Water Safety Plan demonstration projects in Latin America and the Caribbean: lessons from the field
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ABSTRACT
A Water Safety Plan (WSP) is a preventive, risk management approach to ensure drinking water safety. This emerging methodology is being increasingly applied in both industrialized and lower income countries worldwide. In 2006, the U.S. Centers for Disease Control and Prevention (CDC) and other local, national, and international partners in Latin America and the Caribbean (LAC) initiated a series of WSP demonstration projects. The objectives were to raise WSP awareness, build capacity, and promote adoption of the WSP approach while identifying those factors that aid or hinder water safety planning efforts in resource-challenged settings. This paper presents eleven lessons learned from these WSP demonstration projects, including the importance of assembling a well-supported interagency team, long-term commitment to WSP implementation, adherence to a water quality monitoring plan, and determining how WSP impacts will be evaluated prior to WSP initiation. To assist in supporting future WSP activity in the region, this paper shares experiences that led to these successes, challenges, and lessons learned.

Key words | Caribbean, drinking water, Latin America, lessons learned, water quality, Water Safety Plans

INTRODUCTION
According to the World Health Organization (WHO) Guidelines for Drinking-water Quality, ‘The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer. In these guidelines, such approaches are called Water Safety Plans (WSPs)’ (WHO 2008). The basic principles of this systematic and preventive approach to identify, assess, and manage threats to drinking water safety form the foundation of any good system management plan. Because of the inherent flexibility and adaptability of the approach, WSPs hold the potential to help systems of all sizes and levels of development improve water safety and sustain those improvements over the long term. This emerging methodology is being increasingly applied in both industrialized and lower income countries globally. At a time when efforts to address the global drinking water crisis are focused primarily on providing much-needed access to improved water supplies, WSPs can assist water suppliers with the tools and knowledge essential to ensuring that improved systems continue to deliver safe water.

Beginning in 2006, and in close collaboration with the U.S. Environmental Protection Agency (USEPA), the Pan American Health Organization (PAHO), the Caribbean Environmental Health Institute (CEHI) and other international, national, and local partners, the U.S. Centers for Disease Control and Prevention (CDC) has supported the development and implementation of demonstration WSP projects in Jamaica, Bolivia, Brazil, Guyana, Ecuador and Peru (see Figure 1 and Table 1). CDC and other partners contributed seed funding to convene advocacy and capacity-building workshops and offered technical assistance to guide water suppliers and other key stakeholders through the WSP process. The objectives of the
demonstration projects were to raise WSP awareness, build capacity, encourage replication within the region, and identify factors that aid or hinder successful application of the methodology within Latin America and the Caribbean (LAC). These demonstration projects were among the first WSPs carried out in the LAC region. As such, they offer valuable insights into adapting the WSP approach to suit the region’s unique needs, constraints, and cultural and political landscape. The purpose of this paper is to share successes, challenges, and lessons learned to enhance and support further WSP activity in LAC and wherever comparable system characteristics are found.

**METHODS**

While the WSP demonstration projects are currently at various stages of development and implementation and have not yet been systematically assessed for impacts, experiences and observations to date suggest a number of key factors for demonstration projects were to raise WSP awareness, build capacity, encourage replication within the region, and identify factors that aid or hinder successful application of the methodology within Latin America and the Caribbean (LAC). These demonstration projects were among the first WSPs carried out in the LAC region. As such, they offer valuable insights into adapting the WSP approach to suit the region’s unique needs, constraints, and cultural and political landscape. The purpose of this paper is to share successes, challenges, and lessons learned to enhance and support further WSP activity in LAC and wherever comparable system characteristics are found.

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success as well as potential barriers to implementation within this regional context. The lessons learned reflect insights gleaned from participants in the demonstration projects and were collected through informal interviews and conversations with key stakeholders, members of the WSP team, and WSP champions (CDC and other international partners) from 2006 to 2008. The lessons are intended to reinforce or supplement the valuable guidance offered by WHO’s Guidelines for Drinking-water Quality (WHO 2008) and Water Safety Plan Manual (Bartram et al. 2009) and will hopefully help future WSP teams navigate the WSP implementation process.

For the purposes of this paper, the lessons learned are presented in accordance with the WSP framework as outlined in WHO’s Water Safety Plan Manual (Bartram et al. 2009), with results presented for each of the five phases of a WSP: Preparation, System Assessment, Monitoring, Management and Communication, and Feedback and Improvement (Figure 2). As represented in Figure 2, the five phases of a WSP fall into a cyclical process in which feedback and improvement can directly feed back into system assessment. In this paper, each lesson is followed by an example field experience from the WSP demonstration projects that are intended to illustrate and support that lesson.

It is important to acknowledge that the involvement of the CDC and other outside agencies in these demonstration projects undoubtedly influenced the WSP process and outcomes. In some ways, such outside involvement likely enhanced the process. Lessons learned from early projects were carried forward to benefit subsequent projects. Financial and technical support were provided for costly water quality testing, surveys, data analysis, and capacity-building workshops that likely would not have been feasible otherwise. Conversely, outsider involvement likely contributed to challenges among local stakeholders related to project ownership. Such influences may imply limitations to the broad application of the lessons presented in this paper.

RESULTS

Within the five phases of a WSP, 11 modules outline specific activities for implementing a WSP (Bartram et al. 2009), but the lessons learned as presented here are not linked to particular modules; rather, they apply more generally to the

![Figure 2: Phases of a Water Safety Plan (adapted from Bartram et al. 2009).](https://iwaponline.com/ws/article-pdf/11/3/297/416490/297.pdf)
Phase 1: Preparation

Lesson learned 1A: Assemble a well-supported interagency team led by the water utility.

Once the decision has been made to undertake a WSP, the first step in the process is to assemble the WSP team (Bartram et al. 2009). Demonstration project successes and challenges underscore the importance of engaging the appropriate agencies and individuals in the water safety planning effort. A champion to lead the WSP development process is essential, as is a genuine commitment from the water supplier to implement and maintain the Plan. Ideally, the WSP champion will come from within the water utility. That said, interagency participation is a cornerstone of the WSP approach, and a provider has a great deal to gain from enlisting external support. A collaborative approach involving multiple partners can expand the scope of water safety planning to include threats that often lie beyond the purview of the utility, such as source water contamination or unsafe consumer practices, and can strengthen interagency relationships and bridge communication gaps. In communities with a history of poor interagency cooperation and a fragmented approach to water resource management, strengthening communication and providing a platform for collaborative action may be as beneficial as any WSP intervention.

In addition to utility leadership and interagency support, securing senior-level commitment within each participating organization is also critical to the success of a WSP (Summerill et al. 2010). While ground-level staff will generally develop WSPs, improvement plans will often imply changes in policy and practice or in financial and human resource investment. Such plans will therefore require support from those with political influence and proper authority. Additional important considerations include the likely overlap between WSP objectives and those of other programs or initiatives and the need to involve – to the extent possible – existing working groups or committees in the WSP process. This will allow the WSP endeavor to benefit from existing working relationships and expertise and create opportunities for synergy. Engaging and building
capacity within more permanent bodies such as water utilities, ministries of health, or existing interagency committees, will also allow for continued oversight and support to ensure ongoing WSP implementation and may facilitate WSP replication within a country.

Field experience 1A – a mechanism for ongoing WSP oversight. One multi-agency team was assembled to develop the WSP but ceased to meet following development of the Plan due to competing demands on team members’ time. In this instance, the absence of an oversight body hindered WSP implementation, and the team recognized the need to incorporate WSP oversight into the mandate of a permanent national-level body. The WSP team embarked on the development of a charter to define long-term roles and responsibilities. The proposed system is expected to create a sustainable mechanism for WSP follow-through and accountability while at the same time linking the WSP to other related initiatives and strengthening interagency cooperation.

Lesson learned 1B: Commit to long-term implementation of a WSP

The spirit in which a WSP is approached is essential to its success. It is important to bear in mind that a WSP is a process, not merely a document. Certain demonstration project experiences highlighted a tendency to approach a WSP as a one-time report to be completed rather than a working plan to be implemented and maintained. A WSP is fundamentally a tool to improve and sustain drinking water safety and as such requires an ongoing commitment to its use to maximize benefits. Securing ‘buy-in’ and maintaining a focus on long-term implementation of the WSP during the initial stages is essential to ensuring that it is developed to maximize strategic direction, feasibility and accountability and thereby allow it to be put into action. Without executive commitment, a WSP may simply become a ‘token gesture’ (Summerill et al. 2010). If the WSP is instead approached as a series of exercises to produce an assessment report rather than an ongoing process for improving water safety, the progression from WSP development to implementation will be hindered.

Field experience 1B – the drawbacks of a short-term vision. Insufficient buy-in among key stakeholders in one project community resulted in a short-term approach to the WSP. The nature of the ‘completed’ WSP reflected the lack of commitment to its ongoing implementation and maintenance. While most of the major steps of the WSP process were nominally undertaken, the overall effort lacked long-term commitment to ongoing WSP implementation. Consequently, clear and feasible corrective action plans, monitoring plans, and management plans were not developed. The WSP failed to generate momentum and provide direction for the way forward and it came up short in its utility as a tool to effect positive change in water safety.

Lesson learned 1C: Recognize a WSP’s value as a capital improvement planning tool

As stakeholders initially weigh potential costs and benefits of a WSP, consideration of the value of a WSP as a capital improvement planning tool is also important. Capital upgrade needs are typical of water supply systems in lower income countries, and utilities facing these needs may question the value of investing limited resources in a plan that also focuses on noninfrastructure improvements such as training or process optimization. Demonstration project experiences with such systems indicate, however, that water providers in need of major system upgrades have much to gain from a WSP. The WSP process can help providers identify opportunities for low-cost improvements to optimize existing systems during the lengthy process of design and funding acquisition for capital works. A WSP can even aid in capital improvement planning by guiding a water supplier through a methodical assessment of system needs and facilitating the development of plans and programs necessary to sustain improvements in light of existing local capacity. By encouraging service providers to identify and to substantiate their own needs, a WSP also contributes to an important paradigm shift from donor-driven to utility-driven capital works projects in lower income countries. Finally, a WSP demonstrates commitment to good management and can build confidence in a proposed improvement project’s likelihood of success, thus helping to leverage financial support.

Field experience 1C – building donor confidence. One utility in need of capital upgrades involved the international donor community in the WSP process from the beginning by
inviting donor agency representatives to attend WSP meetings and workshops and keeping them apprised of progress. The donor agency was highly supportive of the WSP approach and one senior representative offered these remarks in a workshop address: ‘a Water Safety Plan demonstrates that the water utility and the government are well prepared to implement and sustain donor-funded improvements. Water Safety Plans provide a new stage for funding assistance (Environmental & Engineering Managers Ltd. 2008).’

Phase 2: System assessment

Lesson learned 2A: Ensure clearly defined and locally appropriate water quality standards

The second phase of a WSP, System Assessment, depends in part on clear and appropriate water quality standards (Bartram et al. 2009). Demonstration project experiences suggest that identifying and assessing standards will be a critical early step during System Assessment. Existing water quality standards may be ill defined, poorly understood, or ill suited for the context in which the system is operated. Moreover, governments may nominally adopt international guidelines in their entirety as their national standards without giving due attention to the unique environmental, cultural, and economic factors that might influence exposure to contaminants, and acceptability and feasibility of guidelines. Important water treatment operational parameters, such as turbidity and pH, have no international health-based guideline values and may therefore require system-specific consideration and definition. Clearly defined and locally appropriate water quality standards facilitate the assessment of water quality and provide performance targets and important operational guidance.

Field experience 2A – customizing water quality standards. The public health authority in one project country had previously established a 5-NTU (nephelometric turbidity units) upper limit on finished water turbidity. But the authority based this value on an aesthetic guideline without understanding the potential health implications of high turbidity. After researching the importance of low turbidity for disinfection efficacy and as an indicator of treatment process control, the WSP team recommended a reduced turbidity standard. Recognizing, however, that setting the standard impractically low would undermine its value as an operational and regulatory tool, the team reviewed the utility’s finished water quality monitoring records over a 1-year period to determine the lowest turbidity level that the system could achieve and revised the standard accordingly. The WSP team also agreed that as capital improvements were realized, a lower, long-term standard would be established.

Lesson learned 2B: Assess point-of-use practices when consumers store and/or treat water at home

The demonstration project experiences indicate that in many cases, it is important to evaluate household-level perceptions and practices related to the water supply during System Assessment. In lower income countries, whether due to high pumping costs, scarcity of supply, large losses of unaccounted-for water, insufficient system pressure, or an inability to respond promptly to maintenance needs, intermittent water service is typical. This lack of continuous service often requires consumers to store water at home, introducing opportunities for recontamination of the treated water supply before consumption (CDC 2008b). Further compounding risk, intermittent service may compel consumers to turn to alternative sources for drinking, such as nearby springs or creeks that may be unfit for consumption (CDC 2008c). If a WSP is to protect public health, its scope needs to extend beyond the tap as necessary to include management of risks associated with this final step in the water supply chain.

Field experience 2B – conducting a household survey. Several demonstration WSPs included a household survey conducted early in the WSP process. To inform the water safety planning effort, the survey collected information on household water sources, water quality, storage and treatment practices, consumer perceptions, and health concerns. The questionnaires were adapted to suit the local culture and conditions, and local teams conducted the interviews (CDC 2008a). One system’s survey findings included insufficient chlorine residual and microbiological contamination at consumers’ taps; water quality degradation through increased storage and handling within the home; ineffective point-of-use treatment practices; and consumption of unsafe alternative water supplies (CDC 2008b). These findings provided important operational feedback to
the utility, informed public health officials of community health priorities, and highlighted the need for public education as an important WSP intervention.

**Lesson learned 2C: Consider a qualitative approach to assessing and prioritizing risks when appropriate**

Risk assessment and priority-setting are among the most critical of System Assessment activities. The outcomes of this process serve as the basis for development of improvement plans and programs. The semi-quantitative approach outlined in the WSP Manual (Bartram et al. 2009), which involves assigning scores to hazards based on their likelihood and severity of occurrence, may be particularly useful for systems addressing predominantly direct physical, chemical, or microbial hazards as opposed to the less direct institutional hazards that tend to characterize resource-constrained systems. The demonstration projects suggest that these less-direct hazards, such as a lack of regulatory oversight or insufficient cost recovery, represent critical barriers to water safety but do not always lend themselves well to semi-quantitative risk assessment. Attempting to assign numerical scores to such hazards can be time-consuming, may cause confusion, and can result in a hazard ranking that doesn’t accurately reflect system priorities. In some cases, wrestling with the subtleties of certain key definitions or maintaining consistency in assigning scores can be cumbersome. Certain systems may find a less structured, more qualitative approach to prioritizing hazards more effective, such as a simple team decision reached through discussion and consensus.

**Field experience 2C – prioritizing by simple team decision.**

One WSP team found that many of its hazards were not well suited for prioritization by the semi-quantitative method. When team members tried to determine the severity of the hazard presented by inadequately trained operators, for instance, they found it necessary to divide the hazard into multiple parts. Operator mishaps held the potential to introduce chemical, microbiological, and physical contaminants, and the severity of occurrence varied by type of contaminant. The hazard was then further subdivided to reflect the fact that the operators used a number of chemicals, and the severity of over- or under-dosing varied according to the specific chemical. After considerable time spent attempting to fit hazards into the mold of the semi-quantitative method, the WSP team turned to a qualitative, team consensus approach to prioritizing risk and found it more efficient and effective.

**Lesson learned 2D: Take a step-wise approach to improvement when needs overwhelm resources**

Once risks have been assessed and as improvement plans are made, WSP teams have to recognize that at least initially, addressing all high-priority hazards may not be feasible. Lower-income systems typically have considerably more work to do to ensure water safety – and often with fewer resources – than their wealthier counterparts. Many of the ‘building blocks’ of good system management in place in higher income countries at the outset of WSP development cannot be taken for granted in lower income countries. Systems may lack appropriate water quality standards, operator training programs, standard operating procedures, monitoring and surveillance protocols, or programs to ensure oversight and accountability. In addition to institutional shortcomings, inadequate infrastructure is also typical. In such cases, a step-wise approach to improvement will address a system’s most fundamental needs first and allow initial gains to pave the way for subsequent improvements.

**Field experience 2D – making incremental improvements.**

When one utility began the WSP process, treated water quality was inconsistently monitored and poorly understood, and operators were infrequently and inadequately trained. These hazards were considered high-risk, and the WSP team invested in developing new programs and procedures to address these basic needs. Time and resource constraints prevented the team from giving as much attention to other high-priority improvement opportunities, such as developing emergency response plans. The team ultimately concluded that the system would be better served by a thorough effort to address select fundamental needs than by a cursory attempt to address too many issues.

**Lesson learned 2E: Consider the financial implications of plans and programs to ensure feasibility**

It is important to consider financial constraints as improvement plans are made during the System Assessment phase and as monitoring and management plans are developed.
during subsequent WSP phases. Although the demonstration project experiences revealed a tendency to neglect fiscal realities in the interest of simplicity or expedience, such a trade-off can undermine WSP viability. In lower income countries, insufficient funding is often both a cause and an effect of a utility’s struggle to provide safe drinking water. Utilities can find themselves in a vicious cycle in which poor quality service limits consumers’ willingness to pay for water (Raje et al. 2002; Constance 2004; Bhandari & Grant 2007), which in turn limits a utility’s budget and its ability to provide good quality service. Efforts to break this cycle and overcome additional fiscal barriers are critical to successful water safety planning. Thus, while considering optimal solutions to issues raised during WSP development is valuable, feasibility requires that final recommendations are rooted in due consideration of financial implications and limitations.

Field experience 2E – recognizing and addressing financial limitations. One WSP team recognized that the sustained implementation of the Plan’s recommendations required an adequate funding stream and increasing the utility’s revenue was assigned top priority. The history of insufficient revenue was largely attributed to an unwillingness to pay for poor quality service and to an ineffective billing and collection system. Compounding the problem was the fact that water had historically been provided by a local industry at no cost to the community, creating a culture of entitlement among consumers and contributing further to the reluctance to pay for service. The WSP included a plan to expedite the water supplier’s ongoing efforts to install meters and revamp the billing system, as well as a public relations strategy to improve consumer-utility relations.

Phase 3: Monitoring

Lesson learned 3A: Ensure adherence to a thorough treated-water quality monitoring plan

A critical step in water safety planning is to ensure that a monitoring system is in place to support a thorough understanding of the quality of water produced and delivered to consumers (Bartram et al. 2009). For well-resourced systems, treated water quality is routinely monitored throughout the system, and operational adjustments are made to ensure ongoing compliance with regulatory standards. The demonstration projects suggest, however, that for many resource-constrained systems this is not the case, where laboratory capacity is limited and monitoring programs are often insufficient or poorly enforced by the providers or by external regulators. In addition, formal mechanisms are lacking to systematically review data, and utility personnel are inadequately trained to interpret data and translate findings into appropriate operational adjustments. For such systems, the Monitoring phase represents an important opportunity to improve water safety by strengthening monitoring plans. Water quality monitoring underpins the provision of safe water by ensuring compliance with health-based standards, minimizing discrepancies between actual and perceived water quality, and serving as a basis for identifying improvement needs.

Field experience 3A – dispelling myths about water quality. Operators at one utility believed that a chlorine residual of 0.5–1.0 mg/L at the point of entry to the distribution network was sufficient to maintain a disinfectant residual of greater than 0.2 mg/L throughout the network. This belief had no scientific basis as the utility’s monitoring procedures did not even include chlorine residual testing in the distribution system. Distribution system monitoring performed during the WSP process found that 94% of sampling sites contained less than 0.2 mg/L, and 75% of sampling sites contained zero chlorine residual. Had monitoring not exposed the difference between actual and perceived water quality, utility personnel would not have identified inadequate disinfection practices as a critical threat to water safety.

Phase 4: Management and Communication

Lesson learned 4A: Optimize treatment processes and ensure thorough operator training

Many existing systems have no established, system-specific standard operating procedures (SOPs) or adequate operator training programs. Addressing these fundamental needs during the Management and Communication phase may lead to improved water quality and system efficiency. In lower income countries, where resource constraints and capacity limitations often prevent utilities from operating their systems optimally, plant optimization and operator
training represent critical, cost-effective improvement opportunities. The demonstration projects found comparable treatment infrastructures produced finished water of vastly different quality depending on such operational factors as actual versus design flow rate, coagulation conditions, filter backwashing cycles, and disinfection practices. Optimizing operations is an important first step – before considering costly structural improvements – toward economically improving compliance with water quality standards. Additionally, equipping operators with essential tools and training may help them to appreciate their role as stewards of public health and well-being (Mullenger et al. 2002). Proper tools and training may also improve the morale issues that often exist where the level of investment in operators is low.

**Field experience 4A - investing in operators.** When the WSP process began at one utility, microbiological contamination of treated water was a major problem, and management struggled to improve disinfection practices. Formal operator training had not taken place in over 2 years, and SOPs were unavailable. During the WSP process, one operator was asked to participate in chlorine testing in the distribution system and was genuinely surprised to discover zero disinfectant residual at nearly every site sampled. The operator asked a number of questions that improved understanding of chlorine demand and decay and immediately began to apply a higher chlorine dose at the plant. The simple act of raising the operator’s awareness of basic disinfection principles and providing operational feedback generated enthusiasm and resulted in behavioral change.

**Phase 5: Feedback and Improvement**

**Lesson learned 5A: Determine how WSP success will be measured and how impact will be evaluated**

The final phase of a WSP – Feedback and Improvement – is critical to ensuring the Plan’s long-term effectiveness. Measuring the impact of the WSP will expose any shortcomings in the Plan and reveal opportunities for improvement. The demonstration experiences indicate the importance of deciding early in the process how a WSP’s success will be gauged. The Plan’s ultimate objective is to improve public health by reducing the incidence of water-related illness. But measuring health impacts remains a challenge, particularly where health surveillance data are limited or where multiple exposure routes exist for specified symptoms such as diarrheal illness (CDC 2011). Nevertheless, numerous other potential benefits may serve as interim or additional indicators of success, including:

- Improved source and treated water quality,
- Increased hours of service or water pressure,
- Reduced operational costs,
- Fewer customer complaints,
- Improved water quality monitoring and recording practices,
- More knowledgeable plant operators,
- Safer household storage practices, and
- Increased third-party surveillance activity.

An up-front definition of these metrics will encourage the WSP team to consider specifically what it aims to achieve with the WSP and will highlight data availability gaps that could impair future impact evaluation efforts.

**Field experience 5A - generating baseline data.** One WSP team determined that measuring the impact of WSP implementation on treated water quality would be important in gauging Plan effectiveness. Such measurement would also represent a critical step toward the longer-term goal of linking the WSP to improvements in health. Yet when the water safety planning process began, operators did not routinely record treated water quality. Utility management immediately enforced a monitoring and recording program to generate a record of pre-WSP water quality data. Had the WSP team not identified the need for baseline data early in the process, no point of comparison would have been available to gauge the impact of WSP implementation on treated water quality.

**DISCUSSION**

The information presented here provides lessons learned from on-the-ground implementation of WSPs in Latin America and the Caribbean. Although these lessons are presented within the framework of the five phases of a WSP
(Preparation, System Assessment, Monitoring, Management and Communication, and Feedback and Improvement), the WSP process was found to be fluid, with each step influencing those that follow. For example, a thorough analysis of current, treated water quality during System Assessment contributes to the subsequent identification and prioritization of hazards and to the development of monitoring and management plans to address risks. Defining success and measuring impact are dependent on baseline data collected during system assessment and suggest focus areas for periodic WSP review and revision. That said, maintaining a focus on implementation is fundamental to every step, from selecting members of the WSP team to prioritizing risks, and developing management and monitoring plans. This focus is also essential to ensuring that the WSP is designed as a ‘living document’ to be updated as system improvements are realized, additional resources become available, or additional hazards are identified. When such changes occur, the WSP should be revisited; for example, as more severe hazards are mitigated, a reordering of corrective actions can address less critical issues.

In addition to the interrelated nature of the WSP steps, demonstration project experiences also revealed a number of benefits of the overall WSP process. For example, the multi-stakeholder collaboration inherent in the WSP process tremendously improved interagency communication in many cases, resulting in the coordination of agency activities and more efficient use of time and resources. These newly fostered collaborative relationships allowed WSP teams to deal with longstanding issues such as informal settlements in catchment areas. In the past, water utilities had not been able to successfully resolve such problems on their own. In fact, institutional level outcomes such as improved communication and collaboration – as opposed to operational or investment changes – were often the first results of the WSP process in the demonstration projects.

Collaboration also heightened awareness of threats to water safety throughout the water supply chain among partners and helped stakeholders to appreciate their respective roles in mitigating risks. This, in turn, helped to generate momentum and political will to advance the WSP process and to improve the implementation of existing measures to protect public health within the purview of some of the stakeholders, such as drinking water quality monitoring and surveillance.

The WSP process also provided structure to the water utilities’ ongoing improvement efforts in the demonstration projects. Water supply systems are dynamic entities that undergo both routine changes and large scale upgrades to address limitations, and the WSP process was found to support and facilitate this evolution.

CONCLUSION

These WSP demonstration projects in Latin America and the Caribbean illustrated many of the challenges to anticipate when undertaking a WSP. The experiences also imply, through the projects’ successes and shortcomings, guidance on how best to navigate those challenges. While each WSP will be different, many of the opportunities and constraints encountered during the demonstration projects will likely be encountered elsewhere within the region.

During the course of these demonstration projects, other drinking water providers throughout the LAC region adopted the WSP methodology, including in Mexico, Honduras, Argentina, Uruguay, and Costa Rica (LAC-WSP 2009). In addition, some countries in the region are moving toward establishing national-level regulatory requirements for WSPs, including Jamaica (P. Knight, Director, Jamaica National Environment and Planning Agency, personal communication, March 18, 2009) and Brazil (R. Bastos, Professor, Federal University of Viçosa, personal communication, March 23, 2009). As the application of the WSP approach grows, the need for the WSP community to continue to share lessons and tools becomes increasingly apparent. In lower income countries, where day-to-day operational demands commonly exceed personnel and fiscal capacity, water suppliers may not see value in investing limited resources in a WSP. In addition, policy incentives alone may represent a regulatory workload that is unrealistic in countries struggling to enforce existing regulations. Therefore, balancing top-down policy directives with efforts to create bottom-up support for WSPs is important. Disseminating experiences that highlight the benefits of a WSP can help generate this support by demonstrating their
value and providing water suppliers and other key stakeholders with a basis for championing the WSP approach for their own systems. Sharing lessons learned may also encourage the further adoption of this emerging methodology and improve its application to the growing range of contexts to which it is applied.

More formalized efforts, such as the recently launched WSP Network for Latin America and the Caribbean (LAC WSP Network), can also support the continued application of WSPs within the region. Through its efforts to increase advocacy, facilitate communication, support research, and build capacity, the Network will help enable the regional WSP community to build on one another’s efforts and experiences to overcome barriers and realize the maximum benefits from water safety planning, including safeguarding existing and future investments in water supply against failure (LAC-WSP 2009).

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