housing in flood-prone areas."

Source: Ministry of Tourism, Civil Aviation, and Culture and the Belize Tourism Board (2011).

There is limited information about the disposal of hazardous, industrial, and medical waste. In Belize, the largest producers of industrial waste are the citrus, sugar, banana, shrimp, construction, liquor, and transportation industries. The DoE (2008), in its national action plan, identified industrial waste as one of the main causes of marine pollution and stressed the need to set targets and timetables for managing industrial waste. A unique industrial challenge faced by Belize is the disposal of liquid and solid waste produced by cruise ships. According to the plan, the effluent from cruise ships and other marine vessels is often discharged directly into the ocean in Belize.

Several indicators suggest that the methods for disposing of medical waste in Belize need improvement. A 2001 report carried out on behalf of the Pan American Health Organization

(PAHO) and the World Health Organization (WHO) indicates that the Ministry of Health's medical waste management plan was not successful due to a lack of motivation at the local level (Monge, 2001). In addition, the "Belize National Medical Waste Management Assessment" found that several hospitals do not have a medical waste management plans and, for the hospitals that have plans, the hospital staff lack proper training in how to implement and enforce the plans.[12] Moreover, even though there are medical waste management practices in place in some hospitals, as well as a national policy for medical waste management, there is no line item in the national budget for health care waste management (WHO, 2012).

Based on data on health facilities and their generation of medical waste, it is estimated that 188 tons of medical waste are generated in Belize each year, with no information available about proper disposal practices.[13] In addition, it was discovered that medical waste was being disposed of in an open dumpsite in Belmopan (Caribbean Medical News, 2012).

2.4.3 Financial Performance

There is limited information about the financial performance of solid waste collection and disposal carried out by the town councils. In Belize, town councils charge a fixed monthly fee for solid waste services of an average of US$2.50 per month, which is collected as part of the property tax (IDB, 2010). However, this does not cover the cost of providing residential solid waste services. A recent study by Hydroplan (2011) determined that solid waste service costs in the Western Corridor are approximately BZ$11.89 (US$5.96) per household per month. This cost may increase as a result of the implementation of the SWMP, which ensures the effective collection and proper disposal of solid waste in the Western Corridor, San Pedro, and Caye Caulker. The SWMA notes that currently the municipalities recover the cost of providing this service through one or more of the following mechanisms: (i) fees to commercial customers based on the volume of waste or the size of the business; (ii) user fees to households; and (iii) fees to enter dumpsites for private vehicles (Lewis, 2010). An additional source of funding for solid waste collection and disposal is possible through Article 17(2)(b) and Article 17(2)(c) of the Solid Waste Management Act, which grant the Ministry of Forestry, Fisheries, and Sustainable Development (MFFSD), the ministry responsible for pollution control, the ability to

[12] Available at http://www.bvsde.paho.org/bvsacd/infviaje/residuos/041923/041923-114/hospitalesBelize.pdf
[13] Prüss and Townend (1998) estimated the generation rate at 3.0 kg/bed/day in 1998, while, according to the Belize Basic Indicators 2010, the number of patient days is approximately 62,531.

issue regulations that determine the charges that must be paid for solid waste collection services provided by the SWMA and that establish mechanisms for recovering the charges. Though the SWMA does not currently provide solid waste services and no such regulations are in place, this is one possible way that the cost of solid waste collection and disposal can be recovered in the future.

Through the SWMP, the GoB is working to increase the financial sustainability of solid waste management in the Western Corridor and the islands of Ambergris Caye and Caye Caulker. The GoB must ensure that there is a clear, financially viable mechanism for providing solid waste services throughout the country. Though there are several possible options for paying for the cost of such services, it is important for the GoB to select and implement a mechanism that considers the external costs and benefits to health and the environment. One option is to replicate the mechanism developed as part of the SWMP, which was presented for the cabinet's consideration and approval in July of 2013, and to extend it to the entire country. This would require the cooperation and collaboration of the country's seven municipalities from the onset.

Box 2. How to Pay for Solid Waste Management In Belize

A key question for Belize is how to pay for the three basic components of solid waste management: collection and transport, processing, and disposal. The ideal payment method should meet two objectives: (i) it should ensure the financial sustainability of the sector and its operations, and (ii) it should align the private benefits and costs of all actors with social benefits and costs.

The collection and transport, processing, and disposal of solid waste involve significant costs that must be covered in order for the solid waste management system to be financially sustainable and to continue to function adequately. However, an important market failure implies that the sector cannot be left to the free play of market forces. Specifically, the provision of solid waste management services is a mixed good that has both private and public good characteristics. A generator of waste (whether a company or household residence) receives a private benefit from the collection and removal of waste from its premises (in the case of the household, this benefit approximates the cost of the household disposing of the waste itself through burning or taking it to a dumpsite). But the whole country benefits from the avoidance of the negative externality of pollution. The avoidance of pollution leads to better health, improved aesthetics, better quality of air, water, and land, and greater international demand for Belize's tourism services. The value of countrywide benefits is not internalized by the generators of solid waste, with the result that the social benefits of solid waste collection, processing, and disposal significantly exceed the private benefits.

In this sense, the rationale for government involvement in the solid waste sector is very similar to the rationales for their involvement in education. Education is characterized by the presence of significant positive externalities—society benefits from a person receiving an education over and above the private benefits accruing to the person receiving the education. In the absence of a government subsidy, the demand for and supply of education services would be lower than the economically optimal level.

Moreover, the positive externalities of proper solid waste collection, processing, and disposal have the qualities of public goods. The provision of a clean and healthy environment is both *nonrival* and *nonexcludable*. The enjoyment of a clean and healthy environment by one citizen does not affect or reduce the enjoyment of a clean environment by others. In addition, if the environment is safeguarded, it is not possible to provide that benefit to only one consumer and not to others.

These mixed characteristics of solid waste management—part private benefits and part public benefits—complicate the issues of how to pay for the generation of these benefits and how to charge for the service. From a financial standpoint, the issue is relatively simple: sufficient resources must be provided to cover the costs of each stage of solid waste management—collection and transport, processing, and disposal. In contrast, from an economic standpoint, the issue is complex. Pricing must simultaneously ensure the following: (i) that the incentive structures are correct (i.e., that private interests coincide with the public interest) for each stage of the entire solid waste collection, transportation, processing and disposal process; (ii) that generators of waste have proper incentives to reduce the generation of waste to a socially optimal level; (iii) that producers and consumers of packaging materials have incentives to recycle; and (iv) that generators of waste have incentives to participate in formal waste disposal rather than engaging in burning or illegal tipping. Sometimes these objectives contradict one another, or practical considerations (such as scarcity of information or institutional weakness) make theoretically ideal solutions irrelevant or infeasible. The general principle that the polluter pays is fair, economically efficient, and relatively easy to apply when the polluter in question is a single industrial polluter that is easy to identify and easy to monitor. But the case of household residential waste is much more complicated to incentivize because it has a major free rider problem. The household may incur almost all the costs of waste collection and disposal, but the bulk of the benefits accrue to society. Also, overly high charges for waste collection can strengthen incentives for irregular disposal methods, such as burning or illegal dumping (Kinnaman and Fullerton, 1999).

Governments, central or local, must choose one or a combination of the following three options for funding solid waste collection, processing and disposal: (i) charge generators of waste a fee that is directly related to the quantity of waste (measured by volume or weight); (ii) charge generators of waste a flat fee for waste collection; and (iii) finance solid waste collection and disposal from general tax revenues.

Studies of experiences in several developed economies have shown that charges related to the quantity of waste result in a reduction in the generation of solid waste and increased recycling (OECD, 2006). Increases in illegal disposal due to the imposition of direct charges are difficult to estimate but appear to occur in at least two of the OECD case study countries (Denmark and South Korea). The impact of direct charges on illegal disposal may be lowest where the quality and convenience of separate collection systems for recycling is high, in countries with strong institutions, and in densely populated areas or countries where detection of illegal disposal is relatively easy. In Belize, current social conditions and the high proportion of the population that improperly disposes of waste suggests that the threat that overly high direct charges would create additional incentives for irregular waste disposal is very real. Given this situation, the first priority is to regularize solid waste disposal for as much of the population as is possible. Once a higher proportion of total waste is collected and disposed of formally, the country can move to strengthen incentives for recycling and reducing the generation of waste. This suggests that while there may be some role for direct charges in the short to medium-term, care should be taken to ensure that charges are not excessive, and that flat fees and general taxes also have a role to play in financing the solid waste sector.

In terms of general taxes, it is preferable for the government to support the financing of the sector through general taxes rather than a tied tax. As noted above, given the public good characteristics of protecting the environment, the rationale for government financing of solid waste collection and disposal is very similar to the rationale for government financing of the education sector. There is not a good reason to fund either the solid waste sector or the education sector through tied taxes, and there are several disadvantages. Revenues from a tied tax would match desirable expenditures on the solid waste sector only by chance. If revenues exceed the optimal level of expenditures, expenditures will rise. If revenues fall short of the optimal level of expenditures, either the level of expenditures in the sector would fall below the optimal level, jeopardizing its functioning, or government would have to step in and supplement funding with general revenues anyway. Tied taxes reduce the general flexibility of the tax structure, restrict the government's choice on the mix of taxes, and remove the expenditure from normal budgetary procedures (New Zealand Treasury Department, 2005). Tied taxes also have additional administrative costs when compared to general taxes.

Despite the imminent improvements in solid waste collection and disposal in the Western Corridor, San Pedro, and Caye Caulker, the GoB still faces a number of challenges in the sector.

- *The lack of an updated sector strategy and plan*. The strategy for the solid waste sector is over 20 years old and must be updated to reflect the development of the sector. The sector strategy must reflect the status of the sector and the current initiatives, including the SWMP. However, it is important to note that as part of the SWMP, a consulting firm was hired in 2013 to prepare a National Solid Waste Management Policy and Strategy and update the National Solid Waste Management Plan. This consultancy is to be completed in 2014. The policy will address issues related to the following: (i) legislative and regulatory framework; (ii) institutional arrangements; (iii) operational issues relating to collection, transportation, treatment, and disposal; (iv) waste minimization and diversion; (v) hazardous waste; (vi) special waste; (vii) financial sustainability of the sector; (viii) education awareness; and (ix) monitoring and enforcement. Additionally, this study will produce a strategy and plan to deploy the policy over 25 years, defining short, intermediate, and long-term objectives and targets for the sector.
- *The lack of measurable objectives for the sector***.** The GoB recognizes the need to improve the performance of the solid waste sector in Belize, but it has not established indicators for measuring the sector's performance or set targets for the sector. These targets are essential for developing the sector's strategy, and the indicators are necessary to measure the performance of the sector and to ensure that citizens receive the service. These objectives and indicators should be developed as part of the sector strategy and plan mentioned above.
- *The expansion of the current SWMP to the Southern and Northern Corridors***.** The current efforts to address solid waste management in the Western Corridor and the islands of Ambergris Caye and Caye Caulker need to be expanded geographically to the northern districts of Corozal, Orange Walk (Northern Corridor), and the southern districts of Toledo and Stann Creek (Southern Corridor), where there is an urgent need for solid waste collection and disposal.

- *The weak institutional framework of the sector.* The institutional framework of the sector needs improvement to ensure that the roles and responsibilities of the entities in the sector are clearly defined and to facilitate coordination between key government entities. The GoB must delegate well-defined roles and responsibilities to the government entities and ensure that they have the necessary resources and authority to carry out their mandates.

3 Government Policies and Programs

The government's objectives for the water, sanitation, and solid waste sectors are outlined in the following documents:

- *Belize Medium-Term Development Strategy 2010–2013: Building Resilience Against Social, Economic, and Physical Vulnerabilities (the Medium-Term Development Strategy):* This strategy describes the government's development efforts for the period from 2010 to 2013, which are designed to improve economic and social structures in Belize. The GoB plans to present a new medium-term development strategy in 2013.
- *Horizon 2030: National Development Framework for Belize 2010-2030 (Horizon 2030):* This document illustrates what Belize should look like by 2030 and establishes the goals and strategies necessary to realize this vision.
- *Budget Presentation for Fiscal Year 2013–2014*. This document outlines the government's priorities and planned projects for the 2013–2014 fiscal year.
- *Ministry of Energy, Science, and Technology and Public Utilities Strategic Plan 2012–2017*: This plan summarizes the strategies that the Ministry of Energy, Science & Technology and Public Utilities (hereafter the Ministry of Public Utilities) plan to implement over the period 2012–17. This ministry is responsible for the Public Utilities Commission as well as for setting policy for the urban water sector.

For the water, sanitation, and solid waste sectors, the GoB's main objectives in the medium term are the following: (i) expand the supply of potable water, (ii) develop adequate wastewater collection and treatment in areas of growth (such as areas where there is tourism or a growing retired expatriate community), and (iii) develop and implement a long-term strategy for

solid waste management. Table 4 illustrates the government's specific, medium-term objectives in each sector and provides an evaluation of these objectives.

Table 4: GoB Medium-Term Objectives for the Water and Sanitation, and Solid Waste Sectors

Sector	GoB Medium-term objectives	Evaluation of Government Objectives
Water	▪ 99 percent coverage by 2015 ▪ BWS remains a self-sufficient entity that does not receive subsidies ▪ Implement a national, integrated water resource management policy and legislation	▪ The government's objectives are line with its Millennium Development Goal of 100 percent coverage by 2015. ▪ The government should also develop targets for the quality of water service. ▪ The government should establish a date by which it plans to establish the National Water Resources Commission.
Sanitation	▪ Expand the coverage of sanitation facilities	▪ The government should set more specific, measurable targets for improving sanitation, which include coverage targets and dates by which the targets should be met. ▪ The government should improve the framework governing the sanitation sector and improve enforcement of wastewater discharge.
Solid Waste	▪ Develop and implement a long-term strategy for solid waste management	▪ This is a good first-step for the solid waste sector; the preparation of this strategy started in 2013. ▪ The government should ensure that the strategy sets specific targets for different types of solid waste, including residential, industrial, and medical waste.

Sources: Barrow (2012); GoB (2010); Ministry of Economic Development, Commerce and Industry, and Consumer Protection (2010); and UNDP (2010).

Although the GoB indeed recognizes the need to improve the collection and disposal of solid waste in the documents listed above, it does not set any provide specific, measurable targets for assessing performance, nor does it establish a timeline. As previously mentioned, one major initiative that will improve performance is the SWMP, which improves solid waste management in the Western Corridor and on the islands of Ambergris Caye and Caye Caulker, where more than 40 percent of the total population of Belize live. This project consists of the following components: (i) the construction of a regional sanitary landfill at Mile 24; (ii) the closure of the open dump site and the construction of a transfer facility in Mile 3 (Belize City); (iii) the closure of open dump sites and the construction of transfer stations in San Pedro, Caye Caulker, and San

Ignacio and Santa Elena; and (iv) institutional strengthening of the SWMA. In 2012, the GoB and the IDB agreed to close the dumpsite and construct a transfer station in Belmopan. As part of this project, the GoB is developing a national solid waste strategy and plan.

4 Policy Options and Recommendations

In Belize, water and sanitation coverage and service have improved significantly in the last decade. Since there is almost universal coverage of water service, the GoB should now focus on improving sanitation in urban and rural areas and on improving performance in the provision of water in rural areas. As for solid waste, major improvements are taking place along the Western Corridor and on the islands of Ambergris Caye and Caye Caulker. However, there is still a need to improve the sector's performance across the country, especially in the Northern and Southern Corridors of the country.

In the long term, the government's general objectives for these sectors should be to: (i) increase coverage of water and sanitation services; (ii) improve solid waste collection and disposal, particularly in the Southern and Northern Corridors; (iii) increase the percentage of wastewater that is collected and treated; and (iv) achieve financial sustainability for water and sanitation service providers. The specific options recommended below are designed to help the GoB to determine the strategic direction for the sector and meet the challenges in the coming years. Table 5 summarizes how each option supports the GoB's objectives.

- *Develop a strategy to improve water and sanitation services in rural areas.* The Ministry of Labor has requested assistance to help develop a strategy to improve the performance of the VWBs, which currently perform poorly (few of them can cover their operating costs and the quality of service in general is poor). This strategy should consider all of the available options, including restructuring the provision of water and sanitation in rural areas. The Ministry is conducting a survey of the VWBs to determine the best options for governance on the national, district, or town level. Currently, there are no clear rules as to when, and even if, the VWBs should be transferred to BWS, which has caused some difficulties (e.g., the Placencia Wastewater Treatment Plant Project). The development of a strategy and implementation plan will cost between US$300,000 and US$500,000 and will take six to nine months to complete.

- *Develop a strategy for the urban sanitation sector and, subsequently, develop a master plan for wastewater treatment and collection.* Though Belize has significantly improved coverage of wastewater treatment, it is behind its Millennium Development Goals (MDGs) and has achieved only 76 percent coverage. The figures for wastewater collection and treatment are very low (11 percent) and the issue urgently needs to be addressed, especially in coastal areas where tourism plays a key role in economic growth. Accordingly, BWS has requested assistance to develop a strategy and options for improving urban sanitation, as well as a master plan that analyzes and prioritizes the investments for wastewater treatment and collection. This strategy should also examine industrial wastewater, which the Ministry of Energy, Science & Technology and Public Utilities has identified as a priority. This strategy should also clarify the framework governing the sanitation sector and improve enforcement of wastewater discharge regulations. In addition, it should prioritize areas where there are major tourist attractions (see Appendix B for a description of the major tourism destinations in Belize). The strategy will cost approximately US$300,000 and should take approximately six months to complete. A master plan will cost approximately between US$750,000 and US$1,000,000 and will take between 12 to 18 months.
- *Develop the Northern and Southern Corridors for solid waste collection and disposal.* The existing Solid Waste Management Plan identifies an approach for improving solid waste collection and disposal in Belize. The SWMP is currently implementing several of the plan's initiatives, including the development of the Western Corridor for solid waste disposal in the new sanitary landfill at Mile 24. However, several regions of the country still lack effective solid waste collection and disposal. The SWMA is interested in developing collection corridors and landfills in the Northern and Southern Corridors. The cost of this infrastructure will depend on the scope of the investments.

Table 5: Meeting the GoB Objectives

Option	GOB objective
Develop a strategy for improving water and sanitation services in rural areas	▪ Achieve financial sustainability for water and sanitation service providers ▪ Increase coverage of water and sanitation services and improve the quality of the services
Develop a strategy for the urban sanitation sector	▪ Increase coverage of water and sanitation services ▪ Increase the percentage of wastewater that is treated ▪ Achieve financial sustainability for water and sanitation service providers
Develop other corridors (Northern and Southern Corridors) for solid waste collection	▪ Improve solid waste collection and disposal

Source: Authors' elaboration.

In addition to these options, it is recommended to develop a study of the water resources and water demand. Currently no governmental body is responsible for monitoring and regulating the use of water resources. Though the GoB approved the National Integrated Water Resources Bill in 2010, it has yet to establish the National Water Resources Commission. In the meantime, improvements in the management of water resources and planning for the sector should go forward. The proposed study will provide BWS, the Ministry of Rural Development, and the future National Water Resources Commission with the ability to effectively plan investments in the sector.

References

Barrow, Hon. Dean. 2012. "Budget Presentation for Fiscal Year 2012/2013." Belize: Office of the Prime Minister and Minister of Finance and Economic Development.

BWS (Belize Water Services, Ltd.) 2009. "BWS Business Plan Review Report 2010–2015."

———. 2012. "Annual Report 2011–2012." Belize: BWS.

Caribbean Medical News. 2012. "Western Regional Hospital Burning Medical Waste in Open Dump." Available at http://caribbeanmedicalnews.com/2012/06/western-regional-hospital-burning-medical-waste-in-open-dump/

DoE (Department of the Environment). "National Plan of Action for the Control of Land-Based Sources of Marine Pollution in Belize." Belize: DoE.

GoB (Government of Belize). 2010. "Final Report: Preparing Horizon 2030." Belmopan, Belize: Government of Belize. Available at http://www.belize.gov.bz/index.php/government-initiatives/horizon-2030.

Hydroplan Ingenieur GmbH. 2011. "Waste Generation and Composition Study for the Western Corridor." Worms, Germany: Hydroplan Ingenieur GmbH.

IDB (Inter-American Development Bank). 2007. "Water and Sanitation Initiative." Available at http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35738031

———. 2010. "Integrated Water and Sanitation Programme for the Placencia Peninsula (BL-L1015) Loan Proposal." Available at http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=35517507.

Kinnaman T. and D. Fullerton. 1999. "The Economics of Residential Solid Waste Management." NBER Working Paper No. 7326. Cambridge, MA: NBER. Available at http://www.nber.org/papers/w7326.pdf

Lewis, G. "Solid Waste Management in Belize." Unpublished.

Ministry of Economic Development, Commerce and Industry, and Consumer Protection of Belize. 2010. "Medium Term Development Strategy 2010–2013: Building Resilience against Social, Economic, and Physical Vulnerabilities." Belize: Government of Belize.

Ministry of Labor, Local Government, Rural Development, and National Emergency Management. 2012. "Draft: Study of Rudimentary Water Systems of Belize (RWS)." Belize: Government of Belize.

Ministry of Tourism, Civil Aviation, and Culture and the Belize Tourism Board. 2011. "The National Sustainable Tourism Masterplan for Belize 2030." Belize: Government of Belize.

Monge, G. "Technical Report 545." Washington, DC: PAHO/WHO. Available at http://www.bvsde.paho.org/bvsacd/scan2/036517/036517-02.pdf

New Zealand Treasury Department. 2005. "Changing Behavior: Economic Instruments in the Management of Waste." Report prepared for the Parliamentary Commission for the Environment. New Zealand: Government of New Zealand.

OECD (Organization for Economic Co-Operation and Development). 2006. "Impacts of Unit-based Waste Collection Charges." *OECD Papers* 6(8): 1–157.

Prüss and Townend. 1998. "Teacher's Guide: Management of Wastes from Health-care Activities." Geneva, Switzerland: WHO.

SIB (Statistics Institute of Belize). 2011. "Main Results of 2010 Population and Housing Census." Belize: SIB. Available at http://www.statisticsbelize.org.bz/dms20uc/dynamicdata/docs/20110505004542_2.pdf

SIB and UNFPA (Statistics Institute of Belize and United Nations Population Fund). 2012. "Belize Population and Housing Census, 2010, Country Report." Belize: SIB and UNFPA. Unpublished.

Tynan, N. and B. Kingdom. 2002. "A Water Scorecard: Setting Performance Targets for Water Utilities." Note No. 242. Washington, DC: The World Bank. Available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2002/06/24/000094946_02060704033047/Rendered/PDF/multi0page.pdf.

WHO (World Health Organization). 2012. "Immunization Profile Belize." Geneva, Switzerland: WHO. Available at http://apps.who.int/immunization_monitoring/en/globalsummary/countryprofileresult.cfm?C=blz

UNDP (United Nations Development Programme). 2010. "Belize Scorecard and Outlook Report 2010." Belmopan, Belize: UNDP. Available at http://www.undp.org/content/dam/belize/docs/Millennium%20Development%20Goals/MDG%20Report%202010,%20Belize.pdf

———. 2011. "Belize. MDG Acceleration Framework: Water and Sanitation." Belize: UNDP. Available at http://www.undp.org/content/dam/belize/docs/Millennium%20Development%20Goals/MDG%20Acceleration%20Framework%20Belize.pdf

———. 2012. "Project: Applying MDG Acceleration Framework: Addressing Governance Bottlenecks to Achieve Water and Sanitation Coverage in Belize." Belize: UNDP. Available at http://www.undp.org/content/dam/belize/docs/Democratic%20Governance/PRODOC-Water-and-Sanitation-w-Cover1.pdf.

Appendix A: Creation and Ownership of BWS

The Government of Belize (GoB) incorporated the Belize Water Services Ltd (BWS) on January 22, 2001 as the successor company to the Water and Sewerage Authority of Belize (WASA). BWS was granted a 25-year license by the Public Utilities Commission (PUC) on March 20, 2001 and vested with the assets and liabilities of WASA on March 23, 2001. In March 2001, Cascal B.V. (an international firm that owns, operates, and develops water company investments and is owned by Biwater Plc.) became the majority shareholder of BWS by purchasing approximately 83 percent of the company's shares, which made it the majority owner of the company from April 2001 through September 2005.

On October 3, 2005, the government repurchased the 83 percent of BWS' shares from Cascal B.V. for US$24.8 million (the same price paid for the shares by Cascal B.V. in 2001). Belizeans replaced the expatriate board members and management. The GoB then offered shares in BWS for sale to the general public. The public purchased about 7.4 percent of the shares, and the GoB held the remaining 82.6 percent of the shares and the Belize Social Security Board held 10 percent. As of March 2012, the GoB owned 83.17 percent of the shares, the Belize Social Security Board 10 percent, and the public 6.83 percent.

The Water Industry Act (Section 15) regulates the BWS. A 25-year license was granted to BWS by the PUC in 2003. Both the GoB and the Social Security Board holds a Special Rights Redeemable Preference Share (also known as the *special share*), which gives them the right to appoint one additional director for every 10 shares they own. Thus, the Social Security Board is entitled to appoint one director, while the government is entitled to appoint eight directors. In practice, the BWS Board of Directors consists of eight directors; the Social Security Board appoints one and the GoB the other seven. In addition, the Ministry of Finance and the Ministry of Public Utilities each have a high level official on the board.

Appendix B: Key Tourism Destinations in Belize

The GoB is working to promote the growth of the tourism industry and anticipates that it will become a billion-dollar industry by 2030. The Ministry of Tourism, Civil Aviation, and Culture and the Belize Tourism Board (2011) outline the government's plan for developing the tourism industry in the "National Sustainable Tourism Masterplan for Belize 2030." The following table summarizes the priorities discussed in the document according to the region in Belize.

Table A.1: GoB Development Priorities

Region	Overnight visitors in 2008 (in percent of total overnight visitors)	Development strategies
Western Belize	24%	▪ San Ignacio: promote tourism
South Eastern Coast Belize	14%	▪ Stann Creek: new development ▪ Placencia Peninsula: contain development and consolidate
Central Coast Belize	15%	▪ Belize City: urban renovation
Northern Islands	32%	▪ Ambergris Caye: contain development and consolidate
Northern Belize	10%	▪ Promote tourism
Southern Belize	2%	▪ Promote tourism
Belize Reef	3%	▪ Contain development and consolidate

Source: Ministry of Tourism, Civil Aviation, and Culture and the Belize Tourism Board (2011).

Appendix C: Support for Development Agencies

Current support from development agencies to the water and sanitation and solid waste sectors (both technical assistance and financial support through grants and loans) can be grouped into three separate types: support for BWS' activities in the water and sanitation sector, support for non-BWS activities in the water and sanitation sector, and support for the solid waste sector.

Aside from the Inter-American Development Bank (IDB), which is currently funding a BWS program for the construction of a collection network and wastewater treatment plant in the Placencia Peninsula, the Caribbean Development Bank (CDB) is the main development agency with ongoing or proposed projects with BWS. At the end of March 2012, the CDB accounted for approximately 52 percent (BZ$24.5 million) of BWS' total borrowing. Funds from the CDB are used for a variety of investments, the most recent of which include the development of a water system in the Belize River Valley and the expansion of the water and sewerage system in Ambergris Caye. The Social Investment Fund (SIF) manages and administers most funding from development agencies for areas that fall outside of BWS' service area. The main sources of funding for SIF's investments in the water and sanitation sector are listed in the table below.

Table A.2: Planned Social Investment Fund Projects in the Water and Sanitation Sector, 2012–13 Financial Year

Development agency / funding source	Project focus	Amount (US$ million)	Water and sanitation projects (US$ million)
Caribbean Development Bank (Basic Needs Trust Fund Sixth Program)	Provision of basic social infrastructure	$3.01	$0.68
Caribbean Development Bank Loan #2	Water and sanitation Health Other infrastructure Education Social services Organizational strengthening	$15.00	$4.57
Total		**$18.01**	**$5.25**

Sources: SIF. Financial Statements for the year ended in March 2012.
SIF. BNTF6: Status Report for Sub-projects from April 2012 to March 2013.
SIF. CDB SIF II Loan Project Status Report from April 2012 to March 2013.

In the 2011–2012 fiscal year, SIF invested approximately BZ$28.0 million (US$14.0 million) in water and sanitation projects, which was approximately 26 percent of its total spending for that year. The United Nations Development Program (UNDP) is another important donor in the rural water and sanitation sector in Belize, which was selected as a pilot country for its Millennium Development Goal (MDG) Acceleration Framework. In May 2011, the UNDP developed an action plan (UNDP, 2011) to help Belize overcome challenges in meeting its MDGs for water and sanitation. As part of the plan, the SIF will fund a pilot project to install improved sanitation units in rural communities; the estimated cost of this project is US$125,000.

The IDB provides the majority of the support for the solid waste sector in Belize. In addition, as part of the IDB's Solid Waste Management Project, the OPEC Fund for International Development (OFID) provides a significant portion of the local funding (US$3,264,000 of the project's local contribution of US$3,639,000).