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CASE COMPETITION

Collaborating, learning, and adapting (CLA) have long been a part of USAID's work. USAID staff and implementing partners have always sought ways to better understand the development process and USAID's contribution to it, to collaborate in order to speed and deepen results, to share the successes and lessons of USAID's initiatives, and to institute improvements to programs and operations. Through this case competition, USAID and its LEARN mechanism seek to capture and share the stories of those efforts. To learn more about the CLA Case Competition, visit USAID Learning Lab at usaidlearninglab.org/cla-case-competition.

# Community Collaboration Powers Solution for Batoulay Water Pumping Station

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**What is the general context in which the story takes place?**

Water in Lebanon has become an issue of towering importance. The water sector is operated by four main Water Establishments (WEs) that manage various water sources and distribution to different households. Although the water infrastructure is established, for a long time it was inefficient and suffered from poorly maintained systems, leading to high losses and supply interruptions, with limited focus on demand management.

USAID is committed to improving water supply and sanitation services for the people of Lebanon. It has a history of working with WEs, helping them become more efficient by enhancing staff capacity building, capital investment and planning, and customer service. The aim is for WEs to become self-reliant on the services they provide by lowering operation and management costs and improving means of revenue generation.

In 2010, USAID contracted Development Alternatives Inc. (DAI) to implement the Lebanon Water and Wastewater Sector Support Program (LWWSS). LWWSS is a six-year program that seeks to improve the water management practices of the four regional WEs by providing technical assistance and infrastructure improvement.
The CLA activity was part of the LWWSS rehabilitation project in the Batoulay water pump station (BWPS), one of the principle stations in South Lebanon's Water Establishment (SLWE). The BWPS is a main source that provides the needs for 34 neighboring villages, meeting the demands of more than 40,000 inhabitants in the area.

Key stakeholders included SLWE operators, consulting and engineering companies, local contractors, and other donors.

**What was the main challenge/opportunity you were addressing with this CLA approach or activity?**

SLWE relies on pumping subsurface waters from wells to supply the demands of the area. One of its major establishments is the BWPS, which includes 10 surface pumps (the largest number of pumps in the SLWE) and receives its water supply from six main wells equipped with submersible pumps.
BWPS was one of the major pump stations DAI rehabilitated as part of the LWWSS program. Toward the final stages of the project, an unexpected hindrance occurred that reduced it productivity. During the rehabilitation

project execution, one of the pumps stopped working. (This pump was scheduled to be replaced at a later stage.) SLWE investigated the matter and identified two possible causes:

- The pump broke down. In this case, the new pump would resolve the issue but the replacement would have to be scheduled earlier.
- The underground electrical cable transmitting electricity was not working. Repairing this was not in the initial scope of work of the rehabilitation project.

SLWE discovered that two primary underground electric cables connecting two main wells (250m from the pump station) were severely damaged, preventing electricity to be transmitted to the well; hence, they could no longer supply the BWPS with water. The first cable, which passed under private land, was damaged by a local farmer while digging; the second was damaged due to excessive usage and the exposed cable routing design on which it rested. Furthermore, the original layout of the underground electric cables was old, hazardous, and exposed, making the cables susceptible to damage on a regular basis. Because this was unexpected, it was not part of the project and DAI did not have funds to cover the costs of purchasing and installing new electric cables. This issue would also delay the project delivery date, which was initially scheduled for the BWPS.

Addressing this obstacle presented many opportunities that had a positive impact on the community:

- Resolving an unforeseeable technical issue that affected the output and productivity of the BWPS
- Empowering the director general of the SLWE to address a major issue
- Introducing an adaptable (suitable to the current infrastructure of the BWPS), innovative, and sustainable design for the electricity cables that would prevent such occurrences in the future
- Collaborating with other donors and stakeholders to resolve an issue for the benefit of the community
- Reflecting on the causes of the problem and how it should be addressed in other WEs or regions

When talking about this collaborative effort among different donors that solved a critical need and led to increased productivity and efficiency, SLWE Director General Ahmad Nizam said, “Raising efficiency means increasing quantity, which helps us meet increasing demand for water.”

**Describe the CLA approach or activity employed.**

The aim of the CLA activity was to introduce a long-term, sustainable solution for the damaged underground electric cables. The main objectives were:

- Replace old underground electric cables and install new ones
- Design an improved electric cable routing system that would prevent such problems in the future
- Collaborate with other donors to secure the resources needed to address this issue

Different entities were involved in this CLA activity: SLWE; CDM Smith, an international engineering and construction firm that provided consulting, management, and supervision service; local contractors; Chemonics, a USAID contractor; Dar Al-Handasah, a regional engineering firm that provided consulting, management, and supervision service; and other international donors.

After identifying and assessing the causes that led to the breakdown of the underground cables, CDM Smith, in coordination with Dar Al-Handasah, designed an improved cables routing system using the manhole methodology (i.e., cable maintenance chambers).

The submersible pumps in the wells got power from the electricity provided by the transformer room in the pump station. Underground electric cables connecting the submersible pumps to the transformer room transmitted this electricity, allowing the station to function without interruption. In the previous design, these cables were unprotected and buried underground, which increased their exposure and risk of damage. More important, if the cables were damaged or not functioning, workers would have to excavate the land to access them and rectify any problems.

In the new design, the proposed cables adhered to higher damage-resistance and quality standards. In addition, the cables were installed inside ducts and covered by a concrete encasement, ensuring that the best protective measures were adopted. Finally, eight manholes (cable chambers) were created underground every 30-35m along the route the cables followed, allowing easier access and maintenance. Jacques Bechaalany, a senior project engineer at CDM Smith, explained,

> "Major operational and significant safety concerns were identified at the remote wells during the final stages of the LWWSS Batoulay Water Pump Station rehabilitation project. Existing power cables were exposed and vulnerable to damage from vehicles and agricultural equipment. CDM Smith engineers, working on the [Water Infrastructure Support and Enhancement for Lebanon program], proposed installing power and control cables inside underground conduits encased in concrete. This design provides greatly enhanced safety and protection for all cables, allows easy service and inspection of the cables, minimizes heat transmission, reduces the risk of cables damage, and allows easy access to cables for maintenance or replacement if damaged."

To promote coordination and avoid overlap, the SLWE director general held regular general water coordination meetings at which he explained the issues encountered and the limitations of the BWPS. He also presented the newly suggested design, highlighting the operational and safety improvements, and its implications for the management of the pump station.

Due to this meeting and the fruitful efforts of the director general, two new donors agreed to cooperate with DAI on the project. UNICEF offered to purchase the electric cables. Chemonics, which was working on a similar project (Water Infrastructure Support and Enhancement for Lebanon) secured funds from OTI and took responsibility for installing the cables.

Resolving this issue demonstrated collaboration and teamwork between different donors. Together, they created a long-term solution and showed commitment to the director general's long-term vision for the SLWE.

**Were there any special considerations during implementation (e.g., necessary resources or enabling factors)?**

The installation of the upgraded underground cable routing system was the final stage of the BWPS rehabilitation project. The BWPS was delivered as per the scheduled delivery date without any delays and became fully operational as of July 2015. Effective planning and optimization of resources were key in resolving this issue within the project timeframe.

This activity also demonstrated the collaborative work of several different actors, including the private sector (i.e., local and international companies), other USAID projects, SLWE, and other donors.

The cooperation of the SLWE director general was integral to the success and execution of the project. His technical expertise, as well as his awareness of the social dynamics in the area (he is a local resident), served as a guideline when challenges arose. His proactive approach and scientific presentation of the issue with clear facts and proposing an improved design convinced potential donors to contribute to resolving this obstacle.

CDM Smith and Dar Al-Handasah adapted an improved design for the cable-routing system that adhered to international standards. The manhole methodology, which they introduced for the first time in the SLWE, provided a safer and more efficient operation. If the same problem occurs again, replacing or fixing underground cables will be a smooth and safe process that requires less time and money.

Cooperating with Chemonics, another USAID partner involved in water projects in the same area of South Lebanon, reinforced USAID's commitment to improving the water sector in Lebanon. Chemonics' familiarity with the nature of the water sector and the corporate culture of the WEs facilitated and expedited the implementation

phase. They had already established working relationships with several key figures in previous projects and had extensive background on the geological nature of the area. Hussein Harb, a project engineer working for Chemonics, said,

> "Our work in the Batoulay Water Pump Station reflects our extensive experience in water projects in Southern Lebanon, where we have worked extensively over the past few years. Chemonics and our subcontractor Modon's contribution to this USAID-funded project went beyond just installing electric cables in a new and innovative design—it was about fostering cooperation and synergizing efforts between different organizations for the benefit of the whole local community. Teamwork and collaboration were at the pillar of this activity, and I am glad to witness the rehabilitated pump station now function efficiently and effectively."

When introducing the high-quality standards and a new method of implementing the work, a "Lebanese/local work-culture" aspect had to be taken in to consideration. The local workforce as not accustomed to working with checklists, follow-up, and supervision. DAI, CDM Smith, and Chemonics, on the other hand, wanted to ensure that the quality criteria were being met in order to avoid future malfunctions and breakdowns.

**What have been the outcomes, results, or impacts of the activity or approach to date?**

In the past, degraded, broken pumps and poor maintenance of machines made pumping water inefficient and expensive, and significantly reduced the volume of water being pumped to villages. BWPS obtains water from six different wells to meet the water demands of 34 villages. The rehabilitated station pumps 18,000$m^3$/day toward the Saddiquine pump station, approximately 3km away, which in turn feeds the connected villages. This amount exceeds the estimated 16,000 $m^3$/day needed to meet the demand for water from Saddiquine.

The increased efficiency of each pump station has reduced electricity costs by approximately 15 percent. Electricity is one of the highest costs for these stations, so this significant reduction is a crucial contribution to SLWE's strategic target of achieving full operation and maintenance cost recovery, as set forth in its five-year business plan.

Short-term accomplishments include:

- Replacing two underground cables that connect two major wells that account for one-third of the capacity of the overall supply of the BWPS (each well's capacity is 80L/second).
- Protecting infrastructure, as the new design and installation of cable conduits makes it less prone to damage from human intervention, reducing the frequency of breakdowns and minimizing repair costs
- Providing operation and maintenance training and building the capacity of the operators, helping them identify and repair any problems
- Replacing or fixing underground cables will be carried out using manholes, which give access to the cables

DAI's Acting Chief of Party Rana Maalouf said, "Through this cooperation, we were able to solve the issue at hand as well as deliver a more effective and sustainable solution. We really appreciate the response to our call for support."

**What were the most important lessons learned?**

Empowering local key actors is critical for the success of any project. In this case, the director general took the initiative to resolve the issue by bringing other donors on board and adopting SLWE's vision for the water sector. Providing proper tools and sharing short- and long-term benefits supported the director general when he presented the issue. Hussein Fakih of UNICEF said,

> "In Lebanon, UNICEF aims to ensure that national systems are strengthened to sustain change and the most vulnerable population have protected and reliable access to sufficient, safe drinking-water and sanitation services. When the director general of SLWE presented the issue facing the Batoulay water pump, we agreed to participate, as it's in line with our WASH efforts in the region. Since project details were available and its impact were critical to SLWE, UNICEF initiated a quick supply of the requested cables to SLWE."

A major area of improvement in SLWE was minimizing the potential of human error and exposure to risks that would hinder operations. Projects should assess areas of such risks and address them in advance by upgrading the process. For future pump station projects, we should evaluate conventional underground structures and assess their functionality in similar situations. The solution adopted in SLWE can be replicated in other regions and WEs or with the remaining wells in the SLWE.

To ensure sustainability, involving community members, municipalities, civil society organizations, and other stakeholders in development projects is a best practice. Communities should comprehend the benefits development projects reap and the positive impact they have on the individual and society.

Reviewing business plans of WEs to assess areas for improvement should also be part of the project. Items including the operation and maintenance budget, maintenance, and capacity building are critical elements that ensure sustainability and help resolve problems.

**Is there any other critical information you would like to share?**

This CLA introduced several concepts that could be replicated in other projects and communities on different levels.

**Community Level**: A suggestion is for other IPs to introduce the "director general stakeholder meetings" scheme in different areas and projects. Creating "community involvement modules" or practices that foster cooperation rather than "competition" between NGOs or companies can result in higher impact and better results.

**Local Level**: The SLWE has several wells that feed in to the pump station; however, this situation was unique because the wells were considerably far from the pumping station. This module can be replicated in villages/pumps where wells are far from the pump station. (This module will not apply in other locations in Lebanon where the wells are close to the pumping station).

**Governmental Level**: This implementation methodology can be shared with the Ministry of Energy and Water to be integrated in long-term strategic plans in villages with similar situations (i.e., wells are far from the station).

**Partnerships**: UNICEF understood the situation and was aware that the pump would not work if the cables were not replaced. The purchase of the cables was in line with their work principles and goals.