

Water Operators' Partnership Case Study

GWOPA
Global Water Operators' Partnerships Alliance

UN HABITAT
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UNESCO-IHE
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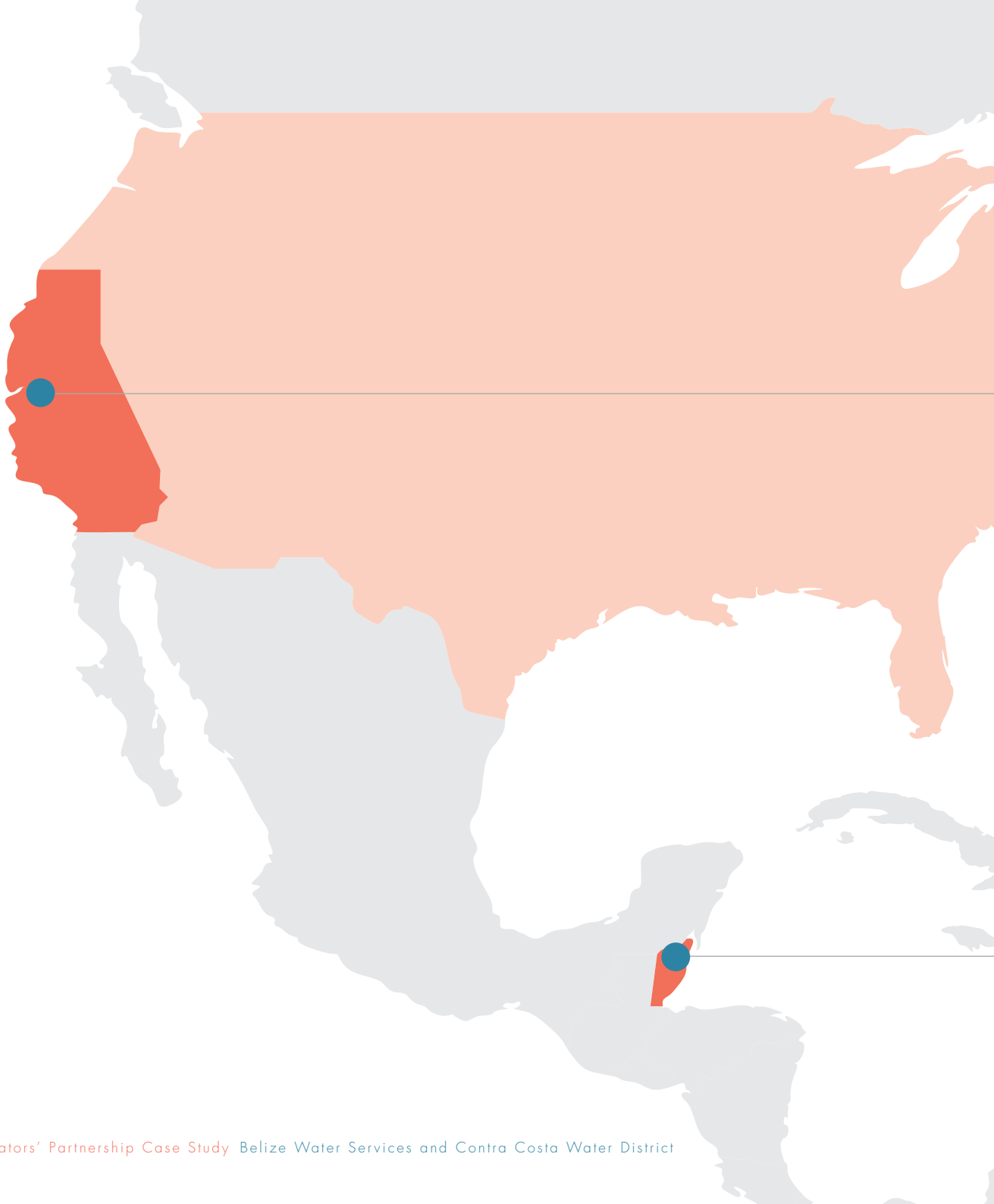
Contra Costa
Water District
USA

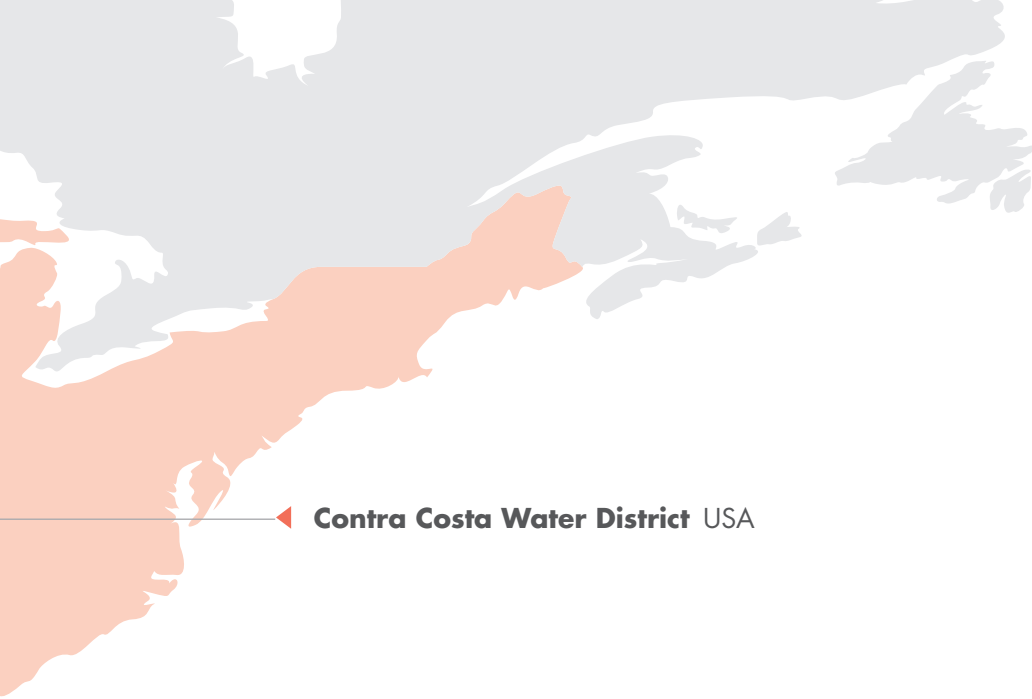
Belize Water
Services
Belize

BEWOP

Belize Water Services and Contra Costa Water District

Water Operators' Partnership Case Study





◀ **Contra Costa Water District** USA



◀ **Belize Water Services** Belize



Abstraction facility for the city of Belmopan

WATER OPERATORS' PARTNERSHIPS

Water operators are critical players in the effort to achieve sustainable and universal access to water and sanitation. But many operators struggle to provide adequate water services. They face a myriad of challenges including rapid urbanization, rising inequity, pressures on water resources, severe resource constraints and ineffective governance frameworks. There is a growing understanding that strong local capacity can provide the foundations to respond to emerging challenges with meaningful and lasting solutions. Supporting water operators in their organizational development efforts to manage effectively over the long-term is the purpose of Water Operators' Partnerships (WOPs). WOPs are peer-support arrangements between two or more water service providers, carried out on a not-for-profit basis with the objective of strengthening operator capacity. They are based on the understanding that capacity development supported by mentors can accelerate water operators' ability to meet the challenges facing the sector. They draw on the fact that much of the innovation and expertise to address water operators' challenges resides within utilities, and that a growing number of these successful operators are highly motivated to share their expertise and innovation with others

as “mentors” on a solidarity basis. WOPs were identified as a high-potential solution by the UN Secretary General’s Advisory Board for Water and Sanitation in their 2006 Hashimoto Action Plan.

Boosting Effectiveness in Water Operators’ Partnerships (BEWOP)

BEWOP is a 5-year research and outreach initiative aimed at Boosting the Effectiveness of WOPs around the world. BEWOP, launched in September 2013, is a collaboration between UNESCO-IHE, the world’s foremost water sector capacity development institute, and UN-Habitat’s Global Water Operators’ Partnership Alliance (GWOPA), the organization leading the global WOPs movement. The program is funded by the Dutch Ministry of Foreign Affairs (via the Directorate-General for International Cooperation).

Objectives

BEWOP aims to address a potential obstacle of the WOPs approach: operators are uniquely placed to share their experience and technical expertise with their peers, yet they sometimes lack the capacity to effectively transfer their knowledge and the expertise to manage the partnership process. The goal of BEWOP is to strengthen knowledge transfer and change processes of WOPs in order to maximize the potential for operational

improvements of water operators. Over the long run, the BEWOP project should contribute to the enhancement of operators’ capacity to cope with emerging technical, financial and institutional issues, leading to better performance of water utilities and improved water and sanitation services.

Activity Areas

The BEWOP initiative is articulated into two major streams: research and operational guidance. Research on WOPs has focused on two main questions: how WOPs function, and the institutional conditions for their wider adoption. Research has involved documenting and analysing WOPs practice and conducting focussed thematic studies in collaboration with water and sanitation operators around the world. The operational component, building upon the knowledge acquired during the research phase, aims at developing supportive tools to overcome bottlenecks to WOPs take-up and specific guidance to address needs at various stages of a WOP: identification of partners, designing agreements, funding, and monitoring and evaluating. Ensuring that BEWOP products are accepted and applied widely in WOPs practice is of primary importance. Throughout the project, communication and outreach work to maximize uptake and is a major component of all activities.

KEY FACTS



Partners

Mentee: *Belize Water Services Limited (BWS)*
National water and sanitation utility of Belize

Mentor: *CContra Costa Water District (CCWD)*
Public urban water district in central and eastern Contra Costa County in Northern California



Duration

Phase 1 2010–2013

Phase 2 2013–2015

Collaboration between the operators still ongoing at time of print



Cost

Phase 1 US\$ 47,800 from GWOPA/
UN-Habitat and Inter-American Development
Bank (2010–2013)

Phase 2 US\$ 49,600 from GWOPA/
UN-Habitat and Public-Private Infrastructure
Advisory Facility (2013–2015)

Plus in-kind contributions for travel and staff time
from both partner operators



Aims

BWS Achieve measurable improvements in specific areas of the organization: safety, engineering, technical services, finance, information and technology, operations, human resources and public outreach; Adopt good practices, strengthen institutional capacity, implement new technology, reduce non-revenue water, increase productivity, and improve customer response time, public relations, tariff structures, and maintenance techniques

CCWD Gain experience, insight and understanding of non-local water district issues; Improve performance by teaching new skills and exposing partner utility to other administrative, technical and operating systems



Approach

The WOP was carried out in two phases, each one receiving funds from different sources and under two formal agreements. The first phase served to identify improvement tracks and develop an action plan, and begin working on it. The second phase built on the achievements of the first phase, furthered work along the improvement tracks and incorporated a number of new activities to sustain the benefits obtained.

The activities in both phases were a mixture of classroom training, job-shadowing, documentation and information sharing, on-the-job operational guidance, review of existing practices and appropriate recommendations for improvements.



Salient results for BWS

- Improved quality and efficiency of service delivery owing to new technical and managerial working methods
- A reduction in work-related accidents and related costs through, among other actions, the establishment of a Safety Committee. Working days lost to incidents reduced by 75 % and US\$ 350,000 earmarked to purchase new safety gear
- Increased efficiency in water production and distribution and reduced maintenance costs through the in-house development and implementation of SCADA systems, enabling BWS to save an estimated US\$400.000 (compared to outsourcing)
- Better trained and certified staff through the mainstreaming of training courses in BWS's human resource activities. 119 BWS employees enrolled in Sacramento State University program, 215 courses; Staff motivation and career opportunities improved
- Improved robustness of revenue streams owing to, among other tasks, cost reduction and improved distribution systems (e.g. meter calibration, leak detection). Service life of meters extended from 5 to 10 years on average; NRW reduced from 34% to 24% since 2009 and increasing average system pressure countrywide by 12% between 2010 to 2016
- Introduction of an online payment system and a rate-setting methodology. Improved purchasing processes leading to strengthened financial viability and increased accountability

of revenue streams. e.g. online payments increased by 15% between 2010 and 2015, and time saved allowed BWS to outsource their collection agents for the Belizean Electricity utility. Between 2014 and 2016, BWS earned around US\$220.000 in commissions

- Increased efficiency in meter reading processes and customer response times through new call centre
- Increased visibility for the mentee and the mentor
- Staff morale boosted and productivity increased for the mentee and the mentor. The workforce is more receptive, aware of their job, and sensitive to global water issues



Success factors

- Alignment with strategic planning
- Long-term vision for knowledge dissemination
- Concurrent capital investment
- Continuous monitoring of activities
- Receptivity and willingness to collaborate



Challenges

- Funding approval process (and management)
- Lack of guiding tools
- Exhausting visit schedule
- Hindering contextual factors



Old river abstraction well near by San Ignacio

INTRODUCTION

This report analyses the Water Operators' Partnership between Belize Water Services (BWS), headquartered in Belize City, Belize, and Contra Costa Water District (CCWD), located in Concord, California, USA (see Map). BWS is the mentee partner, while CCWD is the mentor utility. The partnership aimed to build hands-on knowledge and improve working routines in order to durably improve water and sanitation service performance.

The analysis is informed by a week-long field visit to Belize in April 2016, supporting documentation (agreements, activity reports, work plans, presentations, corporate reports), worksite and facility visits, focus group discussions, and approximately twenty face-to-face semi-structured interviews with employees of BWS and CCWD, as well as with key facilitators at the Inter-American Development Bank, the US Water Partnership and the Public-Private Infrastructure Advisory Facility. The analysis was supplemented with a two-day visit to the Contra Costa, California, USA, to capture the story of the mentor. The political and socio-economical factors within which utilities operate were also examined. This is a narrative case, although it draws quantitative results where possible. This case study from the Central American region was selected by UNESCO-IHE and GWOPA, partners

of the BEWOP program, because of the duration of the partnership, the availability of information, the willingness of the partners to document the case, and the eagerness from donors and water-related organizations to draw lessons learned and good practices to inform American water utilities who may be interested in joining the practice.

Map 1: Political and relief map of Belize



BACKGROUND

Located in the low-land area of the Yucatan Peninsula, bordered by Mexico to the north and by Guatemala in the south and west, the territory of Belize was the site of Mayan city-states for centuries until their decline at the end of the first millennium. During the colonization period of the 17th and 18th centuries, the region was disputed by the English and Spanish. It became the colony of British Honduras in 1862, then gained independence from the United Kingdom in 1981. Belize is the youngest country of the American continent and the only country in Central and South America whose official language is English. The capital of Belize is Belmopan, a new city built in the centre of the country, where it was moved from Belize City following a devastating hurricane in 1961. The country is divided into six districts, subdivided into 31 constituencies (see map).

In Belize, water service provision is divided between urban and rural areas. Belize Water Services Limited (BWS), headquartered in Belize City, is the urban water and sanitation utility and the only licensed service provider in the country. The ownership structure of BWS is mixed, with the government as the majority shareholder (83.2 %), and the Belize Social Security Board (10%) and the general public (6.8% individuals and small companies) as minority

shareholders. The regulatory controls include a statutory regulator, the Public Utilities Commission, which issued the Water Industry Act as an operating license in 2001, and “Codes of Practice” agreed upon by the Regulator and BWS in 2004. Although BWS operates under private business law which offers a degree of *political* autonomy in operational and strategic decision-making (BWS is financially self-sufficient), the Board of Directors consists mostly of government representatives, in particular with high level officials from the Ministry of Finance and the Ministry of Public Utilities. The rural water sector in Belize is governed by the Village Councils Act, which establishes the structure of village water boards and is financially autonomous and independent from village councils. They are responsible for managing the day-to-day operations of the basic water systems in their village. Due to a lack of technical skills and/or financial capacity, the water boards regularly request operational assistance from BWS to deliver their services in rural areas (done on an ad hoc basis, without forward planning).

According to the World Bank, the GDP for this country of 359.300 inhabitants reached US\$1,763 billion in 2015 (compared to US\$17,950 trillion for the USA), with an average annual economic growth rate of 1.9% that same year. The United Nations’ Human Development Index 2014 ranked the country 101st among 193 nations (versus the USA that ranked 8th). Socio-economic inequalities are

significant, as shown by Belize's Gini index score of 53.1 in 2013 (0 representing total equality, and 100, inequality). Nearly 41% of the population lives under the poverty line. Belize has a low population density but has one of the highest population growth rates in the Americas (around 1.9% in 2015).

Belize has a diverse society, composed of many cultures and languages that reflect its rich history. Migrations continue to transform Belize's population. Three ethnic groups constitute the majority, namely the Meztizos (mixed between Spanish and Mayas descents), Kriols (or Afro-Caribbean), and the Mayas (natives from the region), respectively around half, a quarter and a tenth of the population. Other minority ethnic groups are the Garifuna, East-Indians, the German-speaking Mennonites, and others. But due to dynamic migration movements, the composition of the population is changing constantly. It is worth noting that about 16% of Belizeans live abroad, while immigrant residents constitute approximately 15% of the population (mostly from Central America). English is the official language, while Spanish is commonly spoken (approximately half of the population is bilingual). English-based Belizean Kriol is widely used for more informal exchanges. The main religious groups are Roman Catholic (40%) and Protestant (31%), among others (Hindu, Muslim, etc.).

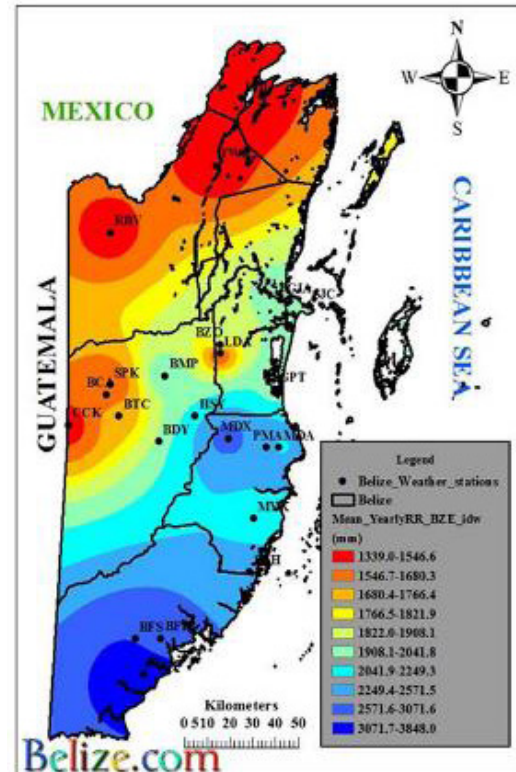
Belize has a small and mostly private sector economy. Tourism recently became the primary foreign

exchange earner, followed by exports of crude oil, marine products, sugar, citrus and bananas. The country imports machinery and transport equipment, manufactured goods, fuels, chemicals, pharmaceuticals, food, beverages and tobacco. It is facing a growing trade deficit due to decreasing prices for sugar and oil. With a pleasant climate, the Belize Barrier Reef, 127 islands, a rich terrestrial and marine biodiversity and numerous Mayan ruins, the tourism and ecotourism industry is thriving. The country received 1.3 million tourists in 2015, mostly from North America. Although the economy seems vigorous, reducing poverty and inequality remain central challenges for the government. High unemployment, a growing trade deficit and heavy foreign debt burden continue to be major concerns.

Belize has a tropical climate, with pronounced dry and rainy seasons. To the east the Caribbean Sea hosts the second-longest barrier reef (shared with Mexico). Belize is a flat, low-land country, divided by a coastal plain covered with forests and marshes in the east and north, while the south contains a low mountain range. The country is vulnerable to natural hazards (in particular hurricanes and flooding). Belize has plentiful surface and groundwater resources and is thus unlikely to suffer from water supply shortages in the future. Rainfall varies considerably between the north and west (1,350 mm) and the extreme south (up to 4,500 mm) (see figure 1). Bulk water supply challenges

are limited although some systems run by BWS require specific approaches, such as underwater water supply main (e.g. for the Placencia peninsula) or reverse osmosis treatment of salt water (e.g. in the Ambergris Caye island), two main tourist destinations. The overall raw water quality is good despite occasional difficulties. Around 2012-2013, BWS faced iron and manganese contamination at a river water intake in San Ignacio (in the east). Salt water intrusion into rivers can also occur during the dry season and could eventually affect the Double Run water treatment plant supplying Belize City, although it is unlikely. Transnational river-basin management is still marginal but is gaining attention as most upstream surface waters come from Guatemala. Strengthening the cooperation with Guatemalan authorities is sensitive due to on-going territorial disputes.

Figure 1: Annual precipitation map in Belize (1951–2013)





Out-of-service abstraction facilities in Belmopan

THE PARTNERS

Contra Costa Water District (CCWD)

The Contra Costa Water District (CCWD) is a public urban water district in central and eastern Contra Costa County in Northern California, USA. Located in the Bay Area, close to the city of San Francisco, CCWD was established in 1936 to provide water for irrigation and industry to overcome the issue of increased salinity of water intakes. The creation of CCWD coincided with the construction of the Contra Costa Canal, completed in 1948, which served to withdraw fresh water resources further upstream from the Delta. Today, CCWD provides about half of this treated water directly through retail, with the other half sold wholesale for distribution by six local water agencies. In total, CCWD serves a total population of about 500,000 people across 13 cities.

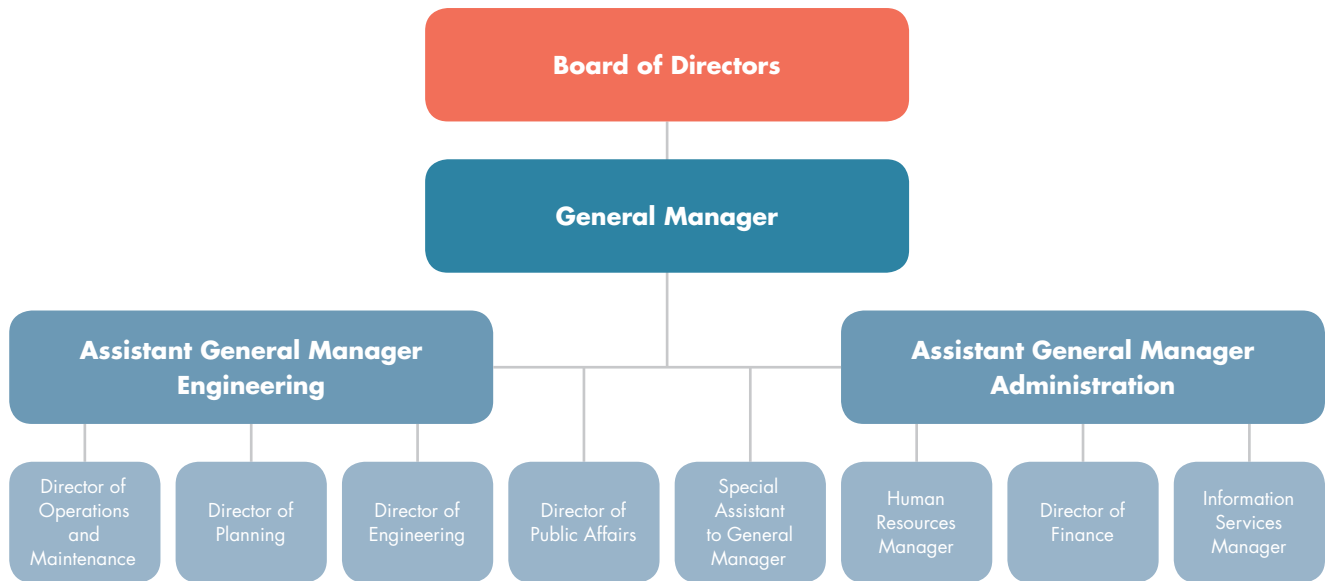
The District has no responsibilities for sanitation services. CCWD draws its water from the Sacramento-San Joaquin Delta under a contract with the federal Central Valley Project (CVP), and it is particularly concerned about Delta water quality and the Delta environment.

Map2: Contra Costa Canal map



CCWD is a public utility, operating under California State law, and abiding by the California Water Code. It is governed by five elected Directors, each representing a division of approximately 110,000 people and elected to 4-year terms. The Board sets policy for the District, while the General Manager runs the utility. The General Manager is supported by two assistants who supervise the Engineering and Administrative branches. The organizational structure of the company is divided into eight units, namely Operations & Maintenance, Planning, Engineering, Public Affairs, Resources, Finance and Services, and a Special Assistant to the GM (see Organizational chart). CCWD's stated mission is to strategically provide a reliable supply of high-quality water at the lowest cost possible, in an environmentally responsible manner.

Figure 2: Organisational chart of CCWD



The mentor water operator is a mid-sized company with 190 full-time equivalent employees. The District provides treated water to different customers, namely residential (47.7%), municipal (22%), commercial (8.8%), industrial (16.2%, mainly oil and gas) and public facilities (5.3%). CCWD has four diverse surface water intakes, five water treatment plants and a network of three pipelines. The backbone of CCWD's water conveyance system is the 77-kilometres long Contra Costa Canal. (For a complete overview of service indicators, see the table below.) CCWD has not been immune to the 4 years of consecutive drought that have hit

California. In 2015, rivers and reservoir levels were well below normal and the District received the lowest water allocation in its history from the Central Valley Project. Despite such difficulties, the utility has been working closely with stakeholders and communities to conserve and use water more efficiently, allowing the company to keep meeting demand from customers with high water quality.

Table 1: Key performance indicators of CCWD

Size and Service Indicators (CCWD)¹	2013	2014	2015
Population Served (in thousands):	196,4	197,5	199,7
Water Supply Connections (in thousands):	61,130	61,220	61,330
Number of Employees (FTE)	194	193	188
Length of Network (in kilometers):	1,298.4	1,298.4	1,298.4
Unaccounted for Water (percent of total)	9.5	4.8	6.7
Working Ratio	0.676	0.621	0.647
Staff per 1000 connections (water supply)	3.2	3.2	3.1
Staff per 1000 population served (water supply)	1.0	1.0	0.9
Service coverage – water supply	100%	100%	100%
Billing / Collection Ratio	0.16%	0.15%	0.23%
Total Revenue (Operating Revenue)	\$ 67,997,737	\$ 72,387,771	\$ 65,562,482
Average Monthly Customer Water Bill	\$61.60	\$56.92	\$49.26

¹ Population for CCWD's retail treated water service area (TWSA). Excludes wholesale service area

CCWD had never been involved in an international Water Operators' Partnership prior to its collaboration with BWS. Nevertheless, the District does frequently interact with neighbouring water operators to benefit from others' experience, and avoid unnecessary costs. Peer exchange between staff on specific topics such as the purchase of equipment or use of a given technology is quite common.

CCWD entered into the WOP with BWS under the leadership of CCWD's former general manager (see next Chapter for the History of the WOP). The initial objectives of the mentor, according to the first agreement, were to develop professional staff, and to gain experience, insights, and understanding of non-local water district issues. The management considered WOPs as a morale boost for its employees, and a means to exercise their social responsibility, improve public visibility and broaden international networks with the water sector community.

To better understand individual motivations and the initial expectations of its staff, the mentor utility carried out an internal survey prior to receiving the first Belizean delegation. The findings revealed moderate initial enthusiasm, with an average of 5.9 on their 10-point scale (10 indicating full motivation). The actual experience far exceeded expectations, with an average result on the post-

WOP survey of 8.3. Overall, the partnership surpassed the expectations of the mentor utility. More information on the benefits realized by the mentor are detailed at the end of this report.

Belize Water Services

Belize Water Services Limited is the national urban water and sanitation utility, covering the larger municipal areas of the country. BWS was founded in January 2001 as part of the corporatization reforms of public utilities engaged by the Government of Belize. BWS was vested with the assets and liabilities of the former public operator Water and Sewerage Authority (WASA). The first majority shareholder was an Anglo-Dutch joint venture company which owned 83% of BWS' shares via an investment agreement with the government. In 2005, the Government of Belize bought back the majority of the shares and, according to long-time BWS employees, the corporatization of the utility was accompanied by a shift in the guiding values and a radical change in the structure. New corporate values such as cost-recovery, financial and operational productivity, and profitability were introduced, and there was a shift in the management culture. The reorientation of core values and a wider staff housecleaning aimed to address the utility that was considered, "too politicized, overstaffed, [a place to put] friends and family in function". Within six months, the operator cut its staff by 40%,

a process considered by staff as, “a shockwave, a tough time”. Today, the operator is still closely bound to the political realm as their main shareholder is the government, however its corporate structure allows for efficient, independent and effective operational and financial management and planning.

The strategic planning, finalized in 2011 included a renewed mission statement,

“To improve the lives of customers by delivering quality and cost-effective water and waste water services in an environmentally responsible manner while promoting employee excellence, fulfilling our social responsibility and providing a fair return to shareholders.”

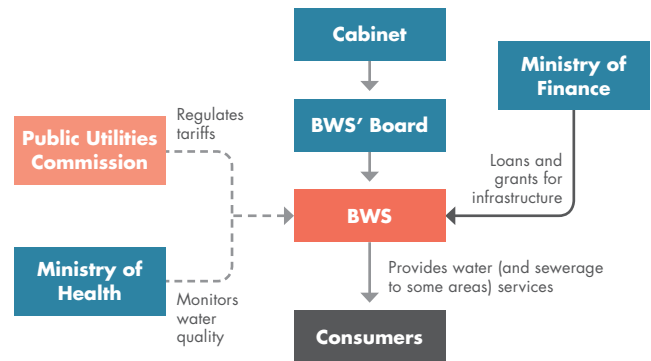
The WOP coincided with the finalization of the strategic plan, and most of the topics addressed in the WOP were aligned with BWS’s new objectives. According to interviewees, the WOP directly contributed to the fulfilment of BWS’s stated vision,

“by 2018, we will be the leading provider of water and wastewater services in the region and will exceed stakeholder’s expectations”.

Since the 2001 reform, BWS’s operational and economic performance indicators have improved drastically, these include: water loss volume

reduction by 56%, sales volume increase by 52%, and pressure increase by an average of 23%. The new strategic plan together with the active commitment to the partnership with CCWD have helped drive BWS towards excellence.

Figure 3: Institutional framework of urban water provision in Belize



Today, BWS is fulfilling its strategic vision of becoming a regional leader. BWS has one of the lowest levels of non-revenue water in the region at 23.6% in 2015. It provides drinking services to about 53,000 customers, which means around 260,000 people or 70% of the total population. In 2015, coverage levels for drinking water services in BWS served areas reached 99.3%, with all connections being metered. In relation to sanitation, sewerage coverage is mostly limited to a few urban centres (in Belize City, Belmopan and San Pedro).

In 2013, only 11% of the population had access to sewerage services, which include both wastewater collection and treatment. This figure is however changing rapidly as new sewage facilities are being funded and built (especially in touristy destinations such as in the Placencia Peninsula or Ambergris Caye). The operational and commercial efficiency of BWS, along with its corporate values, enable the utility to mobilize funding for capital expenditure relatively easily. The operator can borrow money from regional multilateral banks (e.g. CDB, IADB, or GEF) through the instrumental and legal support of the Government of Belize, or directly from their shareholders, such as the Social Security Board. Usually the Government of Belize passes on the loans to the operators at a higher interest rate than the initial loans it borrows from banks. The operator's major investments currently consist of financing a nation-wide sanitation master plan to bridge the gap in wastewater services. In 2015, the long-term debt of BWS was at approximately US\$ 17 million, with an average repayment period of between 15 and 20 years, and variable interest rates ranging from 2.5% to 8.5%. Those loans serve in particular to fund the expansion or construction of drinking water plants, and waste water treatment plants and collection networks.

BWS was involved in a first South-South WOP with Guyana Water Incorporated (GWI) initiated in 2009 during a NRW workshop in Guyana. The objectives

of this first international collaboration for BWS were to reduce NRW, reinvest subsidies to achieve a reduction in operational costs, and treat heavy-metal contamination effectively. At that time, BWS had a problem of iron and manganese contamination in San Ignacio. Although Guyana knew how to resolve the contamination issue, they lacked knowhow BWS already had in reducing water losses. As one GWI manager wrote after the completion of two visits, "the information accessed and on-the-job training was more valuable than an entire year of university studies and a team of high profile consultants visiting GWI put together." Based on this first successful experience, BWS took the opportunity to once more take part in an international partnership, this time with CCWD.

BWS engaged in the WOP with CCWD with a clear idea of what could be achieved through this type of partnership. The initial motivation for BWS was to build the capacity of its staff in order to increase operational efficiency. The set of specific objectives stated at the inception of the partnership were to adopt good practices, strengthen institutional capacity, implement new technology, increase productivity, reduce NRW and improve maintenance techniques, although these initial objectives evolved over time.

Figure 4: Organizational chart of BWS

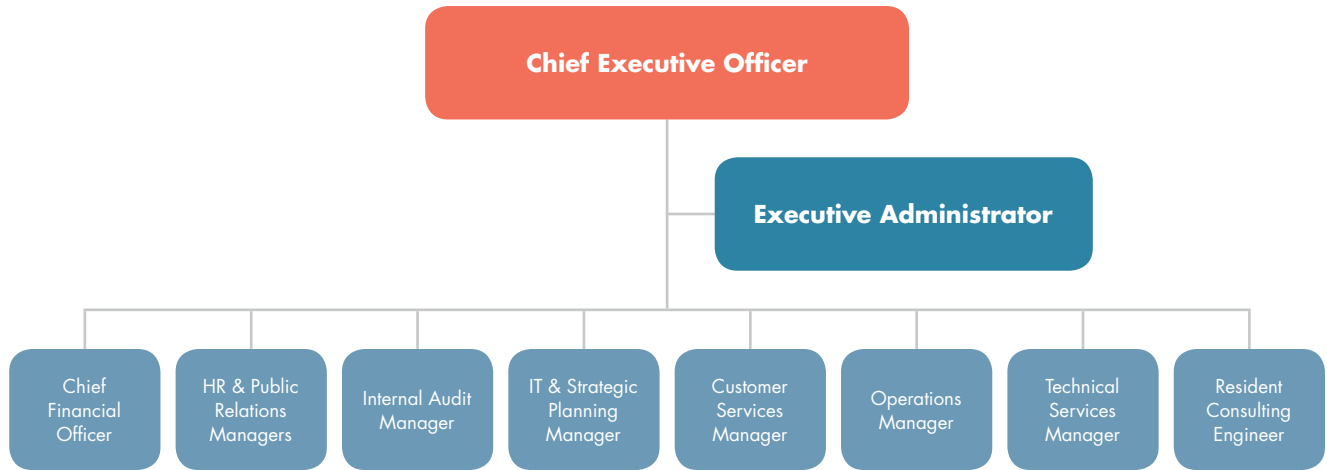


Table 2: Key performance indicators of BWS

Size and Service Indicators (BWS)	2009	2011	2013	2016
Water Supply Connections (in thousands)	41,703	46,061	50,974	55,484
Number of Employees (FTE)	229	252	256	262
Length of Network (in kilometers)	1,083	1,182	1,322	1,400
Unaccounted for Water (percent of total)	29,4%	27,0%	24,5%	24,9%
Staff per 1000 connections	5.2	5.5	5.0	4.7
Billing / Collection Ratio	1.3%	1.9%	1.8%	1.2%
Gross Revenue (in thousands US\$)	15,524	17,664	17,461	21,641
Average Monthly Customer Water Bill (in US\$)	27.97	30.34	28.75	32.22



BWS employees at the Belmopan water treatment plant

FACILITATORS

Inter-American Development Bank

The Inter-American Development Bank (IADB) was the main facilitator and donor for this WOP, providing support through the normative and logistical support of the WOP-LAC platform. The IADB is a multilateral development bank that provides funds and expertise for sustainable economic, social and institutional development in Latin America and the Caribbean. Following the Hashimoto Action Plan's call for up-scaling of WOPs in 2006, the Bank launched a water and sanitation initiative in 2007 with components on capacity building and mutual support between water operators. When the Global Water Operators' Partnerships Alliance (GWOPA) was officially launched in 2009, the financial institution was a founding member. The IADB, with collaboration from GWOPA, hosted the first WOP platform for Latin America and the Caribbean (WOP-LAC) for a period of five years, which was considered complimentary to its core lending activity to member countries for infrastructure development. The Bank perceived WOPs as another means of strengthening water utilities they were already working with. In the framework of this support, the IADB funded the first phase of the WOP from 2011 to 2013, covering two trips of the Belizean

delegation to CCWD, and one trip for CCWD staff to BWS. The budget for the first phase was US\$47,800, earmarked to cover expenses for activities (e.g. travels and general meeting costs).

The United States Water Partnership

The U.S. Water Partnership (USWP) is a Public-Private Partnership established to unite American expertise, knowledge, and resources, and mobilize assets to address water challenges around the globe, especially in the developing world. The USWP has showed a particular interest in WOPs because they align with its mission and is keen to further engage US water operators as mentors in international partnerships with the overall goal of strengthening the, "human and institutional capacities of water utilities and sector institutions in developing nations to meet the dual challenges of improving service (including access, availability, and quality), while also providing efficient and cost-effective delivery of service". The USWP played an instrumental role in securing funding for the second phase of this WOP. Based on the success of the first phase, the USWP, supported by a staff member from the Millennium Challenge Corporation (MCC), supported the second phase as it aligned with USWP's mission and the objectives of its utility strengthening signature initiative. Therefore, USWP reached out to the Public-Private Infrastructure Advisory Facility (PPIAF), which agreed to partly finance the second phase of this WOP.

The Public-Private Infrastructure Advisory Facility

The Public-Private Infrastructure Advisory Facility (PPIAF) is a multi-donor trust fund created in 1999 with the support of the World Bank Group and various other donors. PPIAF's mandate is to act as a catalyst to increase private sector participation in infrastructure and thereby achieve sustainable development. PPIAF provides technical assistance grants to governments to support the creation of a sound enabling environments for the provision of basic infrastructure services by the private sector, and to facilitate PPP transactions and pioneering deal structures. PPIAF's grants help governments frame infrastructure strategies; develop consensus around them; design specific policy, institutional, and regulatory reforms; and build government capacity to design, execute, supervise, and regulate PPP arrangements. Through its Sub-National Technical Assistance window (SNTA), PPIAF also assists local-level governments and entities such as utilities to develop their capacity to access market based financing without sovereign guarantees to improve infrastructure services. PPIAF's SNTA window funded the main part of the second phase of the partnership from 2013 to 2015, together with GWOPA.

GWOPA/UN-Habitat

The Global Water Operators' Partnerships Alliance (GWOPA) hosted by UN-Habitat was the main facilitator and donor for this WOP, jointly with the IADB, providing support through the normative and logistical support of the WOP-LAC platform. GWOPA is the organization set up to promote and support Water Operators' Partnerships worldwide. GWOPA leads WOPs promotion, facilitation and coordination, and is the principle source for WOPs knowledge and guidance. By scaling up effective WOP practice, GWOPA aims to contribute to meeting national and global water and sanitation commitments, including those relating to the Sustainable Development Goals and the Human Right to Water. GWOPA supported the WOP by assisting in regional and global coordination and information sharing activities.



Entrance of the Double Run water treatment plant (supplying Belize City)

PARTNERSHIP DESIGN

In May 2009, BWS staff and the former General Manager of CCWD met at a water-related meeting for the Caribbean region. This first contact led to exchanges on hand-held meter-readers and, three months later, an informal visit of Customer Service staff from Belize to shadow their peers at CCWD. In May 2010, the heads of BWS and CCWD again met informally during a NRW workshop organized by the IADB in Belize, where they discussed partnership possibilities. Soon afterwards, they asked the WOP-LAC platform to secure funds and facilitate the formalization of a WOP. The IADB and GWOPA/UN-Habitat supported this partnership as part of the WOP-LAC regional programme support and a Memorandum of Understanding between the partners was signed in September 2010. The first WOP visit by BWS staff to California took place in March 2011 in CCWD's facilities, hereby marking the inception of the WOP.

Financing the WOP

The cost of the first phase of the WOP was entirely covered by the WOP-LAC platform through funds from the IADB and GWOPA. The budget was US\$ 47,800, earmarked to cover travel and associated costs for two trips for a 4-person group from Belize to California, and one trip for a 2-person group from California to Belize over a two-year period. BWS doubled the number of staff travelling to the US and covered the additional cost. PPIAF and GWOPA financed the second phase of the partnership for an additional two years by committing a further US\$ 37,600 and US\$ 12,000 respectively. Staff time and other expenses of the WOP were covered by the mentor and recipient partner.

The following table presents conservative estimates of the main expenses covered by donors and the staff time provided by the operators themselves. As a not-for-profit partnership, no entity received any payment for their services.

Table 3: Direct and in-kind funding to the WOP

WOP funding			
1st Phase 2010-2012	WOP-LAC (GWOPA and IADB)	Travel expenses	US\$ 47,800
	BWS	Staff time	US\$ 35,000
		Additional travel	US\$ 25,000
	CCWD	Staff time	US\$ 50,400
2nd Phase 2013-2015	PPIAF	Travel expenses	US\$ 37,600
	GWOPA	Training expenses	US\$ 12,000
	BWS	Staff time	US\$ 13,500
		Additional travel	US\$ 15,000
	CCWD	Staff time	US\$ 29,400

Approach and Activities

PHASE 1

The first exploratory phase of the WOP involved mostly high-level staff, such as senior managers from both utilities. This phase involved two visits by BWS staff to CCWD to develop a work plan, and one visit of CCWD to Belize to follow-up on progress and make further recommendations. Peer-to-peer teams were also set up early in

this phase to begin working on recommended actions under each improvement track.

During this phase, the main capacity building activities combined job-shadowing with more formal classroom training. More specifically, activities carried out during the first phase consisted of tailored sessions for individuals, group sessions, field trips and tours, presentations by BWS and CCWD to their counterparts, BWS staff meeting with CCWD's board of directors, and real-time feedback sessions. Social

activities were also organized to help strengthen the relational links between individuals and increase the trust and confidence between peers (welcome reception, team building games, dinners, etc.).

The main outputs of this phase were the work plan that detailed the targeted improvement tracks and related actions, and a results report detailing progress made (see section on Implementation).

PHASE 2

The second phase of this WOP aimed to consolidate progress made and continue to implement the work plan along the improvement tracks. Phase 2 involved more operational and field staff and involved two exchange visits, one of BWS staff to CCWD, and one of CCWD staff to Belize. Both visits aimed to evaluate progress made along various improvement tracks, assess impact and support further actions.

In line with the original work plan, the improvement tracks addressed in this second phase included safety, engineering and technical services, and operations. In addition to those carried over from phase 1, new tracks such as public relations, were also introduced. The approach taken for this phase was mainly on-site training and job-shadowing between peers.

A final results report, co-produced by both utilities and completed in August 2015, sums up all the

improvements made along the work plan in both phases. The report also includes a large number of annexes with meeting notes, surveys, and daily logs. More detail of changes and improvements are described in the Implementation section.

Management of the WOP

Regular and forthright communications strengthened professional and personal ties between partners at different levels of the organization, from management to operations. The monitoring and reporting processes were conducted directly by the managers of the WOP based on their experience and feedback from the participants.

The governance structure of the partnership was not formalized and evolved over time. Initially, it was led by managers, and subsequently more directly by the teams working on the various improvement tracks. The management of the WOP was informal and flexible to allow for the revision of training based on feedback. The partners communicated frequently and exchanged WOP reports to ensure efficient project implementation, financing and accountability.

PARTNERSHIP IMPLEMENTATION

The improvement tracks described below collectively constituted the work plan of the WOP. The WOP was subdivided into thematic groups focused on one common training area.

Safety and security

As the WOP evolved, safety was considered as not solely a concern for operations during maintenance or reparation works, but a cross-cutting issue that related to corporate culture, behaviour and public health issues. Safety therefore became a central improvement track and one of the most successful.

For BWS, health and safety was not a priority issue before starting the partnership with CCWD. Safety aspects were not systematically part of construction, maintenance or basic operational works, and as a result regular accidents or minor incidents occurred. In addition, a culture of disregarding safety concerns remained an obstacle to company-wide adoption of safety practices. Five years after the inception of the partnership with CCWD, the safety situation at BWS has improved considerably.

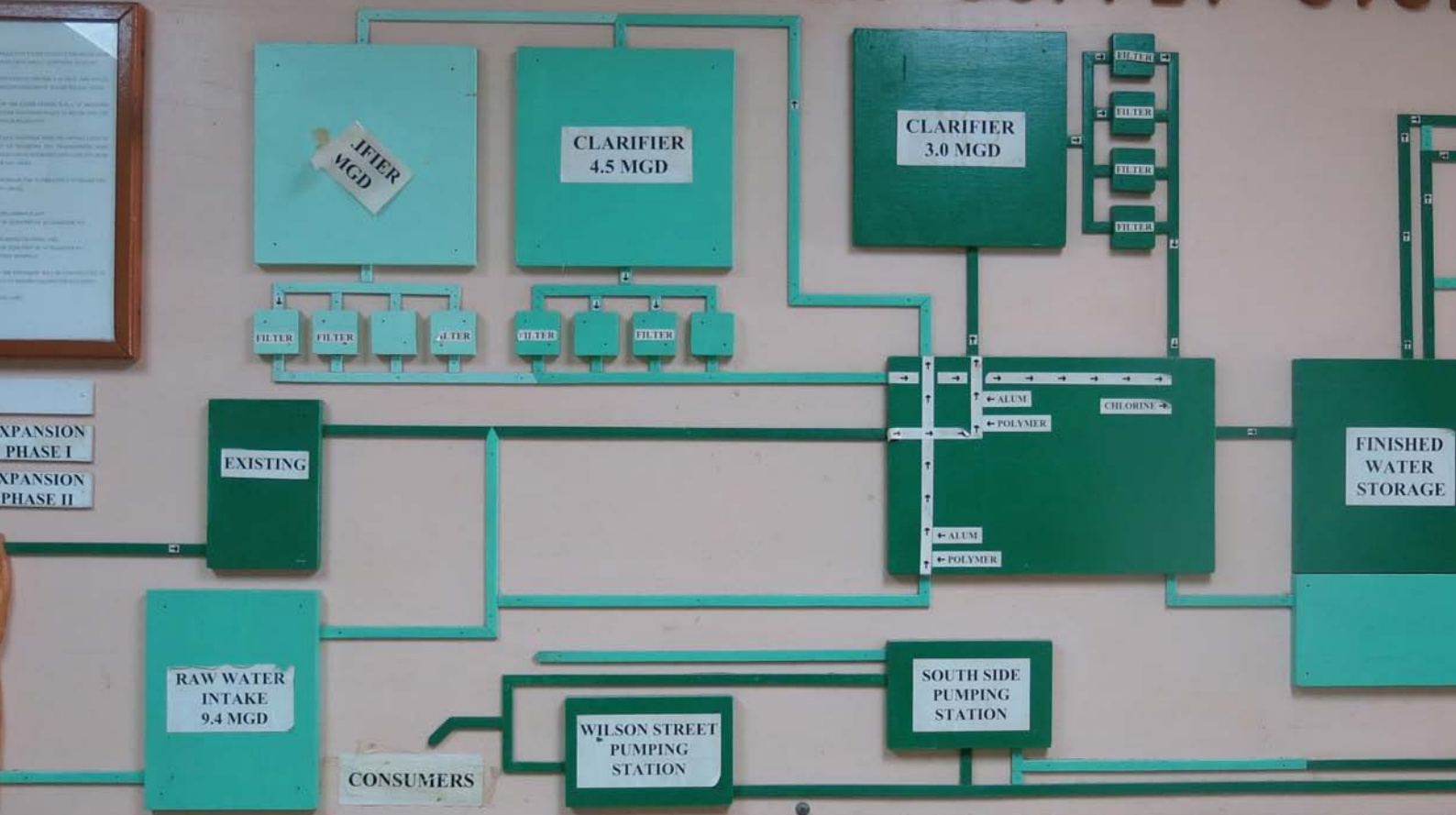
BWS understood the strategic need to build an internal culture of safety for all workers of the

company. The alignment of several factors made the adoption of radical safety changes possible:

- CCWD revised its worker safety program, drawing 'fresh' lessons learned to support safety improvements within BWS;
- BWS management fully supported the safety changes, including with funding to purchase necessary equipment;
- The 'low-hanging fruits' achieved through simple attitude, behaviour and discipline changes were addressed first and created momentum for further change and wider acceptance.

The implementation of this improvement track triggered a range of changes and benefits for the daily work of BWS. One of the most tangible outputs is the creation of a **Safety Committee**, modelled on that of CCWD. Following the visit of BWS to CCWD in 2011, the delegation came back to Belize with a clear understanding that safety is the responsibility of each and every individual within the company. The interdepartmental aspect of the CCWD Safety Committee was eye-opening and inspiring for BWS. The management solicited volunteers to form the Safety Committee. According to the partners, a successful Safety Committee should include enthusiastic volunteer staff from various departments, with at least one member having some managerial authority. To support the implementation

BELIZE CITY WATER SUPPLY SYSTEM



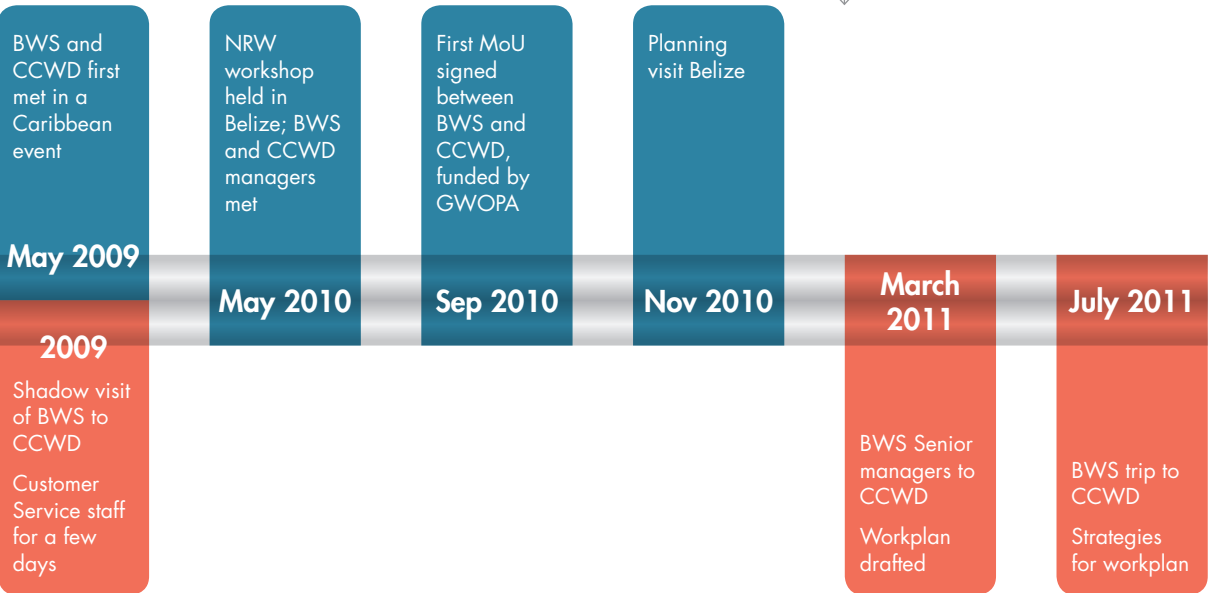
Schematic representation of the Belize City water supply system

Timeline

This timeline is not exhaustive, but highlights some key events in the WOP.

2011-2015

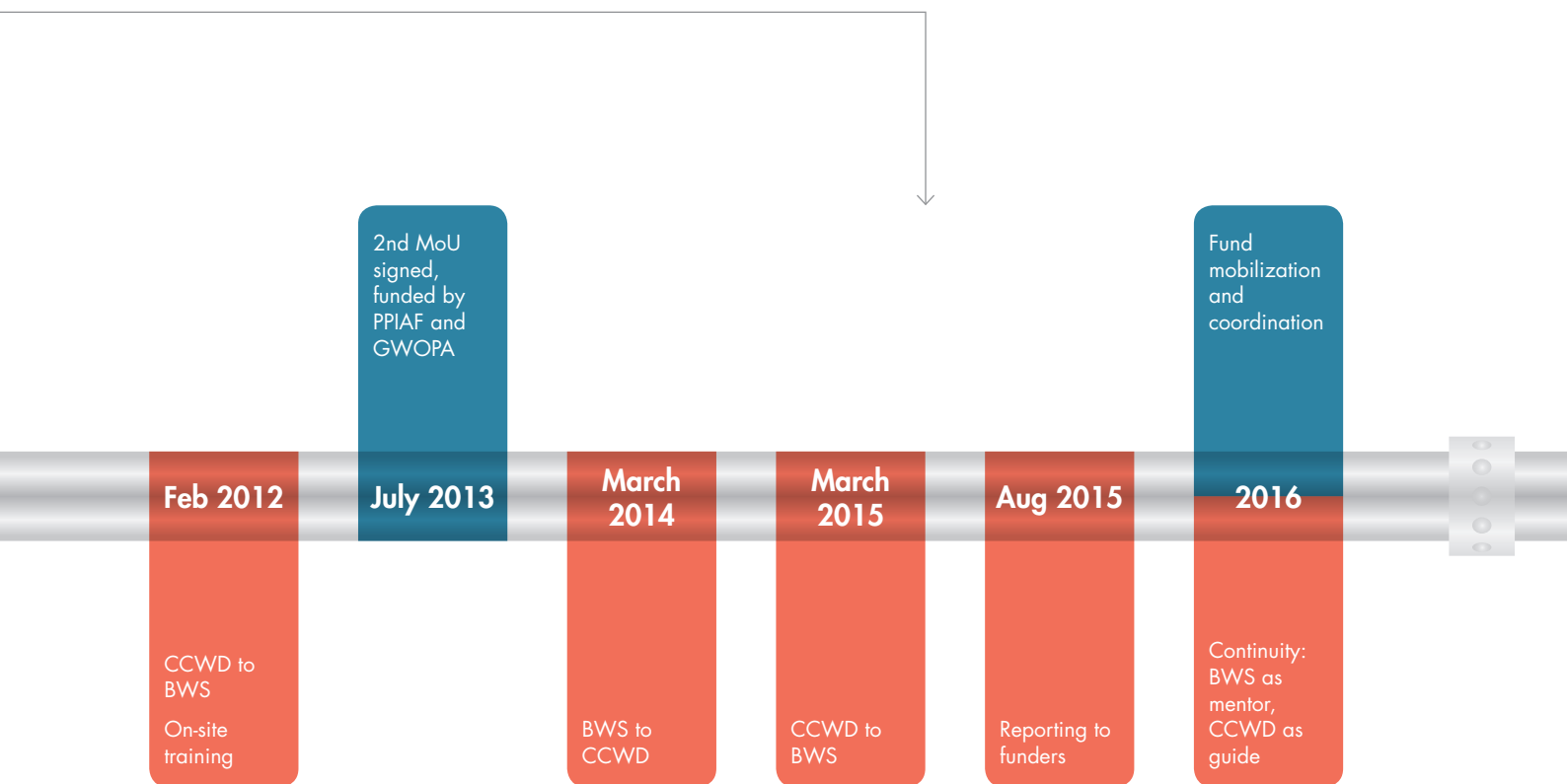
Frequent peer-to-peer exchanges
Remote consulting



↑ MATCHMAKING PROCESS ↑

↑ 1ST PHASE ↑

ACTIVITIES ON 6 THEMATIC: SAFETY, OPERATIONS, CUSTOMER SERVICE, IT AND FINANCE. **COST:**



↑↑ 2ND PHASE ↑↑

, ENGINEERING,
US\$ 47.800

FOLLOW-UP ON THE 5 THEMATIC: SAFETY, ENGINEERING / TECHNICAL
 SERVICE, IT, OPERATIONS, PUBLIC AFFAIRS. **COST: US\$ 49.600**

and operationalization, a new safety officer was hired to oversee activities of the committee.

The Safety Committee's role included:

- Investigation after accidents;
- Acknowledgement of staff leader(s) in safety;
- Identification of sites and facilities with specific safety issues, concerns and potential solutions through open and regular discussions with employees;
- Communication on site and facility safety priorities and potential corrective actions;
- Identify and recommend subjects for potential safety training;
- Ensure existing safety equipment and practices are maintained, functional, and effective.

The Safety Committee is now fully operational and working to improve the overall health and safety practices of the operator. Following initial resistance, the committee took a constructive approach to helping the staff understand the necessity of safety and security measures. For instance, when a potential danger was noticed, it would be reported to the management who would then sit with staff to discuss causes and find consensual solutions. Interviewees gave an example of field workers complaining about wearing helmets in such a hot climate. Instead of punishing this

behaviour, representatives of the Safety Committee discussed with the staff to understand why they were unwilling to wear protective helmets. They jointly decided to use cooling towels to alleviate the heat while continuing to wear the helmets.

To support the uptake of safety measures within the utility, BWS needed to buy and use up-to-date equipment and materials. The management and board agreed to set aside a budget of US\$ 350,000 to purchase **Personal Protective Equipment** and new safety gear, and the Safety Committee committed to standardise its use. The financial commitment showed evidence of BWS's willingness to bring real change to the safety culture.

In coordination with CCWD, BWS also developed **in-house training programs and facilities**, including: a backflow prevention program based on training provided by CCWD aimed at improving public health, and a confined space training program based on the one used at CCWD.

Furthermore, CCWD recommended a set of simple, low-cost, **housekeeping measures** that resulted in significant immediate improvements. These included clearing tools and supplies at the end of a job, posting of signs at facilities to inform of potential risks, addressing fall hazards by putting chains across open areas, clearing of wet areas by cutting drain channels, creation of safe access to

equipment and facilities, and maintenance of public safety through proper signage and safety measures.

CCWD also recommended a **protocol** to follow in case of a major accident.

The priorities to act are as follows:

- Stabilize the situation to prevent it from getting worse
- Save lives
- Protect the environment
- Secure personal property.

Today, this protocol is systematically applied within BWS.

CCWD made a set of recommendations to **prevent accidents**. The following basic safety measures are being implemented:

- Personal Protective Equipment are used systematically such as safety helmet, vest, goggles and steel-toed shoes;
- Unsafe electrical lines and connections are observed at various facilities and contractor construction sites and corrective actions are implemented;
- A lock-out tag-out approach is in place, tagging each piece of equipment and electrical lockouts with labels in order to readily identify that exact device. This safety procedure

ensures a proper shutdown of equipment during maintenance or repair work;

- Basic trench shoring measures are systematically implemented on construction/maintenance sites;
- BWS has implemented a similar confined space training facility and module used by CCWD;
- Safety signs for road disruption are systematically used to protect construction/maintenance sites;
- Certification for specialist works such as welders are implemented;
- Regularly review of first aid kit and training are done;
- In order to keep safety in the mind of all employees, a safety section in annual personal reviews or in the quarterly BWS newspaper has been added.

In addition, a **step-by-step safety task procedure** is systematically applied to ensure that all elements before the intervention in the field are gathered to ensure the security of field crews and public on intervention sites.



BWS employees at work, repairing a leak on the main to Belize City

“Tailgate meetings” have now become part of most interventions. These consist of an informal safety meeting, generally conducted at the job site prior to starting a job or work shift. Job supervisors can draw attention to hazards, processes, equipment, tools, environment and materials to inform all workers of the risks in their surroundings. Field workers and foremen are invited to contribute ideas to get the job done safely. These practices were observed during the visit to produce this report during the reparation of a major leak that occurred on the main supplying Belize City.

Changing the safety culture was a central theme, linking all working areas from engineering design and construction to operation and maintenance. By creating a common route, with standardized practices, for the entire utility, safety culture created a bridge between departments and emulated staff toward the achievement of a common overarching goal. The improvements achieved along this theme have been undoubtedly a great success which have performed profound changes and initiated further long-term outcomes.

Operations

The Operations department is the central unit of a water utility and deals with the day-to-day provision of water and wastewater services. This improvement track resulted in the most profound

and lasting changes, together with the safety track. As with the other tracks, the first phase of the WOP served to identify the objectives and priorities for Operations and to start implementing changes, while the second phase aimed at consolidating the gains and reinforcing the knowledge and know-how acquired. This track evolved along four main topics: operator certification training program, water meter calibration, backflow prevention and water quality monitoring.

One of the biggest achievements of this WOP is the **water operator certification training program**. In addition to training provided by CCWD as part of the WOP, BWS expressed interest from the inception of the partnership to pursue a utility-wide training program, equivalent to the one provided by the American Water and Wastewater Association. Initially, BWS looked into the possibility of co-creating a training program for water operators together with the national university of Belize however because of the small size of the country, the demand for such courses would have been too low.

CCWD supported BWS to single out an affordable, quality set of certifying courses to strengthen and standardize the knowledge and know-how of staff. Together, the partners selected the programs available through the Sacramento State University, the same curriculum followed by many CCWD

employees. BWS received full support from its management and board of directors to cover the cost and launch a company-wide set of training courses from the university. The program consists of online training supported by physical material (e.g. books, manuals) that aims to certify operators. According to BWS staff, the courses are well structured, practical and easy to follow. The online aspect gives staff the flexibility to fulfil their responsibilities while following

the course. The programme started in January 2015 and at the time of writing, BWS had purchased 215 Operator Training Courses that were followed by 119 employees, from managers to foremen. One course costs on average one hundred US dollars including the online courses and a physical manual. Overleaf is the breakdown of the courses and number of staff participating in the program.

Action plan on safety improvement track and related results

Topic	Outputs	Outcomes
Improved worker safety	<ul style="list-style-type: none"> • Use of safety gear on worksites improved • Workplace safety issues discussed through the entire organization, from work crews to management • Safety Committee to review and evaluate safety practices established and operational • Budget for purchasing new worker safety gear set aside • Confined space training program developed and improved • Safety signs for road disruption to protect construction/ maintenance sites widely used 	<ul style="list-style-type: none"> • Health and safety corporate culture (totally) changed • Number of accidents and incidents reduced substantially • Related costs and expenses reduced <p>e.g. number of working days lost due to incidents reduced by 75% between 2014 and 2016, enabling the company to save about US\$10,000 in 2016</p>
Designing for safety	<ul style="list-style-type: none"> • Specific issues at water treatment plants identified and addressed: chemical handling practices, check-in practices for workers, etc. • New facility designs for worker safety issues discussed and concrete actions formulated and implemented: e.g. retrofit of the Belmopan water treatment plant to add handrails and walkways 	<ul style="list-style-type: none"> • Safety aspects systematically included in engineering designs

Table 4: Categories of staff following the courses

Management	12
Operations	67
Technical Services	40

Table 5: Topics addressed in the courses and number of staff taking them

Water and Wastewater Specialist Program	12
Manage for Success: Effective Utility Leadership Practices	13
Operation and Maintenance of Wastewater Collection Systems, Volume 1	18
Operation and Maintenance of Wastewater Collection Systems, Volume 2	3
Operation of Wastewater Treatment Plant, Volume 1	13
Operation of Wastewater Treatment Plants, Volume 2	6
Small Water System Operation and Maintenance	45
Water Distribution System Operation & Maintenance	61
Water Treatment Plant Operation Volume 1	24
Water Treatment Plant Operation Volume 2	20

The operator certification program is now an integral part of the development of BWS staff, from recruitment (mandatory to pass a course during the probation period) to promotion. Each employee is expected to follow eleven courses and has around three years to complete them all. So far the completion rate is 93%.

BWS decided to improve its **water meter calibration** practices due to lack of accuracy in the measurement of water flows and the short lifespan of the meters installed. When the BWS delegation travelled to CCWD facilities, they were very impressed by the meter calibration bench, which performs quality assurance, quality control and calibration. The expected service life of a water meter at CCWD is 25 years, compared to 5 years at BWS in 2007. Consequently, BWS staff expressed the desire to design and build their own meter calibration bench with the technical support and expertise from CCWD. Despite the lack of resources to implement a fully operational meter lab during the implementation of the WOP, BWS started to build an in-house metering control station which will eventually house a meter lab. The meter unit cost increased by 20% between 2012 and 2016, moving the average replacement period from 5 years originally to up to 10 years. Due to extended service life of meters (calibration, better meters), BWS estimates it saved US\$ 3 million (cost of not changing 23 000 meters)

between 2012 and 2016. In the meantime, they started using field-based portable meter testers to check accuracy of meters. The objective is to synchronize the data collected by the meters with the SCADA system. A full implementation of remote read flow meters is planned but it is a long and costly process. It will eventually eliminate the time-consuming task of manual meter reading.

Through their exchanges and job-shadowing activities with CCWD, BWS realized the importance of **backflow prevention measures** in reducing health risks in the distribution system. Adding backflow devices into BWS' service lines is crucial to avoid water-borne diseases and contamination that could seep into the network from private premises. BWS is now installing backflow prevention valves for customers with independent water sources to avoid the contamination of the BWS drinking water network. They are also evaluating the feasibility of purchasing meters with built-in backflow prevention devices. The full implementation of backflow prevention devices requires significant investment, and thus is still a long-term objective. Finally, BWS has pushed for an enforcement of the Plumbing Code of Belize, which would standardize plumbing practices and provide consumers with safer sanitary plumbing systems. As a result, the Central Building Agency and the Public Utilities Commission agreed to partner with BWS to enforce the Code. All stakeholders gathered in October 2015 to discuss



BWS employees at work, repairing a leak on the main to Belize City

the modalities of the enforcement. At time of writing, there were no major updates on this process.

BWS faces limited resources in terms of **water quality monitoring**. The main challenge is the lack of space and instruments in the national central laboratory at the Double Run Treatment Plant. Nonetheless, the laboratory staff and management are committed to plans to expand the existing labs by allocating a specific budget. Furthermore, the central laboratory is pursuing ISO 17025 accreditation.

As BWS staff/CEO reported, many customers do not drink tap water due to its strong smell and taste of chlorine. Accustomed to harvested rainwater and other abstracted sources of freshwater, customers in Belize initially rejected tap water when reliable services first arrived, despite its higher level of safety. Over the last 20 years, this has led to a boom in the consumption of bottled water. During the WOP, peers exchanged on water quality monitoring issues. BWS participants were surprised to learn that CCWD also experience customer complaints about their water's smell and taste, despite the Californian's high-tech equipment and monitoring devices. To overcome this challenge, CCWD had established testing procedures to reduce flavour and odour of drinking water by adjusting treatment processes and thus addressing customers' perceptions. The partners agreed that 'flavour-odour'

testing would be a useful complement to traditional monitoring to meet international water quality standards. Without top notch technologies, the 'keep it simple' approach works in both countries.

In 2014, the BWS central laboratory was upgraded with new equipment and facilities were renovated (further expansion is still to be done). CCWD was consulted informally and provided recommendations on the purchase of new equipment. Although this improvement track was not addressed during the first phase of the WOP, it was explicitly considered under the second MoU as a result of peer exchanges and discussions. BWS laboratory supervisor engaged in the WOP and benefited from the technical knowledge and supplier network of CCWD. The shadowing visit enabled a BWS lab supervisor to observe CCWD lab processes and view the physical layout of their laboratories. The laboratory supervisor later highlighted the value of seeing an accredited laboratory in operation, from sample collection to processing, and the full access to internal documentation. As a result of the visit, new quality control procedures were added to the BWS laboratory Standard Operating Procedures for most testing methods. New laboratory notebooks with updated quality insurance and control procedures, documentation of calibration, a procedure manual for housekeeping work data and a laboratory manual for training purposes were put in place.

Finally, the CCWD laboratory, which had recently renovated its lab, agreed to donate an atomic photo spectrometer to BWS, along with lamps and glassware. BWS is paying for the shipment and delivery fees. At time of writing, the material was on its way. CCWD will support remotely (if not possible in person) the installation and calibration of this valuable piece of equipment. It will enable the central laboratory of BWS to look at atomic elements, like heavy metals, previously not examined. According to CCWD lab staff, the

cost of this second-hand instrument is evaluated at US\$ 50,000 (a brand new one costs around US\$ 200,000). The lab supervisor peers from both partners have developed a friendship and are in regular contact. The BWS lab team is relatively young, committed and motivated to improve their practices toward excellence.

See the video interview of the Laboratory Manager at [<https://www.youtube.com/watch?v=0TRvrUJBSdM&t=7s>]

Action plan on Operations improvement track and related results

Topic	Outputs	Outcomes
Operator Certification Program	<ul style="list-style-type: none"> • Sacramento State University program identified and followed 	<ul style="list-style-type: none"> • 119 employees enrolled, 215 courses followed, with a completion rate of 93% • Staff motivation and career opportunities improved
Water meter calibration	<ul style="list-style-type: none"> • Meter calibration shop established and operational • Calibration procedures developed and followed 	<ul style="list-style-type: none"> • Service life of meters extended from 5 to 10 years on average • Contribute to NRW reduction from 34% to 24% since 2009 • Improved revenues stream robustness and reduced meter replacement costs by US\$ 3M between 2012 and 2016
Backflow prevention	<ul style="list-style-type: none"> • Need for backflow prevention devices identified as long-term goal 	<ul style="list-style-type: none"> • Backflow preventers installed to new piping installations, and upgrades to existing distribution systems
Leak detection	<ul style="list-style-type: none"> • Ability to find leaks improved through the adoption of techniques used at CCWD • Detection tools and techniques improved 	<ul style="list-style-type: none"> • Production/Collection ratio increased • Increased average distribution system pressure countrywide by 12% between 2010 to 2016 (from 36 to 40.2Psi)

Engineering and technical services

The focus of this track was on improving the design, construction and maintenance of the different water systems and facilities. The main achievement relates to the **development, installation and implementation of SCADA systems** (Supervisory Control and Data Acquisition). SCADA systems help water operators to collect data, report, control and monitor a variety of factors such as quality, pressures and flows. The first SCADA system in Belize was introduced in 2009 to monitor a pumping station in Belize City. Based on this first experience with the monitoring tool, BWS realized the importance of implementing it across the network. The WOP enabled BWS to develop and expand SCADA to all major systems. Following exposure to the systems in California and based on internal technical capacity, BWS decided to develop the program architecture behind the SCADA system in-house. BWS staff have estimated the cost of outsourcing the development and implementation of SCADA by external consultant for all systems at US\$1,000,000 (compared to US\$600,000 in-house), hereby enabling BWS to save an estimated US\$400,000. It was a very cost-effective solution given the expense of outsourcing this activity, despite the fact that it increased the work load on the IT department. In addition, the do-it-yourself approach allowed staff members to be trained and build their own expertise on SCADA systems.

With the support of their peers, BWS staff were able to fine-tune the SQL database (Structured Query Language, **a special-purpose programming language designed for managing data**), improve SCADA display panels and standardize the colour coding for SCADA alarms, hereby increasing efficiency in response. Furthermore, BWS hired new staff to assist with the expansion of the new systems. As a result, BWS installed SCADA systems to newly constructed remote stations such as the Belize River Valley, Dangriga, Southside and Wilson Street Water Pumping Station in Belize City, the Double Run Water Treatment and Caye Caulker Water Treatment Plants. In addition, they are planning to expand the monitoring system to the tourist towns of Placencia and San Pedro. BWS is currently expanding their services to new areas and is planning the systematic installation of SCADA systems.

BWS staff are now able to make logic and programming changes to remote sites from the main office. The development of these systems saves travel time and enables technicians and supervisor to access and control their pump stations from a central location. At the time of writing, BWS was upgrading their SCADA room, installing large, flat panel monitors for HMI (Human-Machine Interface) Operations to control the distribution system, modelled on CCWD's facilities.

During the visits to California, the BWS staff also worked on corrosion issues and pipe location techniques. To **prevent corrosion of tanks and pipes**, BWS prepared a rough list of items that needed protection and prioritized them. The first item to be replaced was a 500,000 gallon tank. BWS studied two options, either install a corrosion protection or simply replace the existing tank with a new one. BWS contacted a Canadian company and studied the costs/benefits of both solutions with the support of CCWD. The full implementation of corrosion preventive techniques is a long-term goal that will occur over the replacement cycle of existing facilities. In relation to **locating underground pipes**, BWS developed a design for tracer wire installations on service laterals. Tracer wire consists in a coloured wire laid down along the length of a pipe helping field crews to more easily locate the exact location of a water or sewer pipe. BWS has started to place tracer wires for new or replacement pipe installation and will continue over the replacement cycle of existing pipes.

The Engineering and Technical Department also addressed an issue that was not expressly planned as an objective of the WOP, but which stemmed from the radical change in the safety culture of the company. The department decided to **improve the facilities and office design for safety**. First, after visiting CCWD and touring facilities, the department started to incorporate safety into

treatment plant design which had not been done before. Basins and open areas are now designed with handrails and other safety measures, and existing hazards were addressed (see Image # handrail). The Engineering Department also designed a new ergonomic office layout for their department, which the management fully supported with US\$ 25,000 earmarked to replace all furniture. At the time of writing, the layout plans were finalized and all the furniture was ordered and about to be delivered. This first re-arrangement of an entire unit office will serve as a pilot to be replicated progressively toward the entire refurbishment of all departments' offices.

Overall, BWS staff from the Engineering and Technical department brought back a lot of ideas, such as the development of Standard Operating Procedures (SOPs) for managing SCADA systems, the introduction of variable frequency drives for use and control of plant rates and pump stations flows, the option to use remote-read smart meters for flow totalizing, the assessment of using a cellular network and point-to-point radios to expand the SCADA system, or the possibility to import solar panels.

See the video interview of the Technical Services Manager at [<https://www.youtube.com/watch?v=6Fuw1tenxFs>]

Action plan on the Engineering and Technical Services improvement track and related results

Topic	Outputs	Outcomes
SCADA system	<ul style="list-style-type: none"> • SCADA infrastructure has been developed, installed and implemented successfully in all major systems, enabling BWS to save an estimated US\$400,000 (compared to outsourcing) • Now expanding to sub-stations 	<ul style="list-style-type: none"> • More accurate, efficient and centralized control and monitoring of water production and distribution • Travel time saved and productivity enhanced • Reduced response time in case of problems
Corrosion protection	<ul style="list-style-type: none"> • Techniques for corrosion protection discussed • Different solutions analyzed • Full implementation is a long-term goal 	<ul style="list-style-type: none"> • Reduced maintenance and replacement cost of pipes and tanks
Pipe location design	<ul style="list-style-type: none"> • Practices to locate underground water pipes improved, e.g. use of tracer wires for new installations 	<ul style="list-style-type: none"> • Reduced response time to locate and repair leaks • Contribute to improve leak detection and decrease water losses. Ratio water sold over water produced increased by 5% between 2010 and 2015

Finance

The finance improvement track formed part of the first phase of the WOP but was not renewed during the second phase as other topics were prioritized. This specific track did not bring major changes but brought new ideas and concepts to be implemented over the mid-term. Although some recommendations from the mentor were implemented during the WOP, others have been postponed due to limited cash flows caused by

heavy loan burdens and a recent unexpected decrease in tariffs by the regulator (7% in 2012).

Overall, capital projects, budgeting and accounting are now more detailed in the financial operations of BWS, which reinforce their financial stability. By understanding how another foreign utility operates, BWS's financial department realized that their own legal structure made them more efficient as there are fewer layers of approval for payments, for example. The financial department has pushed forward a set of actions stemming from the WOP,

within the limitations of available resources. In particular BWS worked on the following aspects:

- **Processing online payment:** customers' bills are now processed through an online system. It has enabled the department to save time and tracks more rigorously and easily the revenue flows of the utility. Online payments have increased by 15% between 2010 and 2015, from 16% to 26% of the total sales volume (payments via Bank were already available in 2010). The efficiency gain enabled them to free-up time for BWS cashiers and allowed BWS to outsource their collection agents to the national electricity company, Belize Electricity Limited (BEL). Since 2014, BEL commissions enabled BWS to earn around US\$220,000.
- **Inflationary adjustment to tariffs:** BWS used to submit rate application to the Public Utilities Commission to raise tariffs by between 5 and 15% every 3 or 5 years. Through their collaboration with CCWD, they recognized that inflationary adjustments (used by CCWD) were appropriate. Slow tariff increases of 1 to 2% every year are more easily accepted by consumers and the regulator alike. As the BWS financial manager highlighted "that was something very unique we saw at CCWD in terms of asking for small and yearly tariffs increases".
- **Purchasing and stores:** One specific example clearly illustrates improvements made along this track: the management of the vehicle fleet. BWS was inspired by the fuel card swiping machine used at CCWD. Despite not having the technology available in Belize at that time, the financial team studied the possibility of setting up a similar system. Today, some fuel stations are starting to introduce this new system and BWS is now in the process of implementing this payment system. In addition, CCWD recommended that BWS renew their fleet of vehicles every five years to optimize the efficiency and reduce maintenance costs. In parallel, BWS implemented a vehicle tracking system which enabled BWS to save about US\$60,000 in fuel expenses between 2013 and 2016. Vehicles also gained in efficiency, increasing by 14% the average miles per gallon (from 17 in 2013 to 20 in 2016) and reduced maintenance cost by 7%.



Sewer lagoons wastewater treatment plant of Belmopan, Capital of Belize

Action plan in Finance improvement track and related results

Topic	Outputs	Outcomes
Detailed budgeting	<ul style="list-style-type: none"> • New budget processed including more detailed budgeting and project accounting established and used • Better structured capital expenditure projects 	<ul style="list-style-type: none"> • Improved perception of donors, the government and the regulators over the financial viability of BWS
Electronic payments and time sheets	<ul style="list-style-type: none"> • Electronic payment options for customers developed and used • Internal electronic time sheets for employees developed and used 	<ul style="list-style-type: none"> • Payroll process and record keeping are more efficient • Monitoring and accountability of revenues streams more rigorous and easy • Online payments have increased by 15% between 2010 and 2015, which freed up time for BWS cashiers • Outsourcing BWS collection agents for the Belizean Electricity company enabled BWS to earn US\$220,000 in commissions since 2014.
Rate-setting methodology	<ul style="list-style-type: none"> • Inflationary adjustment to tariffs approach analyzed and used 	<ul style="list-style-type: none"> • More acceptable and accountable tariff increases for customers and regulator
Purchasing and stores	<ul style="list-style-type: none"> • Purchasing operations improved, e.g. bar coding system and electronic fuel card management system 	<ul style="list-style-type: none"> • More efficient management of stocks and assets, e.g. vehicle tracking system enabled BWS to save about US\$60,000 in fuel expenses between 2013 and 2016.

Customer services

The Customer Services department at BWS is in charge of billing and collection services, meter reading, call centre and customer reception. Customer service staff are located at the headquarters in Belize City and in regional offices. The Customer Service Manager together with the Credit Control Supervisor went on the first visit to CCWD during phase 1 of the WOP and the billing supervisor and another staff member from the department were part of the second trip. Based on their experiences, the central focus of work was decided and BWS staff job-shadowed and exchanged with their peers.

During a visit in March 2012, CCWD Customer Service Supervisor noted a range of possible improvements that would not entail substantial financial commitment. The on-the-job recommendations made by CCWD to BWS consisted of **housekeeping and streamlining processes**, such as:

- Remove closed account records: store closed account files for more efficient access to current customer files and reduce visual mess;
- Streamline new service application process: instead of having to fill out a 3-page application form while a customer service representative waits in real time, CCWD recommended a

more efficient set-up to attend to clients by creating two different lines, one for payments, and one for everything else. As such, clients receive service more quickly and efficiently;

- Link the service order database and the customer service database in order to avoid duplication and general inefficiencies. CCWD recommended merging the work order database and the customer service database;
- Provide solitary worker safety forms: CCWD recommended providing each worker going out into the field with a checklist to ensure she/he has all necessary gear to accomplish tasks. For instance, the meter readers would require safety gear such as a meter strap, mace, etc.

After the observation of **meter reading** devices in action at CCWD, BWS' customer service department studied the possibility of buying similar reading devices. Once a decision was made and the equipment purchased, reading accuracy and revenue streams increased. However, a lack of standards for meter placement in customers' premises made installation for fieldworkers difficult. Based on the recommendations of CCWD, BWS purchased some handheld electronic meter readers, which improved the efficiency of the collection. These actions served more as a pilot, as all meter-reader foremen had not yet been equipped with such handheld meters. In addition, the locations

of meters inside the private premises of customers make meter reading difficult. The installation of a meter shop, modelled after CCWD's, as explained in the Operation section is also contributing to the improvement of customer services as part of their meter reading responsibilities.

Based on their observations at CCWD, BWS decided to **update various office devices and systems**. The management agreed to change the entire phone system to create a centralized and integrated call centre. After looking into different options, the management decided to outsource the implementation of a new phone system. The new call centre is now operational, three years after the original ideas emerged from the WOP. The installation of such a system has drastically increased the efficiency and enhanced the productivity of the Customer Services department. Another central element for the activities of the Customer unit was the mail room where two new devices were introduced:

- a paper-folding machine. Previously a meter reader had the role of folding the 48,000 bills manually before sending them to the customers, a task that took several days every month. Now, the meter readers can dedicate more time to assist with other tasks, such as meter replacement or other field work.

- a more stable and reliable printer was acquired, with a much greater capacity than the previous one.

One of the big changes reported by a Customer service employee is the delegation process. BWS managers and supervisors observed the working relationships between different levels of the CWWD hierarchy. In Belize, they tried to shift their management style by giving more leeway to the staff they supervised. The approach was successful and now managers have more time to control the overall activities of the department instead of doing ineffective micro management. It has also empowered staff who now feel more responsible and creative in proposing solutions to overcome operational problems.

Action plan on Customer Service improvement track and related results

Topic	Outputs	Outcomes
Meter reading	<ul style="list-style-type: none"> Handheld electronic data logger purchased 	<ul style="list-style-type: none"> Improved efficiency and accuracy of meter data collection Contribute to NRW reduction from 34% to 24% since 2009
Call center	<ul style="list-style-type: none"> New phone system purchased and in use 	<ul style="list-style-type: none"> More efficient management of users calls Shorter response time for consumer request

Public outreach

Initially addressed as an integral part of the customer service improvement track, the public relations (PR) track evolved into a dedicated topic in the second phase of the WOP. Public outreach grew in importance through the WOP as the peer relationship between PR managers became stronger. Collaboration on this track involved:

- **Educational outreach:** development of a curriculum in collaboration with Belizean schools to raise awareness about water issues
- **Community outreach:**
 - representatives of the PR department of both utilities were invited to a Belizean TV show to discuss the partnership
 - on World Water Day, staff members of both utilities were interviewed by local medias

- staff enhanced connections with students, teachers, and the public at the St John’s College junior career day, BWS staff communicated about the role of the utility in society
- **Institutional outreach:** realizing their dependence and interlinkages with upstream countries about the quality and quantity of their water sources, BWS decided to open dialogue with Guatemala for better management of transboundary water resources.

Action plan on Outreach improvement track and related results

Topic	Outputs	Outcomes
Educational outreach	<ul style="list-style-type: none"> Existing program identified and educational material under development with the objective to implement one lesson through a grade level (e.g. the water cycle) 	<ul style="list-style-type: none"> Ultimately, schoolchildren will be aware of some water-related issues
Community outreach	<ul style="list-style-type: none"> Participation in a national television show 'Open Your Eyes' to discuss world water issues and benefits of the WOP Activities during the World Water Day (March 20, 2015), including interviews and exchanges with community members 	<ul style="list-style-type: none"> Awareness of the community raised
Institutional outreach	<ul style="list-style-type: none"> Initiate dialogue with their Guatemalan counterparts 	<ul style="list-style-type: none"> Ultimately, reinforcement of diplomatic ties to manage collectively regional resources

Information and technology

The Information and Technology improvement track was less of a priority than other topics. This track only materialized during the first visit of BWS to CCWD, yet some results were achieved. It is also worth recalling that the IT department provided crucial support to the success of other improvement tracks, such as the architecture of the SCADA system.

The changes achieved along this improvement track include the following:

- **Web-based meter reading system**
 - Based on visits to CCWD, the BWS

IT department implemented a new web-based meter reading system.

- **Service desk improvements** – The IT department changed the way it interacts with other staff of the utility. The department established one unique contact number for all staff to request support, instead of relying on individual people. Now, one employee is assigned to the help desk phone, and an online monitoring system tracks each tasks to ensure it is carried through.
- **Virtualization project for servers** – The aim was to unify multiple servers into one physical box. It allows for stored data to be recovered in case of disaster and also reduces costs, as well as savings in energy.

Action plan on IT improvement track and related results

Topic	Outputs	Outcomes
Computer Server	<ul style="list-style-type: none"> • Establishment of a redundancy system 	<ul style="list-style-type: none"> • Reduce power costs • Improve data back-up capability
Web-based meter reading system	<ul style="list-style-type: none"> • Wireless transfer of meter data to BWS computer established 	<ul style="list-style-type: none"> • Free up time for BWS cashiers, which resulted in outsourcing BWS collection agents for the Belizean Electricity company and enabled BWS to earn US\$220,000 in commissions in 3 years (2014-2016)
Internal customer service	<ul style="list-style-type: none"> • Service model for better management of request established. Help desk developed by the IT department with web interface to receive and track BWS staff requests implemented 	<ul style="list-style-type: none"> • Improved management of customer requests



Pump at the Belmopan abstraction facility



BWS employees inspecting the Belmopan water treatment plant

SUSTAINING CHANGES

Unlike the previous chapter which shows the concrete achievements stemming from the WOP, this section highlights the conditions created to sustain improvements over time. As the mentor provided a number of thematic recommendations, the partnership has paved the way for long-term, lasting changes. The mentee has initiated a process of organizational and instrumental reforms to realize its strategic objectives and fulfil its vision.

Human capital

Although the partners did not formally assess the initial in-house capacity, it is reasonable to say that, overall, the partnership has helped the mentee to strengthen a large pool of experts on different themes, reducing dependency on external and costly technical assistance. The WOP has offered a high level of specialist support through occasional onsite training and visits, and via remote communications.

As in most peer-learning partnerships, this WOP aimed primarily at strengthening the human and organizational capacity of the recipient utility. The knowledge and working methods acquired through the WOPs contribute to positive changes

in mentee performance. As explained previously, attribution of performance improvements to the WOP is not straightforward; nonetheless, processes of individual, organizational and institutional capacity-building drive these positive changes. The mentee is implementing new technical and managerial knowledge, know-how and working methods that were gained through the partnership.

Beyond the knowledge and knowhow passed on by the mentor, one of the achievements of the WOP is the company-wide training certification program. As BWS CEO highlighted, “the training received in the WOP generated much more training, which triggered a number of promotions” adding, “it also creates a fair market value for staff as they become internationally certified. The certification training programs have now been streamlined. For instance, a career ladder plan was developed based on the model of CCWD. In addition to making it more detailed than the mentor’s plan, completing certification courses is now part of the career evolution path of an employee. Staff have a better perspective on how they can evolve in their job. In the same vein, the recruitment process is now more professional and includes knowledge and practical tests, with a probation period requiring a completion of one certification course. Those aspects have undoubtedly empowered different layers of staff, with a more delegated management model, giving more

responsibility to technical employees and listening to their suggestions for overcoming problems or improving processes. Motivation for doing a good job has spread over the entire company.

Safety culture

Changing the corporate culture of a company and going against a cultural mental block is never an easy task for managers. It usually requires time and lot of education and diplomacy to explain the rationale behind the required behavioural changes and the benefits they will create over time. In the case of BWS, the WOP was an appropriate solution and worked well to guide the mentee in this process. The visits and advice from a foreign peer utility created emulation, enthusiasm and inspiration. It shifted the entire philosophy and psychology of staff as individuals and the company as an organization. Previously, the unwillingness to wear safety equipment was a 'sign of strength and self-confidence.' Today, wearing personal protective equipment has become something natural that shows rigour and professionalism.

Those behavioural changes were possible thanks to the adequate recommendations from the mentor, most pertinently the establishment of the Safety Committee. The Committee played a central and fundamental role in implementing safety measures in a progressive manner. The team encountered

resistance at first but with the support of the mentor, engaged in a constructive process to help staff understand the necessity of safety and security measures. Rather than impose safety, positive incentives and adequate solutions were identified to promote compliance with safety measures.

Safety became the responsibility of everyone. The motto, "Don't learn safety by accident – Safety isn't expensive, it's priceless", is proudly displayed over the BWS confined space module. It has been implemented across all departments and at all scales from operations and maintenance, to engineering design and office ergonomics. Top management support was central to the successful buy-in of the entire company. As a direct result, it has reduced the number of accidents and incidents, with substantial drop in related costs. Finally, BWS is now ahead of, and fully prepared to comply with, the upcoming national law on Occupational Safety and Health Administration (OSHA). In this context of reform, BWS is becoming a safety model for other national utilities (e.g. electricity, telecom). The WOP was the right vehicle to achieve this shift because it sparked an openness for change in many different departments.

Organizational and relational shifts

Overall, the WOP enabled the mentee to modify the organizational structure and the inter-relational

dynamics between different layers of hierarchy. Inspired by the observations of the relationships between staff at CCWD, BWS incorporated new management practices. Two main results were identified as important in the way BWS conducted its work. First, the relationships and interactions between departments have been fostered through the implementation of the different improvement tracks. Either by the establishment of the Safety Committee composed of staff from different departments, or the implementation of SCADA systems implying a close collaboration between technical, customer and operational services, the WOP increased communication between departments. Second, the relationships between managers and staff have improved. The delegation of responsibilities from managers to staff has empowered employees, who acknowledge that they have gained, “more autonomy, critical thinking, and creativity for solutions.”

Overall the WOP enabled the standardization of a great number of procedures and tasks, which has reduced the reliance on individuals and increased efficiency. The automation and remote control introduced with the SCADA systems have also resulted in substantial time and cost savings. In general, the planning, time management, and team work of the entire company has improved thanks to the WOP.

Sustainability

This partnership is proving to be sustainable and to have a long-lasting impact over the recipient company. First, the partners are keeping communication channels open and some peers continue to exchange on specific technical issues before embarking on new work. Second, the WOP has created financial savings due to increased efficiencies described along this case. Third, the certification of more than half employees through an internationally-recognized program will strengthen the long-term capacity of the utility to do its work effectively and efficiently. As a manager highlighted, “before [the WOP] our staff were learning on the job, now they are fully equipped with the knowledge and know-how needed to work better”. Finally, BWS is in the process of becoming a mentor with the support of CCWD to pass-on their knowledge to other Caribbean utilities.

WHAT THE PARTNERS SAY

"This was a powerful experience. Everything we worked on with CCWD was in line with what I want BWS to become."

BWS employee

"I think that having the BWS team here helped CCWD employees feel valued and appreciated, because they were genuinely interested in what we do and wanted to learn from us."

"I continue to be amazed at the degree of similarities between our two utilities, both in terms of structure/education/abilities, and in personalities and warmth of spirit"

CCWD employees

"It was all positive. CCWD is a very forward looking organization and has a unique leader. He and the staff saw the value that they were getting back."

Chuck Chaitovitz, Program Manager at USWP

"The WOP struck me as a very cost-effective way of delivering technical assistance, compared with the alternative of having consultants."

Stephen Gaull, Senior Operations Advisor, on staff detail to USWP from Millennium Challenge Corporation

"Our Health and safety protocols resulted in changes at Belize Electricity Limited and Belize Telemedia. Their work crews now wear safety gear."

Dave Pascascio, Operation Manager at BWS

“They were willing to share and we went with an open mind to learn. That was a critical success factor.”

Rashida Castillo, Chief Financial Officer at BWS

“The partnership was cost-effective. It is difficult to measure benefit in dollar value at this moment because lots of benefits are non-tangible such as motivation of the staff, team building, trust, confidence in the staff etc.”

Sanjay Keshwani, Technical Services Manager at BWS

“Our superiors now recognize the quality and creativity of our work”

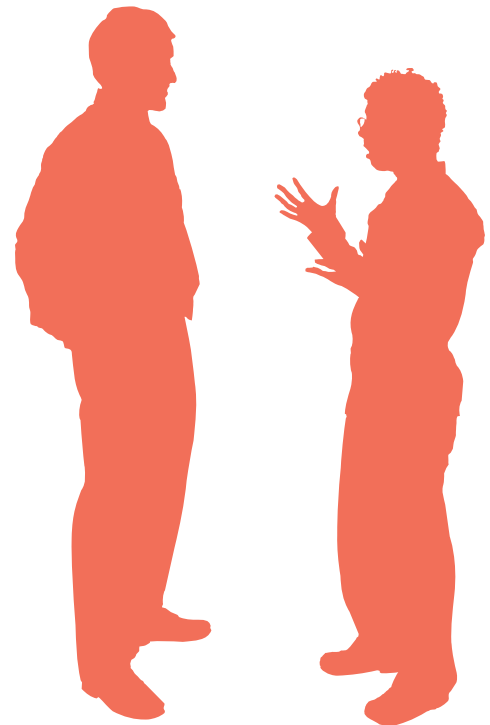
Gayle Ross, Chemist-Microbiologist at CCWD

“The number one success factor is that everybody was on board”

Paul Wade, Billing Supervisor at BWS

“This partnership continues to be a valuable opportunity for CCWD to share our experiences as a water provider. At the same time, CCWD is benefitting from the information exchange about common challenges and ways to improve our services.”

Representative from CCWD



SUCCESS FACTORS

Alignment with strategic planning

A key lesson learned from this WOP is that if the initial analysis of needs serves to align WOP activities with ongoing operational interventions and priorities of the mentee, there is greater buy-in and funding can go further. Management and political buy-in on the mentee side were essential to accessing and freeing-up the funding necessary to implement changes.

The WOP started at the same moment that BWS finalized its strategic plan. As the Chief Financial Officer of BWS highlighted, “the WOP benefited from the momentum of the new strategic planning finalized in 2011.” The partnership helped to guide BWS toward the achievement of the following strategic objectives: Empower Employees (improving knowledge and skills of staff), Increase/Improve Strategic Partnerships, Improve Operational efficiency, and Effective investment in Technology (GIS, SCADA, billing system). The demand-driven nature of WOPs is manifested in this alignment between the improvement tracks chosen and the strategic objectives of the recipient company. This configuration has allowed the WOP to help BWS not only fulfil its mission, but also to achieve its strategic objectives. Today, BWS is on track to fulfil its strategic plan.

Long-term vision for knowledge dissemination

In addition to the strategic objectives that aim at improving the quality and efficiency of the services provided, BWS has formulated a vision statement that reads as follows, “By 2018, we [BWS] will be the leading providers of water and wastewater services in the region and will exceed stakeholders’ expectations”. This ambitious vision to become a model for other Caribbean water operators, drives the utility toward excellence. BWS has been able to use the WOP to fulfil this vision and progressively become a mentor itself. CCWD, along with GWOPA, IADB, PPIAF and USWP, are providing instrumental and financial support for this transition. Discussions to materialize this new step are in progress at the time of writing. Recipient Caribbean operators have been shortlisted and CCWD will guide BWS in this new journey. GWOPA will support with tools and guidance materials.

Concurrent Capital investment

Water and sanitation services are capital-intensive as large infrastructural investments are needed to build treatment facilities and expand distribution systems. The total budget for this WOP was very small in comparison with the investments made by the mentee. During the implementation of the WOP, BWS spent money on capital works, creating numbers of possible interactions between peers as

well as creating the right conditions for implementing the recommendations made by CCWD.

The impact of the WOP on the creditworthiness of the company is difficult to assess precisely (so far BWS has no credit/rating), but it is certain that stable revenue flows, enhanced by a more efficient billing and collection along with more efficient and safer practices, amplify the trust and perceptions of financial institutions. The engineering operational and financial departments of BWS have established a set of master plans for a total value of US\$ 100 million in order to equip all systems run by BWS with the appropriate infrastructure. The future performance of BWS will strongly depend on its capacity to mobilize those funds. The WOP has surely paved the way toward it.

Continuous monitoring of activities

CCWD invented a number of simple and creative tools to monitor progress and, “capture the value of the program.” For instance, daily surveys were developed and filled out by each participant after a day of activities to, “capture impressions, thoughts, key learning, takeaways, and any surprises”. Similarly, end-of-visit surveys were completed by the staff of both operators. In addition, WOP managers asked participants to compare their expectations with their actual experiences (the actual experience largely surpassed initial hopes). These ongoing, internal monitoring exercises helped provide

evidence for WOP participants, donors and other stakeholders of the success of the partnership, and served as a management tool. Beyond the benefits to the immediate WOP, it provided useful learning to improve practices of future WOPs.

Receptivity to change

BWS was open to criticism and CCWD was not afraid of providing constructive inputs. The recipient operator positively received the criticism and acknowledged shortcomings. This positive relational behaviour was key to fully implementing changes and sustaining them over time. Adapting to change and challenges requires trust and confidence between partners. In this respect, the peer-to-peer approach can be more useful in overcoming resistance to improvements than management or service contracts. The WOP was successful because of the mentee’s readiness to learn and change its working routines. Although culture and individual personalities play a role in a utility’s receptivity, a central lesson learned here is the importance of establishing personal relationships, and reserving time for feedback. For instance, the welcome reception during the first visit served as an icebreaker, and started to build working relationships. During this social event, the partners shared stories and realized similarities in their experience. That same evening a group dinner was organized.

CHALLENGES

Funding approval process (and management)

The approval, disbursement, and follow-up process to fund the WOP activities were onerous. Several interviewees criticized the time required for approval and the lack of updates on the status of the initial WOP funding proposal submitted to the donors. The issue was raised in particular on the mentor side. The disbursement process was considered onerous relative to the small budget of the partnership and burdensome for water operators willing to voluntarily engage in a not-for-profit partnership. This impediment risks negatively affecting mentee motivation and bringing the WOP to an early end. Funding should be conditioned by a list of clear factors, however once the donor approves the partnership, the funding process should be eased.

Lack of guiding tools

Despite support received in the creation and formalization of the partnership, the partners found little ready-made guidance to support them in the implementation of the WOP activities. For instance, the mentor initially had no idea how to adequately receive a visiting group from a foreign country. CCWD developed several simple instruments and monitoring tools to facilitate the process. Even

then, they often found themselves improvising. The guidance and tools currently being developed by GWOPA will help overcome such obstacles.

Exhausting visit schedule

According to interviewees and WOP reports, the visit schedule was too intense. The training curriculum, originally designed for two weeks, was compressed into one, which entailed working late into the evening to prepare presentations for action plan progress. In addition, the distance between headquarters and the facilities sites, both in California and Belize, implied long transit times and forced lunches to be rushed. Some of the generic training could have been replaced by more focused training or shadowing visits. Better use of distance communication tools could have helped to spread the workload, alleviating the intensity of visits. The use of video conferencing has been successfully implemented in other WOPs, both in preparation and follow-up of training and exposure visits.

Hindering contextual factors

A number of contextual factors in Belize were highlighted as posing serious challenges for the implementation of CCWD's recommendations. Interviewees mentioned the absence of an effective postal service (e.g. for customer's communication), the non-existence of a regulatory framework for

safety (a new law is about to be adopted), the difficulty of purchasing specific equipment and goods in Belize, the limited influence of BWS on rate structures, and the location of water meters

on customers' private premises (complicating meter-reading). A lesson to be drawn is that the applicability of recommendations always needs to be checked carefully in relation to the local context.



BWS employees working on a pump at the Belmopan abstraction facility



Meeting with BWS' managers during the evaluation visit



CONCLUSION

The BWS-CCWD WOP was designed to support investments in water and sanitation. It has provided cost-effective peer knowledge sharing and capacity building to enable BWS to sustainability operate, maintain and manage its assets to deliver continuous improvements in their services. BWS has introduced new procedures, technologies and management systems in their daily operations. Continuous improvements and future works planned, along with the peer support from CCWD and trust from financial lenders, are creating favourable conditions for BWS to provide in a near future universal and equitable drinking water and sanitation services for all in their licensed operational areas.

The WOP between Belize Water Services and Contra Costa Water Services has been showcased as a model in the Caribbean/Central American region by several stakeholders.



Ministry of Foreign Affairs of the
Netherlands



UNESCO-IHE
Institute for Water Education

GWOPA
Global Water Operators' Partnerships Alliance