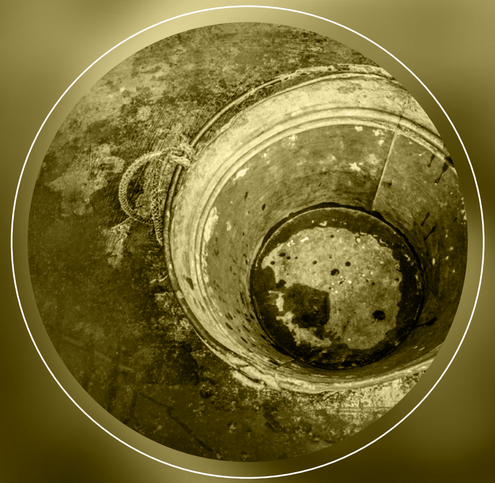
# Motivational Capital: Financing Water Service Improvement in Central America

## Feasibility Study for a Water Service Capital Facility

**February 2014**

Absolute Options

Commissioned by: CRS Catholic Relief Services



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*Is credit for water service providers feasible in Central America?*

# Executive Summary

This study examines the feasibility of establishing a credit facility to finance improvements in existing water services in Central America (both urban and rural).

This study focuses on upgrading existing water systems driven by the knowledge that (a) water systems are failing at a high rate in the region, and (b) the reconstruction, rehabilitation, and expansion of existing systems absorbs a large portion of funds for the water sector, (c) donor assistance for the water sector is diminishing, and (d) most water users in Central American countries should be able to cover a high portion of the cost of water delivery.

AO and CRS analysts visited four Central American countries over two months and conducted over 100 key informant interviews with water users, water committees, municipalities, national water service providers and other public agencies, donors, NGOs, international, regional, and national development banks, private banks and industry experts.

By analyzing both the demand and supply sides of the water service equation, this study concluded that difficulties in maintaining water service infra-structure are not due to an overall lack of capital, but instead are due to (a) a sub-optimal allocation of resources available and (b) non-engagement of private sources of capital.

The impact of a water credit facility, therefore, will be predicated upon its ability to marshal motivational capital.

Motivational capital encompasses non-financial elements essential to the successful deployment and return on private capital investments, and to attain a higher return upon public and donor investments in the potable water sector.

This study demonstrates that water users are able and willing to pay more for water service delivery. While we assert that full cost recovery including capital assets through user fees is not a realistic objective in the short term, several examples exist whereby water committees are paying for administrative and operational costs, while creating a reserve for future capital asset expenses.

Further, our economic models demonstrate that private finance is financially feasible.

We recommend a package of financial funding mechanisms and products, including a loan guarantee fund, co-investment, risk-buy down mechanisms, interest rate participation, insurance, municipal bonds, social investment bonds, equity-based investment trusts, and inventory finance for material suppliers.

As water service delivery is a new sector for most commercial banks, qualification requirements are strict and interest rates relatively high. As such, the Water Credit Facility should first demonstrate that loans to service providers are viable, and establish a track record of borrower repayments. Using donor resources to fund direct loans while establishing guarantee methods will facilitate private finance at more favorable terms in the future.

Credit alone is not sufficient, however. We assert that a regional mechanism needs to be established for technical assistance coordination, policy analysis, and learning and communication.

Technical assistance at the national level should focus on technical/engineering skills, financial and managerial capacity, and entrepreneurial skills for water service providers. Public agencies, universities, and NGOs will all be important partners to this end.

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*How can demand for credit and willingness to finance be measured?*

# Methodology and Objectives

## *Objectives of the Feasibility Analysis*

CRS and partners learned several important lessons from the four-year Global Water Initiative (GWI) in Central America:

- Measure water service delivery, not coverage of water infrastructure
- Aid should focus on capacity development of local governments and institutions, rather than directly funding infrastructure
- Development funds should be used to leverage credit for water infrastructure
- Water users can and should pay for the real cost of water service delivery
- Leverage private sector resources for water stewardship
- Promote innovative funding for water source protection

Based largely upon these lessons learned, CRS has commissioned a market research and financial feasibility study to better understand the opportunities and challenges of a Water Services Fund presents in C4 countries.

## Objectives of this Study:

- Analyze water user ***ability and willingness to pay*** for the real cost of water services;
- Evaluate ***operational, management and financial oversight capabilities*** of selected local water service providers;
- Estimate water service provider ***demand for credit;***
- Gauge ***financial partner interest*** and preliminary term requirements (interest rates, collateral, and repayment periods);
- Develop ***funding models*** and ***financial products*** appropriate for differentiated water service providers and ***evaluate*** their ***financial feasibility;***
- Advise on ***Credit Fund Design and Governance***; and
- Recommend a ***Strategic Implementation Plan***, including potential partners, stakeholder roles, and specific next steps.



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## Methodology

AO employed a combination of quantitative and qualitative methodologies to assess the feasibility of finance for water service improvement in Central America.

***Market Opportunity Assessment:*** Prior to the initiation of field work, AO advisors interviewed a number of leading thinkers in the water and sanitation sector. The purpose of these preliminary interviews was to understand the primary challenges facing water service improvement, become familiar with promising solutions to those challenges, and to identify potential gaps in water finance practice and theory. See Appendix I for a summary of the MOA.

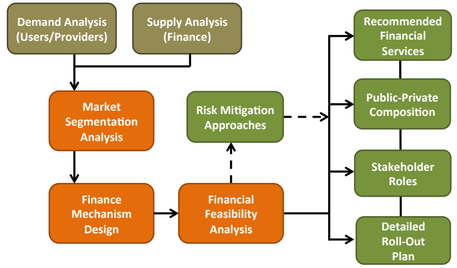
***Field Visits and Key Informant Interviews:*** AO advisors visited 18 water service providers across El Salvador, Guatemala, Honduras , and Nicaragua. Additional key informant interviews included NGOs, local and national governments and agencies, national development banks, multilateral donors such as the World Bank and the Inter-American Development Bank, private banks, and dozens of water users.

***Quantitative Analyses***

***Income-based Demand Modeling:*** AO estimated water users ability to pay for water services based upon per capita incomes, income distributions, UN water affordability indices, and various proxies to establish feasible minimum water user fees.

***Financial Modeling:*** Used discounted cash flow methodology to determine the feasibility of several financial products across multiple sensitivity scenarios.

*Figure 1 Overview of Feasibility Methodology*




| Market Analyses | Financial Analyses | Risk Mitigation | Implementation Plan |
|---|---|---|---|
| **Demand** | **Inputs** | **Potential Risks** | **Fund Design** |
| Water Users | Demand Model | Provider Capacity | Regional/National |
| Service Providers | Tariff Positioning | • Operations | Total Capitalization |
| Municipalities | Provider Cash Flow | • Financial Mgt. | Composition |
| Level of Service | **DCF/Feasibility** | • Governance | Phasing |
| Current Tariffs | Private Loans | Tariff Inelasticity | Likely Partners |
| Growth Potential | Mixed-Loans | Borrower Default | Ownership |
| ***Demand for Loans?*** | Donor Finance | Public Policy/Legal | Management |
| **Supply** | Social Bonds | Donor Coordination | Next Steps |
| World Bank, IDB | Insurance | **Potential Mitigation** | |
| Dev. Banks | Leasing | Tech. Institute (PPP) | |
| Private Banks | **Sensitivities** | Info. Campaigns | |
| Companies | Interest Rates | Loan Guarantees | |
| Donors/NGOs | Terms | Standby LCs | |
| ***Willingness to Finance?*** | Guarantee Fund | Policy Advocacy | |
| | Co-investment | Coor. Forums (RAS) | |

*Evolution or steady-state: How is service provision changing?*

*Are the prospects for sustainability improving?*



## *Water Service Providers – Findings and conclusions*

Although the Latin America and Caribbean region has made significant progress towards 2015 Millennium Development Goals (MDG) for the percentage of its population with "access to improved water supply" at over 90%, several Central American countries rank far below the regional average. Further, the MDG water access indicator does not account for water quality, nor the sustainability of access. While the quality of service provision varies greatly within and across Central American countries, many water service providers (WSPs) fail to deliver quality water on a consistent basis, and many water users only having access to potable water a few hours per day, or even a few hours per week.

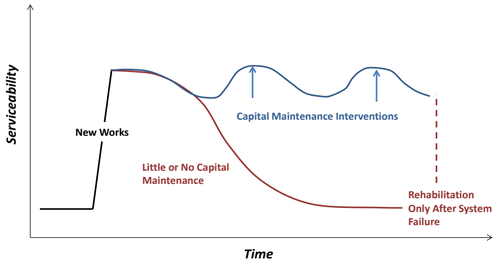
Key informant interviews, site visits, and review of secondary data provide several insights into the state of water service provision in the CA4 countries (El Salvador, Guatemala, Honduras, and Nicaragua):

***Sub-optimal Allocation of Public Capital Constrains Service Improvement***

Despite the investment of hundreds of millions of dollars into the potable water sector over the past few years, the percentage of households having access to quality water has remained stagnant, or has even begun to slip. This is due to several reasons:

- ***Donors are typically investing in new infrastructure for expanded water "coverage"***, while neglecting routine maintenance and rehabilitation of existing systems. This leads to a "build and fail" syndrome whereby the lack of existing system maintenance leads to a major system failure requiring a significant infusion of capital to reinstate water service.

*Figure 2 Example of the "Build and Fail" Syndrome*




*Source: Franceys and Pezon, 2010, p. 3.*

- ***Donor resources have only begun to focus on the capacity development of WSPs.*** Cooperación Suiza in Honduras is one of the few donors investing in technical and managerial strengthening of WSPs. The historical lack of resources for technical assistance has constrained the sustainability of many WSPs as the lack of technical and managerial capacity leads to poorer service delivery, an inability to charge sustainable water fees, and, in some cases, to the mismanagement of WSP funds.
- ***The over-reliance on grants perpetuates "dependency" and crowds out private investment.*** With grants remaining the primary financing mechanism for most donors, WSPs have little incentive to improve service delivery over the medium term and to establish more sustainable fee mechanisms. Further, grants diminish WSP appetite for finance capital.

## WSP capacity development needed more than infrastructure

The primary objective of this study is to determine the feasibility of a water service capital facility for CA4 countries. An important first step to accomplishing this objective is to assess the technical and managerial capacity of CA4 WSPs that largely determines the quality of water service delivery. Improved water service delivery is a necessary, but not sufficient, element to achieving more sustainable water user fees.

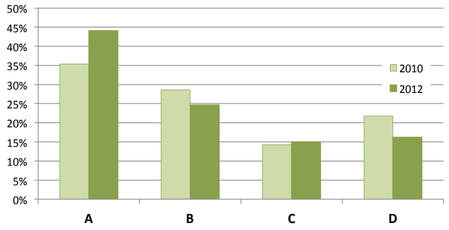
The Sistema de Información de Agua y Saneamiento Rural (SIASAR) is a new monitoring system piloted in Honduras, Nicaragua, and Panama. SIASAR establishes classification criteria to assess the quality of water services, including technical and managerial competence (Figure 3).

Although SIASAR has not yet been adopted by all CA4 countries, empirical evidence from Honduras and qualitative assessments from other CA4 countries suggest that only a minority of WSPs fall into Category A of well functioning systems. Although WSPs in Guatemala and Nicaragua appear to be stalled in a steady-state of poor service delivery and water system dysfunction, WSPs in Honduras, and to a lesser degree, in El Salvador, are improving. Figure 4 demonstrates that the percentage of WSPs in Category A in Honduras has improved from 35% to 45% between 2010 and 2012. However, over 30% of Honduran water systems still struggle to provide even basic water services.

*Figure 3 SIASAR Classification of Water Service Providers*

| Level | General Description of Condition |
|---|---|
| *A* | System functions well, there is potable water every day, with regular maintenance. |
| *B* | System may function well but there are management problems. |
| *C* | System may function but with serious management and infrastructure problems. Some investment in infrastructure required, but costs should be covered by community/users. |
| *D* | System is so degraded that the community cannot repair with its own resources. A major rehabilitation or new system is needed. |

*Figure 4 Classification of WSPs in Honduras (ERSAPS)*




## Urban WSPs have a greater share of failing systems

The capacity of WSPs and the quality of their service provision is not solely determined by their size or whether they are rural or urban. Figure 6 summarizes key characteristics of urban, semi- or peri-urban, and rural water systems, using population parameters from ERSAPS in Honduras. The percentage of WSPs qualifying as high-capacity service providers (Category A) does not vary significantly per urban-rural sub-sector classification.

*Figure 5 WSP Capacity by Sub-Sector in Honduras (ERSAPS)*

| Type | Rural | Peri-Urban | Urban |
|---|---|---|---|
| A | 43.0% | 50.0% | 49.5% |
| B | 25.7% | 20.9% | 16.4% |
| C | 15.2% | 14.2% | 13.3% |
| D | 16.1% | 14.9% | 20.8% |

While more Small- and Peri-Urban and Urban WSPs qualify as high-capacity service providers (Category A), a greater percentage of Rural WSPs fall into Category B, which require only modest infrastructure investments and are likely to yield more immediate results from technical assistance. Contrary to the common belief that Rural WSPs are more likely to be the lowest quality service providers (in terms of management skills and consistency of water supply), a greater percentage of Urban WSPs fall into the lowest capacity category (D) (Honduras). This may be due, in part, to the fact that Urban WSP user fees are often kept artificially low via politically driven subsidies than sparsely populated rural areas, which have greater incentive to improve service quality in pursuit of higher, more sustainable, user fees.

*Figure 6 WSP Sub-Sectors*

| URBAN | |
|---|---|
| Description | Large Cities; Municipalities |
| Population | 2,000+ |
| Connections | 500+ |
| Alternative Water Source | HH Boreholes |

| SMALL AND PERI-URBAN | |
|---|---|
| Description | Fast-growing areas adjacent to urban boundries |
| Population | 1,000 - 2,000 |
| Connections | 200 -500 |
| Alternative Water Source | HH Boreholes; Tankers |

| RURAL | |
|---|---|
| Description | Unincorporated Rural Communities |
| Population | < 1,000 |
| Connections | < 200 |
| Alternative Water Source | Springs, Rivers, Streams |

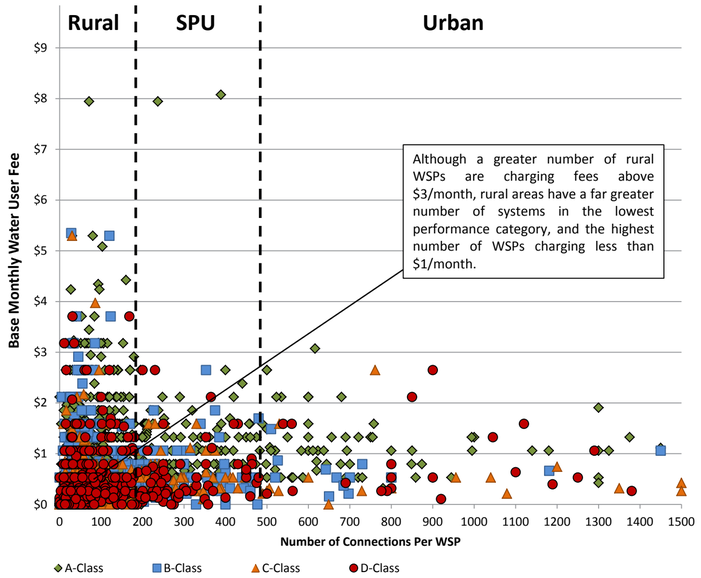
Small, fast growing, urban areas typically face a resource deficit compared to urban and rural areas. Urban water systems tend to receive a greater amount of public subsidy (as do rural municipalities). Rural communities tend to capture a greater share of donor resources and NGO attention. This is despite the fact that small urban areas are struggling to maintain service quality due to increasing water demands from urbanization and economic growth.

## Honduran rural water users willing to pay higher fees for quality

A commonly held belief is that rural households are too poor to pay for sustainable water user fees. However, where water systems are providing a medium-level of service or higher (B- or A-Class), rural water users tend to pay more for water than their small-urban and urban counterparts. Higher fees are not necessarily driven by higher operating costs typical of more dispersed rural systems, but instead a willingness among rural households to pay for quality service. Interviews with rural water users indicate that alternatives to potable water are more expensive in terms of time and money than prevailing water user fees.

Lower urban fees are likely the result of politically driven subsidies or below-market fixed fees, which tend to de-link fee for service incentives. In other words, why should WSPs strive for improved service when they are not able to charge adequate fees for sustained operations and maintenance?

*Figure 7 Monthly User Fees from 5,000 WSPs in Honduras (2012) per ERSAPS*








## El Salvador lags Honduras in water service provider quality

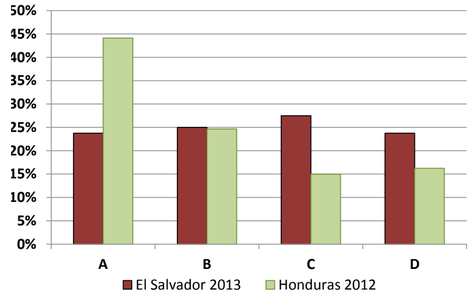
Based upon a sample size of 80 water service providers (WSPs), only 24% of Salvadorian WSPs are providing year-round 24-hour water service (data per Jacob Hileman, CRS). This compares to nearly 45% of Honduran WSPs that qualify as Class A per the SIASAR ranking system. Several factors likely contribute to the lower performance ranking. First, the sample size of WSPs is small compared to over 5,000 WSPs evaluated by ERSAPS in Honduras. Currently, no single entity is compiling comprehensive data on El Salvador water system performance. The lack of data, including the absence of formal SIASAR data collection and reporting, likely omits well-performing urban systems that may qualify for Class A ranking.

Second, El Salvador water systems tend to rely upon pumps rather than gravity-based systems prevalent in rural Honduras. This increases the cost of system operation and results in intermittent service delivery where tanks are filled to capacity and allowed to empty before pumps are re-engaged. This creates a gap in service delivery as tanks are re-filled (few systems utilize floats to allow for automatic refilling at pre-determined storage levels).

Lastly, the lower performance ranking reflects the reality that most Salvadorian WSPs have under-invested in capital maintenance necessary to deliver consistent quality water service.

Figure 9 provides a breakdown by sub-sector (rural, small/peri-urban, or urban) for each classification of Salvadorian WSPs. A clear rural-urban divide exists in El Salvador, with only 15.4% of rural WSPs qualifying for Class A. Half of urban WSPs sampled, however, are providing year-round 24 hour water service.

*Figure 8 SIASAR Classification of WSPs in El Salvador*




*Note:AO applied SIASAR definitions to the Hileman dataset according to hours/days/weeks of water delivery of each WSP.*

*Figure 9 WSP Capacity by Sub-Sector in El Salvador*

| Type | Rural | Peri-Urban | Urban |
|---|---|---|---|
| A | 15.4% | 35% | 50% |
| B | 25% | 30% | 13% |
| C | 25% | 30% | 38% |
| D | 34.6% | 5% | 0% |

## Paying more for less - small/peri-urban and rural water users

Although only 35% of Salvadorian small/peri-urban water users have access to year-round 24-hour water service, they pay more than their urban and rural counterparts. The median base monthly water fee for small/peri-urban systems is $3.60, compared with $3.30 for urban systems and $2.00 for rural systems. Lower rural water fees should not be viewed as evidence that rural water users are not able to pay for improved water service. In fact, it is remarkable that median monthly fees for basic service top $2.00 even though only 15% of rural users enjoy year-round 24-hour services. Five rural WSPs from the El Salvador sample of 80 water systems charge $3.00, $4.00, or even $5.00 per month for only intermittent water service (Class D).

Data from the *Asociación Nacional para la defensa, desarrollo, y distribución de agua a nivel rural* (ANDAR), further demonstrates the potential of rural water users to pay for improved service.

*Figure 10 ANDAR Base Monthly Fees by System Size*

| Type | Total | 90th % | Median |
|---|---|---|---|
| Rural | 5 | $10.40 | $7.00 |
| SPU | 6 | $5.50 | $5.00 |
| Urban | 4 | $7.40 | $6.00 |

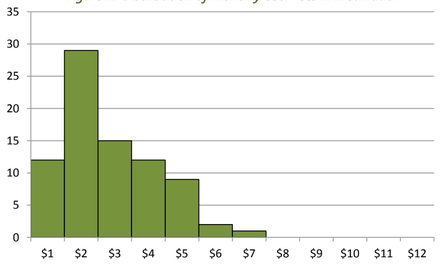
An important conclusion from the analysis of water fees in El Salvador is that much more needs to be done by government agencies, donors, and NGOs, to systematically collect and distribute water service data. Findings and conclusions from limited sample sizes should be considered preliminary.

*Figure 11 Monthly User Fees by WSP Quality and Sub-Sector in El Salvador*

| Type | A | B | C | D |
|---|---|---|---|---|
| Rural – 90th % | $3.84 | $4.50 | $2.52 | $4.30 |
| Rural - Median | $3.00 | $1.55 | $2.00 | $1.84 |
| SPU – 90th % | $6.40 | $5.00 | $4.10 | $1.90 |
| SPU - Median | $4.00 | $3.00 | $1.60 | $1.90 |
| Urban – 90th % | $4.23 | $1.15 | $2.90 | n/a |
| Urban - Median | $3.60 | $1.15 | $2.52 | n/a |

*Data from Hileman, CRS*

*Figure 12 Distribution of Monthly User Fees in El Salvador*




*Source: Hileman and ANDAR*





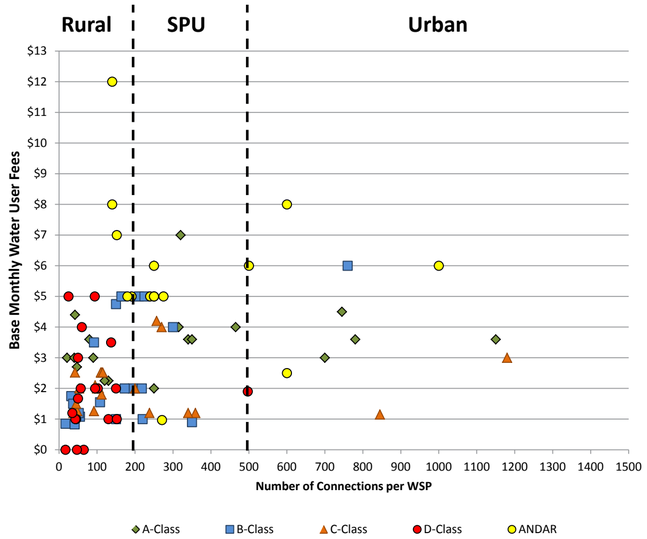
## The majority of poor quality water systems in El Salvador are rural

Eighteen of 19 "Class D" water service providers in El Salvador are rural (less than 200 connections). Despite this, 32% of rural WSPs are able to charge above $3.00 for basic monthly water service, and 19% are charging more that $4.00 per month. This is further evidence that the notion that rural water users are unable or unwilling to pay "sustainable" water fees is false.

Water user fee data from El Salvador also reinforces our conclusion that Central American water users are willing to pay more for better service. All 19 Class-A WSPs are charging above $2.00 per month, with nearly 60% paying $3.00 or more, and 29.9% paying $4.00 or more for basic monthly water service.

An additional conclusion is that ANDAR has been successful in charging more sustainable water fees. Thirteen of 15 ANDAR WSPs are charging $5.00 or more for monthly service.

*Figure 13 Monthly User Fees from 95 WSPs in El Salvador (2013)*



## Fees not achieving cost recovery, but improving

Although many WSPs are charging above $3 per month for basic water service, the majority of WSPs still charge less than $1.50 per month. In Honduras, the median monthly fee for high-service quality Urban WSPS is $1.06 per month, and only $0.44 for Urban WSPs delivering low-quality service (Class D WSPS). Small- and Peri-Urban WSP user fees average between $0.79 (Class A) and $0.34 (Class D) monthly. Median user fees for Rural WSPs range from $0.79 to only $0.19 per month (Class D) (Figure 14). ***At current median user fees, most Honduran WSPs will have a difficult time qualifying for private finance.***

*Figure 14 Monthly User Fees by Sub-Sector and Service Quality, Honduras (2012) per ERSAPS*

| Category | A | B | C | D |
|---|---|---|---|---|
| Rural – 90th Percentile | $1.59 | $1.06 | $0.64 | $0.79 |
| Rural - Median | $0.79 | $0.26 | $0.21 | $0.19 |
| SPU – 90th Percentile | $1.59 | $1.06 | $0.93 | $1.32 |
| SPU - Median | $0.79 | $0.53 | $0.40 | $0.34 |
| Urban – 90th Percentile | $1.79 | $1.52 | $1.06 | $1.59 |
| Urban - Median | $1.06 | $0.53 | $0.42 | $0.44 |

Several of the WSPs assessed during the course of this study, however, are charging well above $3 per month and earn significant monthly income, including:

- SERMUPAS, a municipal water authority in Honduras, charges $7.36 monthly for basic service (18 m3/month).
- ACOSAMA in El Salvador charges $8 per month for basic service,
- ANDAR, an association of 700 water committees in El Salvador charges $7 per month for basic service.
- Las Lipes user fees in Nicaragua stand at $2.36 per month.

These examples create a benchmark by which we can estimate feasible user fees if WSPs deliver high-quality water service.

*Figure 15 Summary of Water Service Providers Surveyed by Country*

| NO. | SERVICE PROVIDER | SEGMENT | TYPE | YEAR EST. | ACTIVE MEMBERS | HOURS OF SERVICE | CONN. FEES | MO. BASE TARIFF | MAXIMUM USAGE | EXCESS USAGE FEE | AVG. MO. INC. | MICRO-METERS | TYPE OF SYSTEM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **El Salvador** | | | | | | | | | | | | | |
| 1 | ACOSAMA | SPU | Junta | 2001 | 3000 | 8/day | $572 | $8.00 | 19 m³ | Yes | $24,000 | Yes | Mix |
| 2 | Vulcancito | Rural | Junta | 1991/2010 | 20 | 8/week | $30 | $3.00 | 15 m³ | n/a | $60 | No | Gravity |
| 3 | Chaguaton | Rural | Junta | 1996/2010 | 77 | 24 | $0 | $1.50 | No | n/a | $116 | No | Gravity |
| **Guatemala** | | | | | | | | | | | | | |
| 1 | Parraquin | SPU | Junta | 2010 | 120 | 24 | $0 | $3.07 | 0 | Yes | $368 | Yes | Pump |
| 2 | Tonela | Rural | Junta | 1991/2008 | 100 | 24 | $0 | $2.56 | 3000 lts | None | $256 | Yes | Gravity |
| 3 | Nuevo Monte Cristo | Rural | Junta | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | Gravity |
| 4 | Tecana | Urban | Muni. | 1991 | 2020 | 24 | $19 | $2.56 | n/a | None | $5,171 | No | Pump |
| **Honduras** | | | | | | | | | | | | | |
| 1 | Cuyali | SPU | Junta | 1985 | 320 | 24 | $0 | $1.96 | No | None | $628 | No | Gravity |
| 2 | Las Vegas | Rural | Junta | 2011 | 52 | 24 | $0 | $2.45 | No | None | $128 | No | Gravity |
| 3 | Colonial | Rural | Junta | 2013 | 118 | 0 | $0 | $4.90 | No | None | $579 | No | Pump |
| 4 | El Paraiso Rural | Rural | Junta | 2010 | 70 | 24 | $0 | $2.45 | No | None | $172 | No | Pump |
| 5 | SERMUPAS | Urban | Muni. | 2004 | 4,300 | 24 | $25 | $7.36 | No | None | $31,633 | No | Pump |
| 6 | COCEPRADIL | Rural | Assoc. | 1991 | 12,000 | 24 | $0 | $2.94 | No | None | $35,311 | No | Mix |
| 7 | COCEPRADE | Rural | Assoc. | 1993 | 800 | 24 | $0 | $4.90 | No | None | $3,923 | No | Mix |
| 8 | Japoye | SPU | Junta | 1993 | 1,529 | 24 | $0 | $3.43 | 25 m³ | Yes | $5,249 | No | Gravity |
| **Nicaragua** | | | | | | | | | | | | | |
| 1 | Las Lipes | Rural | CAPS | 2011 | 70 | 24 | $0 | $2.36 | 10 m³ | None | $236 | No | Gravity |
| 2 | Peri-Urban Jinotega | SPU | CAPS | 1991 | 129 | 8/week | $0 | $0.79 | No | None | $102 | No | Gravity |
| 3 | Peri-Urban Matagalpa | SPU | CAPS | 1991 | 68 | 24 | $0 | $0.79 | No | None | $54 | No | Gravity |

## WSP situational analysis per country

***El Salvador***

Although the majority of WSPs in El Salvador are operating at C or D-levels (per the SIASAR service classification), roughly 30% of WSPs are delivering high-quality water service and are able to charge user fees sufficient to cover administrative, operational and maintenance costs. Over 700 WSPs who are members of ANDAR, an association of water committees, are charging over $7 monthly for basic water service. ACOSAMA, with over 3,000 connections, charges $8 for monthly water service and intends to increase fees by an additional 10% before the end of 2013. The greatest challenge facing WSPs in El Salvador is the lack of technical support. The government agency responsible for water services, ANDA, is under-staffed and under-resources, and is not able to provide managerial and technical (systems maintenance, repairs) capacity development for WSPs.

***Guatemala***

The water sector in Guatemala is institutionally the least developed of the CA4 countries. The country has no legal framework for the water sector, and government institutions, such as the *Instituto de Fomento Municipal* (INFOM), have limited capacity. Municipalities enjoy a high level of political influence, allowing them to attract subsidies from the central government and to raise revenues locally to offset water user costs, but even in Guatemala City, peri-urban residents often depend on boreholes and hand-pumps for water. Donors to the water sector in Guatemala have focused on institutional strengthening as a prerequisite to funding additional infrastructure.

***Honduras***

The water sector in Honduras is the most developed out of the CA4 countries. In addition to the passage of a national water law in 2004, the Honduran government has focused a significant, (although still insufficient), amount of resources to maintain and expand water coverage levels. The roles and responsibilities of key government agencies is becoming well-define, and stakeholders in the sector are energized and engaged in service improvement efforts. The donor community is also more active in Honduras than other CA4 countries, which may provide the opportunity to pilot credit schemes for improved water services. Honduras offers several examples of successful rural water committee development and operation. WSPs such as COCEPRADIL, COCEPRADII, *Junta de Agua de JAPOE*, and others are purchasing and protecting water resources, improving and expanding water service, and charging water user fees close to the real cost of water services.

***Nicaragua***

Nicaragua passed a new water law in 2009, but still has significant policy challenges. The *Comités de Agua Potable y Saneamiento* (CAPS) created under this law are treated as small enterprises, and are hence taxable. As a result, many opt to operate "unofficially", and will face challenges in obtaining formal credit. Although Nicaragua has established agencies responsible for technical assistance to the water sector, they are underfunded. Rural and peri-urban WSPs are working to organize themselves into municipal and and national "networks" to achieve economies of scale with regard to both maintenance costs, and technical assistance.

## Positive signs that service providers are evolving

Although nearly every WSP requires technical and managerial capacity development, and many WSPs are struggling to charge sufficient user fees to cover operating and routine maintenance costs, several encouraging developments indicate that WSPs are evolving towards better management and improved service delivery.

***Self-Financing of Water Source Protection***

Both rural water committees and water users themselves have demonstrated increased awareness about the importance of protecting their water sources. Several water committees have prioritized purchasing the land surrounding water sources, and have successfully been able to raise both one-time contributions and long-term fee increases to raise needed purchase capital from its members. For example, COCEPRADII, an 800-member water committee in San Juan, Honduras, purchased 400 manzanas (roughly 280 hectares) for 130,000 Lempiras ($6,500) in its primary micro-watershed. It plans to purchase an additional 500 manzanas to expand the water source protection area further. The self-finance of water source purchases demonstrates that users not only understand the importance of protecting water quality but that they are willing to pay for that protection. This is an indication that water users may be willing to pay higher water fees in order to service loans for system improvements.

***Increasing Use of Micro-Meters***

Nearly all WSPs understand the importance of installing water meters as means to accurately charge households for actual water use, most have faces fierce resistance from their members/clients.

Many residents believe that micro-metering is contrary to their communitarian ideals, or even a step towards the privatization of community water systems.

Despite cultural and, in some cases, political resistance to the installation of micro-meters, dozens of leading WSPs have begun installing meters. Key informant interviews suggest that roughly 15% of water users in CA4 countries currently have micro-meters, a number that is expected to double in the next two years.





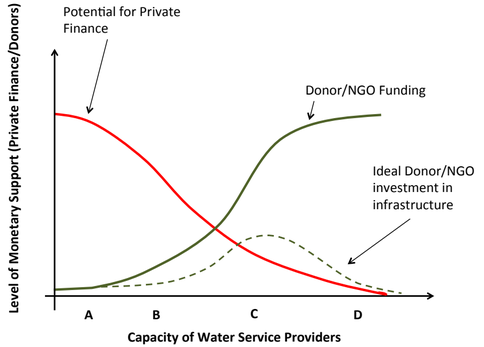

## Recommendations for improved water service provision

Prior to analyzing user demand for water service provision and determining the feasibility of a water service capital facility, several recommendations for improved service provision can be made.

### Donor Resources Can Be Allocated More Effectively

- Without improved technical and managerial capacity, WSPs will continue to operate unsustainably. Donor resources should focus at least equally on capacity development as infrastructure investment.
- WSPs with the poorest service record (Class D), should receive only technical assistance. Donors and NGOs are investing in water service infrastructure on behalf of WSPs lacking even the most basic managerial capacity, comprising the intended effects of investments.
- Donor investments should focus on Class C, and to a lesser extent, Class B service providers, as many Class A WSPs are well positioned for private finance (see Figure 10).
- Greater resources should be dedicated to small, fast-growing municipalities and peri-urban areas that typically face a resource gap.
- Given the "crowding-out" effect of development grants, donors should dedicate a greater share of resources towards revolving funds, loans, loan guarantee mechanisms, and third-party co-investments. Such utilization of finance will leverage of donor resources, greatly increasing impact of limited resources available.

*Figure 16 Water Service Provider Resource Gap*




### Data Collection Should Be More Uniform and Comprehensive

- Donors, NGOs, and governments should strongly encourage the adoption and implementation of the SIASAR rating system.
- User fee, water quality, management competency, and technical proficiency data needs to be accurately and comprehensively collected.

## *Other recommendations*

### Installation and Maintenance of Micro-meters is Essential

- Requires a communication and outreach campaign to increase user awareness of the benefits of metering.
- Micro-finance for WSPs can accelerate the purchase and installation of meters.

### Resources are Needed for Technical Troubleshooting

- Most WSP technicians have no external resource to assist with technical troubleshooting and more complex technical questions.
- This can be done through public agencies such as SANAA in Honduras or ANDA in Honduras, through NGOs (in the short term).

### Full Cost Recovery Through User Fees Not Realistic

- Some have argued that water services should only be considered sustainable when the cost of system replacement can be amortized through user fees. However, even in developed countries, water fees are rarely sufficient for full cost recovery. Large-scale system rehabilitation is financed through public resources.
- Instead, CA4 donors and government should strive for the more realistic goal of achieving user fees that cover operations, maintenance, and management costs, plus a capital replacement reserve at less than full recovery.

### Full Cost Recovery Through User Fees Not Realistic

- Beyond technical troubleshooting, WSPs need design and engineering services, financial management training, and resource optimization advisory for both system optimization and revenues. Several WSPs interviewed have identified infrastructure needs (filtration systems, expanded storage capacity, etc.), but do not know the technical, engineering, and cost requirements associated with improvements. WSPs expressed a willingness to pay for technical services.
- JAM in El Paraiso, Honduras is an excellent example of a quasi-NGO that could develop into a self-sustaining, for-fee service provider.
- With NGO support, JAM is providing design services to water committees in their community, and has begun exploring charging for services.







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*Are users able to pay for the real cost of water service?*

*Are service providers willing to accept credit / loans to improve services?*

# Demand Analysis

The first component of this feasibility study was to understand the capacity of water service providers and to assess their ability to charge more sustainable water fees as service improves. As the previous section demonstrated, many WSPs are obtaining higher fees for improved service. However, with the majority of lower service-quality WSPs struggling to charge more than $1 per month, the next important question is whether water users are willing and able to pay higher fees if the WSPs in question are able to improve service. The answer to this question is critical to the overall feasibility of a Water Service Capital Facility. WSPs may be willing to accept loans for system improvements, but if user fees prove inelastic, they may struggle to service loans obtained even at low interest rates.

The objective of this analysis is to determine maximum feasible user fees. Feasible in this case means what is the highest fees possible without placing undue hardship on households. The goal is not to squeeze households for maximum fees, but to understand what fees are reasonable based upon disposable income levels and expenditures on alternative water sources (bottled water, tankers, etc.).

We utilized two primary methodologies. First, we analyzed secondary data, including the UNDP Affordability Index for Water, to estimate feasible user fees by income segment (Figure 17). The Affordability Index is defined as the percentage of household disposable income that can be spent on potable water (and for some indices, sanitation) without having to forego expenditure on other important items such as school fees, food, shelter, etc. The Affordability Index is meant to be applied to disposable income, defined as income after taxes, but not after other essential household expenditures.

Similar to assumptions used in our financial models, we have attempted to use the strictest thresholds to determine feasibility. If the models demonstrate feasibility with the most conservative inputs, we can draw conclusions with the highest degree of confidence.

*Figure 17 Quantitative Demand Model Methodology*

Monthly Disposable Income per Capita
x Average Household Size
**= Monthly Household Disposable Income**

Population
x % of Population per Income Quintile
**= Population per Income Quintile**

Population per Income Quintile
x Monthly Disposable Household Incomee
**= Monthly HH Disposable Income per Quintile**
**x UNDP Water Service Affordability Index**
**= Maximum Monthly Water Fees per Income Quintile**

Some have estimated that an appropriate Affordability Index (AI) for Latin America is 6%. The UNDP AI for developing countries is 3%.

For the purposes of this analysis, we have assumed the more conservative UNDP rate of 3% of disposable household income as the ceiling for this analysis. Similar to assumptions used in our financial models, we have attempted to use the strictest thresholds to determine feasibility. If the models demonstrate feasibility with the most conservative inputs, we can draw conclusions with the highest degree of confidence.



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## Even low-income HHs can afford $2 to $8 monthly water fees

*Figure 18 Quantitative Demand Model - Results*

| COUNTRY | AVERAGE MONTHLY INCOME/CAPITA | AVERAGE HH SIZE | AVERAGE MONTHLY HH INCOME | BOTTOM 20% | SECOND 20% | THIRD 20% | FOURTH 20% | HIGHEST 20% | TOTAL/ AVG. |
|---|---|---|---|---|---|---|---|---|---|
| **Distribution of Income** | | **(A)** | **(B)** | **(C) % of GDP Earned by Quintile** | | | | | |
| El Salvador | $188 | 3.91 | $734 | 3.7% | 8.8% | 13.7% | 20.7% | 53.1% | 100% |
| Guatemala | $133 | 4.91 | $655 | 3.1% | 6.9% | 11.4% | 18.5% | 60.3% | 100% |
| Honduras | $82 | 4.7 | $388 | 3.4% | 7.1% | 11.7% | 19.7% | 58.0% | 100% |
| Nicaragua | $69 | 4.7 | $322 | 6.2% | 10.2% | 14.8% | 21.5% | 47.2% | 100% |
| **Population In Quinitiles (D)** | | | | | | | | | |
| El Salvador | | | | 1,259,400 | 1,259,400 | 1,259,400 | 1,259,400 | 1,259,400 | 6,297,000 |
| Guatemala | | | | 3,016,000 | 3,016,000 | 3,016,000 | 3,016,000 | 3,016,000 | 15,080,000 |
| Honduras | | | | 1,587,200 | 1,587,200 | 1,587,200 | 1,587,200 | 1,587,200 | 7,936,000 |
| Nicaragua | | | | 1,198,400 | 1,198,400 | 1,198,400 | 1,198,400 | 1,198,400 | 5.992,000 |
| **Population x Distribution x Monthly HH Income (B x C x D)** | | | | | | | | | |
| El Salvador | | | | $34,303,820 | $81,644,942 | $126,674,485 | $191,121,285 | $490,886,745 | $924,631,277 |
| Guatemala | | | | $60,798,996 | $135,218,547 | $224,048,250 | $364,399,180 | $1,189,528,416 | $1,973,993,388 |
| Honduras | | | | $20,912,169 | $43,669,530 | $71,962,466 | $121,167,570 | $356,737,009 | $614,448,744 |
| Nicaragua | | | | $24,013,197 | $39,417,160 | $57,098,904 | $83,158,242 | $182,376,75 | $386,064,260 |
| **Monthly Disposable Income Per Quintile (B x C x D)/(A)** | | | | | | | | | |
| El Salvador | | | | $107 | $253 | $393 | $593 | $1,524 | $734 |
| Guatemala | | | | $99 | $220 | $365 | $593 | $1,937 | $654 |
| Honduras | | | | $62 | $129 | $213 | $359 | $1,056 | $387 |
| Nicaragua | | | | $94 | $155 | $224 | $326 | $715 | $322 |
| **Maximum Monthly Water Tarrifs per UNDP Affordability Index** | | | | | | | | | |
| Affordability Index: | | | | | | | | | |
| El Salvador | | | | ***$3.20*** | ***$7.60*** | ***$11.80*** | ***$17.80*** | ***$45.72*** | ***$22.03*** |
| Guatemala | | | | ***$2.97*** | ***$6.60*** | ***$10.94*** | ***$17.80*** | ***$58.10*** | ***$19.64*** |
| Honduras | | | | ***$1.86*** | ***$3.88*** | ***$6.39*** | ***$10.76*** | ***$31.69*** | ***$11.63*** |
| Nicaragua | | | | ***$2.83*** | ***$4.64*** | ***$6.79*** | ***$9.78*** | ***$21.46*** | ***$9.66*** |





## Users often spend more on alternative sources of water

The quantitative demand analysis suggests that even those households in the bottom 20%, whose monthly household incomes range from $62 (Honduras) to $107 (El Salvador), can afford to pay up to ***$1.86*** to ***$3.20*** monthly for water service, without comprising other essential household expenditures. Those households in the second income quintile can afford to pay up to ***$3.88*** to ***$7.60*** monthly for water service.

***Qualitative Demand Analysis***

Quantitative models are useful, but need to be verified through field research and water user surveys. At a general level, we found multiple examples across the CA4 countries of households paying for water tanker services at two to three times the cost of household water service through pipes systems. We also witnessed a number of households purchasing at least two five-gallon bottles of drinking water, also at a much higher cost than prevailing water user fees in surrounding areas.

Additionally, as a verification snap-shot, several households across three rural communities in the El Paraiso area of Southern Honduras were surveyed. Figure 19 below summarizes the results of the surveys, which suggest that based upon the 3% UNDP water Affordability Index, households can afford up to ***$5.31*** per month on average for water service.

As a means to test the robustness of findings from the quantitative demand analysis, we applied the 3% AI to monthly household savings (disposable income less typical household expenses).

This very conservative approach still yielded feasible monthly user fees of $1.59 per month. Further, five of ten households surveyed reported buying bottled drinking water, spending between $3.59 to $7.84 per month.

*Figure 19 Quantitative Demand Model - Results*

| | NAME | HH SIZE | MONTHLY INCOME | TOTAL SPENDING | SAVINGS | MAX FEE (I) | MAX FEE (S) | BOTTLED WATER |
|---|---|---|---|---|---|---|---|---|
| *1* | Sonio Lobo | 3 | $97.9 | $96.5 | $1.5 | $2.94 | $0.04 | $3.92 |
| *2* | Jose Benita Arias | 5 | $97.9 | $63.7 | $34.3 | $2.94 | $1.03 | $0.00 |
| *3* | Iris Guadalupe Covo | 5 | $293.8 | $235.1 | $58.8 | $8.81 | $1.76 | $3.92 |
| *4* | Jose Rene Rios | 13 | $240.0 | $97.9 | $142.0 | $7.20 | $4.26 | $3.92 |
| *5* | Claudia Ordonez | 6 | $293.8 | $229.9 | $63.9 | $8.81 | $1.92 | $3.92 |
| *6* | Santos Gonzalo Vallejo | 7 | $186.1 | $101.2 | $84.9 | $5.58 | $2.55 | $7.84 |
| *7* | Abel Herandez | 4 | $97.9 | $71.0 | $26.9 | $2.94 | $0.81 | $0.00 |
| *8* | Juan Carlos Vasquez | 2 | $39.2 | $19.6 | $19.6 | $1.18 | $0.59 | $0.00 |
| *9* | Henrique Alexander | 8 | $166.5 | $106.0 | $60.5 | $5.00 | $1.82 | $0.00 |
| *10* | Victor Rodriquez | 13 | $257.1 | $217.9 | $39.2 | $7.71 | $1.18 | $0.00 |
| | AVERAGE | 6.6 | $177.0 | $123.9 | $53.2 | $5.31 | $1.59 | $2.35 |

*What financial mechanisms are most appropriate for each market segment?*

*Is a capital facility for water service feasible?*

# Financial Product Design and Feasibility

## *Conservative financial modeling assumptions create a feasibility threshold*

From the previous two sections we understand that WSPs are increasingly able to charge fees sufficient for improved water service, and that even the poorest Central American households are able to pay fees at or near the cost of water service delivery. The next step in this study was to analyze whether credit for WSPs is feasible, and to investigate what financial products and finance mechanisms are most appropriate for the potable water sector.

***Approach***

We utilized financial feasibility best practices by first testing whether WSPs could afford to service debt at current (high) interest rates and short repayment periods. Although we are not recommending that credit be structured according to such strict terms, it was necessary to analyze WSP ability to repay based on the current terms. After determining the amount of credit WSPs could absorb under strict terms, we were able to determine WSP ability to repay loans under more favorable terms with a very high degree of confidence.

***Conventional Loans***

We analyzed WSP ability to obtain and repay conventional loans based upon current and improved user fees. We developed a financial model that uses an optimization routine to determine the highest-value loan that a WSP can obtain given user fees, number of connections, operating and administrative expenses, and the resulting net revenues.

We analyzed maximum feasible loans for each WSP segment (urban, small/peri-urban, and rural) using three user fee scenarios:

1) Base user fees based upon ERSAPS data from 2012
2) Moderate user fees likely due to improved services
3) Aggressive user fees based upon examples of top performing WSPs throughout the CA4 region.

Consistent with our approach feasibility approach, we analyzed maximum loan amounts only for B-class WSPs to remain conservative (compared to higher rates for A-class providers).

*Figure 20 User Fee Assumptions for Financial Modeling*

| SEGMENT | ACTUAL FEES | IMPROVED SERVICES BASE | IMPROVED SERVICES AGGRESSIVE |
|---|---|---|---|
| A - Urban | $1.79 | $2.34 | $8.00 |
| A - Small/Peri-Urban | $1.59 | $2.19 | $7.00 |
| A - Rural | $1.52 | $2.20 | $6.00 |
| ***B- Urban*** | ***$1.52*** | ***$1.99*** | ***$7.00*** |
| ***B - Small/Peri-Urban*** | ***$1.06*** | ***$1.46*** | ***$6.00*** |
| ***B - Rural*** | ***$1.06*** | ***$1.54*** | ***$4.00*** |
| C- Urban | $1.06 | $1.39 | $5.00 |
| C - Small/Peri-Urban | $0.93 | $1.29 | $3.50 |
| C - Rural | $0.64 | $0.92 | $2.00 |
| D- Urban | $1.59 | $2.08 | $3.00 |
| D - Small/Peri-Urban | $0.34 | $0.48 | $2.25 |
| D - Rural | $0.79 | $1.15 | $1.50 |



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## *Conservative financial modeling assumptions create a feasibility threshold*

***Financial Modeling Scenarios***

We further ran financial models according to three scenarios:

- ***Scenario 1 – Very Conservative Loan Terms***
  - 20% interest rate
  - Loan repayment terms of 3, 5, and 10 years
- ***Scenario 2 – Conservative Loan Terms***
  - 15% interest rate
  - Loan repayment terms of 3, 5, and 10 years
- ***Scenario 3 – Medium-level Loan Terms***
  - 10% interest rate
  - Loan repayment terms of 3, 5, and 10 years

*(Note: high interest rates (20%) are used only to create strict terms for financial modeling).*

Lastly, each scenario above was run at 25%, 50%, and 100% of WSP net revenue. Although it is not likely, nor advisable, that WSPs spend 100% of net income on debt service, we ran models at 100% to demonstrate the upper-end of loan values feasible for given WSP net incomes.

***Results***

Figure 21 summarizes the results of 243 financial model iterations. Assuming 2012 water tariff levels (from Honduras ERSAPS data) and 50% utilization of monthly net income, average urban WSPs have sufficient income to repay loans from ***$12,600*** to ***$35,500***. Small and Peri-urban WSPs have sufficient income to repay loans from ***$3,100*** to ***$8,800***.

Loans for individual WSPs at 2012 tariff levels are not feasible, with maximum loan amounts ranging from ***$510*** to ***1,400***.

***Results for Higher Tariffs Due to Improved Service***

The center column of Figure 21 summarizes maximum loan amounts if loan proceeds are utilized effectively to improve service. We estimate that tariff fees could potentially be increased from 31% to 45% (see Appendix 2) if basic improvements in service can be delivered.

Using these higher fees ("base" fees in Figure 14 above), we re-ran the three scenarios for each WSP sub-sector. Urban WSPs would have sufficient income to repay loans from ***$17,200*** to ***$43,300***. Small and Peri-urban WSPs would be able to afford loans from ***$4,800*** to ***$13,400***. Rural WSPs would be able to afford loans from ***$860*** to ***$2,400***.

***Results if Market-leading Tariffs are Assumed***

A significant number of WSPs are currently charging $4 to $7 monthly for basic water service. The far left column in Figure 15 models maximum loans possible if WSPs are able to improve services to the highest levels, and are able to subsequently charge aggressive user fees. Under this analysis, urban WSPs would be able to repay loans ranging from ***$61,300*** to ***$172,500***. Small and Peri-urban WSPs would be able to repay loans from ***$21,300*** to ***$59,900***. Lastly, rural WSPs would be able to repay loans ranging from ***$2,500*** to ***$7,000***.

The maximum loan amounts discussed here assume very conservative assumptions. If lower interest rates and longer repayment times were modeled, the average feasible loan sizes for all WSPs would increase significantly.

*Figure 21 Maximum Loan Amounts Feasible by Scenario, Tariff-level, and % of Net Income Used for Debt Service*

| | | | MAXIMUM FINANCE AMOUNT FEASIBLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | STEADY-STATE LOANS (2012 Fees) | | | PRODUCTIVE LOANS (Base Improved Fees) | | | TRANSFORMATIVE LOANS (Aggressive Fees) | | |
| | | | % OF MONTHLY TARIFF SURPLUS | | | % OF MONTHLY TARIFF SURPLUS | | | % OF MONTHLY TARIFF SURPLUS | | |
| SCENARIO | ANNUAL INTEREST RATE | PAYMENT TERM (YEARS) | 25% | 50% | 100% | 25% | 50% | 100% | 25% | 50% | 100% |
| **Urban: 720 Connections; $1.52 Base Monthly Tariff; No Escalation** | | | | | | **720 Connections; $1.99 Tariff; No Escalation** | | | **720 Connections; $7.00 Tariff; No Escalation** | | |
| Scenario U1 | 20% | 3 | $6,317 | ***$12,634*** | $25,269 | $8,594 | ***$17,188*** | $34,377 | $30,667 | ***$61,334*** | $122,668 |
| Scenario U2 | 20% | 5 | $8,861 | ***$17,723*** | $35,445 | $12,055 | ***$24,110*** | $48,221 | $43,017 | ***$86,035*** | $172,070 |
| Scenario U3 | 20% | 10 | $12,148 | ***$24,296*** | $48,593 | $16,527 | ***$33,054*** | $66,107 | $58,974 | ***$117,947*** | $235,895 |
| Scenario U4 | 15% | 3 | $6,772 | ***$13,545*** | $27,090 | $9,214 | ***$18,427*** | $36,854 | $32,877 | ***$65,754*** | $131,509 |
| Scenario U5 | 15% | 5 | $9,868 | ***$19,737*** | $39,474 | $13,425 | ***$26,851*** | $53,702 | $47,907 | ***$95,814*** | $191,627 |
| Scenario U6 | 15% | 10 | $14,552 | ***$29,103*** | $58,207 | $19,797 | ***$39,593*** | $79,187 | $70,642 | ***$141,284*** | $282,567 |
| Scenario U7 | 10% | 3 | $7,276 | ***$14,552*** | $29,103 | $9,898 | ***$19,797*** | $39,593 | $35,321 | ***$70,641*** | $141,283 |
| Scenario U8 | 10% | 5 | $11,050 | ***$22,099*** | $44,198 | $15,032 | ***$30,064*** | $60,129 | $53,640 | ***$107,281*** | $214,562 |
| Scenario U9 | 10% | 10 | $17,765 | ***$35,531*** | $71,061 | $24,169 | ***$48,337*** | $96,674 | $86,242 | ***$107,281*** | $344,970 |
| **Small/PeriUrban: 300 Connections; $1.06 Base Monthly Tariff; No Escalation** | | | | | | **300 Connections; $1.46 Tariff; No Escalation** | | | **300 Connections; $6.00 Tariff; No Escalation** | | |
| Scenario SPU1 | 20% | 3 | $1,571 | ***$3,141*** | $6,282 | $2,383 | ***$4,766*** | $9,532 | $10,653 | ***$21,306*** | $42,611 |
| Scenario SPU2 | 20% | 5 | $2,203 | ***$4,406*** | $13,370 | $3,343 | ***$6,685*** | $13,370 | $14,943 | ***$29,886*** | $59,772 |
| Scenario SPU3 | 20% | 10 | $3,020 | ***$6,041*** | $12,081 | $4,583 | ***$9,165*** | $18,330 | $20,486 | ***$40,971*** | $81,943 |
| Scenario SPU4 | 15% | 3 | $1,684 | ***$3,368*** | $6,735 | $2,555 | ***$5,109*** | $10,219 | $11,409 | ***$22,841*** | $45,682 |
| Scenario SPU5 | 15% | 5 | $2,454 | ***$4,907*** | $9,814 | $3,723 | ***$7,445*** | $14,890 | $16,625 | ***$33,283*** | $66,566 |
| Scenario SPU6 | 15% | 10 | $3,618 | ***$7,236*** | $14,472 | $5,489 | ***$10,978*** | $21,956 | $24,539 | ***$49,077*** | $98,155 |
| Scenario SPU7 | 10% | 3 | $1,809 | ***$3,618*** | $7,236 | $2,745 | ***$5,489*** | $10,978 | $12,269 | ***$24,539*** | $49,077 |
| Scenario SPU8 | 10% | 5 | $2,747 | ***$5,494*** | $10,989 | $4,168 | ***$8,336*** | $16,672 | $18,633 | ***$37,271*** | $74,532 |
| Scenario SPU9 | 10% | 10 | $4,417 | ***$8,834*** | $17,668 | $6,701 | ***$13,402*** | $26,805 | $29,958 | ***$59,916*** | $119,832 |
| **Rural: 54 Connections; $1.06 Base Monthly Tariff; No Escalation** | | | | | | **54 Connections; $1.54 Tariff; No Escalation** | | | **54 Connections; $4.00 Tariff; No Escalation** | | |
| Scenario R1 | 20% | 3 | $255 | ***$510*** | $1,019 | $429 | ***$858*** | $1,716 | $1,236 | ***$2,473*** | $4,945 |
| Scenario R2 | 20% | 5 | $357 | ***$715*** | $1,429 | $602 | ***$1,203*** | $2,407 | $1,734 | ***$3,468*** | $6,937 |
| Scenario R3 | 20% | 10 | $490 | ***$980*** | $1,960 | $825 | ***$1,650*** | $3,299 | $2,378 | ***$4,755*** | $9,510 |
| Scenario R4 | 15% | 3 | $273 | ***$546*** | $1,092 | $460 | ***$920*** | $1,839 | $1,326 | ***$2,651*** | $5,302 |
| Scenario R5 | 15% | 5 | $398 | ***$796*** | $1,592 | $670 | ***$1,340*** | $2,680 | $1,931 | ***$3,863*** | $7,725 |
| Scenario R6 | 15% | 10 | $587 | ***$1,174*** | $2,347 | $988 | ***$1,976*** | $3,952 | $2,848 | ***$5,696*** | $11,391 |
| Scenario R7 | 10% | 3 | $293 | ***$587*** | $1,174 | $494 | ***$988*** | $1,976 | $1,424 | ***$2,848*** | $5,696 |
| Scenario R8 | 10% | 5 | $446 | ***$891*** | $1,782 | $750 | ***$1,500*** | $3,001 | $2,163 | ***$4,325*** | $8,650 |
| Scenario R9 | 10% | 10 | $717 | ***$1,433*** | $2,866 | $1,206 | ***$2,412*** | $4,825 | $3,477 | ***$6,953*** | $13,907 |

## Rural WSPs will need to form associations to qualify for loans

Figure 21 shows maximum feasible loan amounts for B-Class WSPs at improved user fee rates (Base from Figure 20).

Rural WSPs are not able to service debt of any meaningful size. This is not due to an inability to charge adequate user fees, but more to the small number of connections per WSP. Gross income is obviously determined by individual user fees times the number of users. As preceding sections demonstrated, some of the best managed WSPs are small rural water committees who have the capacity to manage funds effectively, even if their debt service ability is low.

The solution for credit access for rural WSPs is to form umbrella associations, similar to ANDAR in El Salvador, in order to capture economies of scale necessary to obtain loans large enough to impact system performance.

*Figure 22 Max Loan Amounts for B-class WSPs, Medium Tariffs*

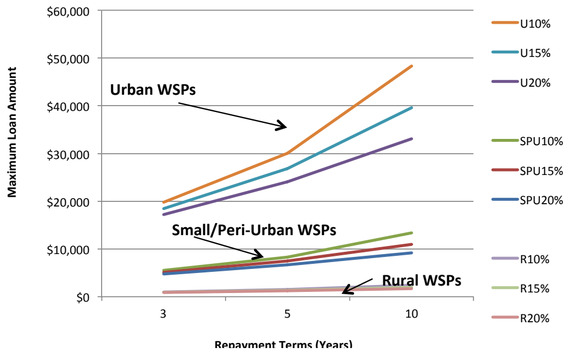



***Figure 22 demonstrates that longer repayment terms have a greater impact on the size of feasible loans than due interest rates.***
For example, at 3-year repayment periods for Urban WSPs, the maximum loan feasible varies only slight as interest rates decrease from 20% to 10%. However, when loan repayment periods are extended to 10 years, maximum loan amounts nearly double with constant interest rates. This means that the Capital Facility should focus on longer repayment terms as much, if not more, than lower interest rates than private lenders are currently offering.



## Other finance mechanisms can catalyze credit and investment

Although financial models demonstrate that conventional private loans are feasible for many WSPs, banks may still be reluctant to extend credit due to their unfamiliarity with the potable water sector and a high perceived level or risk. Other finance mechanisms can help "buy-down" some of the perceived risk to catalyze longer term loans at more favorable rates.

***Loan Guarantee Fund***

As the Capitalization Opportunity Analysis below explains, the heavy reliance on grants by donors has created a degree of dependency for WSPs. Interestingly, credit for water services is more advanced in El Salvador than Honduras. One reason for the advancement of credit for water services in El Salvador is the relative dearth of donor resources for the sector, compared to other CA4 countries. This has led to the formation of associations of "private" water committees (such as ACOSAMA) and the creation development of credit for the water sector. Although water credit is very new in El Salvador, a project involving BANDESAL and FUNDES (a technical NGO supported by the Inter-American Development Bank), are preparing to pilot 25 loans to pre-qualified water service providers. The example of BANDESAL is interesting because as a national development bank, they are able to assume a higher level of risk than most private banks. By moving first, BANDESAL has the opportunity to support "proof of concept" investments that can demonstrate the ability of WSP to repay loans and to demonstrate the opportunity that the potable water sector presents to private capital. In the absence of such first-movers, a loan guarantee fund can help stimulate private capital in a similar way.

Donors should invest in a loan guarantee fund to reduce private capital risk and catalyze investment and finance of the water sector.

Based upon successful examples from West Africa, such a loan guarantee fund should offer 50% guarantees to commercial and even quasi-governmental development banks for loans made to WSPs. Guarantees above 50% run the risk of creating moral hazard for the sector, whereby banks begin to make loans based more upon the guarantee than on the soundness of loan dockets under consideration. The African Cashew Initiative, funded by the Bill and Melinda Gates Foundation in West Africa, was able to stimulate private sector loans at a leverage rate of 3 to 1. This means that for every $1 invested in the loan guarantee fund, $3 of private loans were issued.

Guarantees are only paid out upon loan default, and only after first-loss is absorbed by the private bank. Banks should be required to cover at least 10% of the value of the defaulted loan, after which the donor-funded 50% guarantee would be applied. This further assures that banks are investing as equal partners and assuming a significant portion of risk.

***Revolving Funds***

Another proven finance mechanism is the establishment of revolving funds. A revolving fund creates a pool of loan capital to be disbursed to qualified WSPs at below market interest rates. Risk is mitigated through the self-enforcement of a group or association of WSPs.

## A basket of financial products should be utilized by the Facility

*Figure 23 Potential Financial Products for the Potable Water Sector*

| Financial Product | Description | Success Factors |
|---|---|---|
| Conventional Loans | Private and Development Bank Credit | Risk-buy down, Co-Investment<br>Proof of Concept |
| Revolving Funds | Donor and Private Equity<br>Zero to No Interest<br>Loans within WSP Blocks<br>Repaid Loan Capital Used for New Loans | Pooled Risk<br>Self-enforcement (SILC) |
| Municipal Bonds | AFDB Infrastructure Bond Model<br>Long-term Municipal Debt<br>Local Capital Markets | Mature Capital Markets<br>El Salvador Most Feasible |
| Social Investment Bonds | Monetization of Future Social Savings | Credible Savings Estimates |
| Exchange Traded Funds | Sector/Country Based Mutual Funds<br>Investors Buy Share of Fund<br>Openly Traded (Local/International) | Work with Investment Banks<br>Established Mechanism |
| Insurance | Deposit Insurance Most Feasible | Determine Pay-Out |
| Inventory Finance | For Water Stores | New Product Line for Existing Large Wholesalers |
| Water Source Purchase Mechanism | Lower Interest Rate Loans<br>Significant Community Contribution | Foundations, Angel Investors |

An initial group of between 10 and 20 WSPs should be pre-qualified for loans, with an initial one or two providers receiving loans first. WSP members of the fund should understand that only upon repayment of the initial loans will other WSPs in the group receive loans in subsequent rounds of loan disbursements. Similar to the Loan Guarantee Fund, the return on donor investment of revolving funds can range from 300% - 500%, or higher. Instead of issuing what is ultimately "dead" money via grants that only help a single WSP, donor resources are recycled to fund subsequent projects as initial loan recipients repay their loans.

***Other Financial Products***

***Social Investment Bonds (SIB).*** SIBs monetize future savings generated by current investment in social development. For example, the installation of a drinking water system will improve the health of the beneficiary community over the long run. Such improved health has real economic benefits such as reduced sick-leave from work or school, increased worker productivity, reduced infant mortality, reduced health costs, and more. Socially minded investors purchase the bonds, generating immediate cash for communities and governments. Investors subsequently receive dividends over time as communities and government begin to realize savings from social investments.





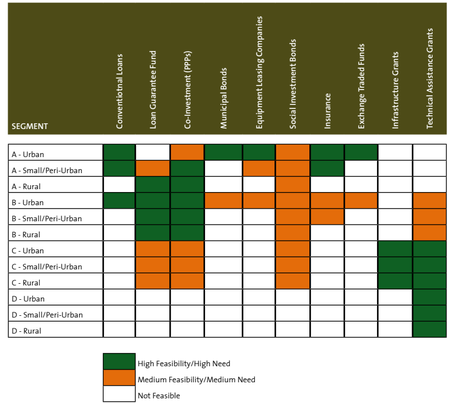
## Financial products should vary by size and managerial capacity

***Exchange Traded Funds***

A second innovative financial product is Exchange Trade Funds or ETFs. ETFs act much like mutual funds, where higher-risk investors are able to buy into a sector and country specific fund. Returns on investments and loans build the overall value of the fund, which increases the value of share held and funds the payment of quarterly or annual dividends to shareholders. ETFs throughout the world for a multitude of sectors, including water sector ETFs (India).

The challenge with ETFs for Central America is the strong resistance to privately-owned water companies providing water services to residents. While private companies will likely develop overtime, the fear of "privatization" expressed by many water users will constrain the use of ETF proceeds for wholly-owned water systems. However, loans and co-investments from ETFs can provide much needed capital to WSPs while creating the engines of financial return ETFs need to be successful.

*Figure 24 Potential Financial Products for the Potable Water Sector*




The above matrix (Figure 24) summarizes our assessment of feasibility for various financial products for each WSP segment under consideration. As an example, non-guaranteed commercial loans are most appropriate for Urban and Peri-Urban Class A and Class B providers. Similarly, grants for infrastructure should only target Class C providers, Class D WSPs do not have the management capacity to benefit from infrastructure investments. Instead, Class D providers are prime targets for technical assistance grants.

*Are commercial banks willing to extend credit to service providers?*

*Under what terms?*

*How can donor/ public resources be leveraged?*

# Capitalization Opportunity

## *Donor resources should leverage private capital*

Several conclusions can be drawn from the preceding analyses:

1) A significant number of Water Service Providers have the capacity to obtain adequate fees for improved service;
2) Water users are willing and able to pay higher fees for improved service; and
3) Several financial products are economically feasible for Water Service Providers.

These conclusions indicate, at least theoretically, that finance for improved water services is feasible.

The next question is whether private and public sources of capital are interested in participating in a Water Service Capital Facility, and the most feasible composition of capital sources.

***Commercial Bank Finance***

Most commercial banks in Central America focus on sectors such as construction, trade and inventory finance, real estate, auto loans and others. Water infrastructure is not a priority sector, and therefore is considered higher risk for commercial banks. Interviews with bankers across CA4 countries indicate that likely annual interest rates would start between 24-36% until repayment histories can be established and risk is better known. Even if WSPs could qualify for meaningfully-sized loans at these rates, they would not, and should not, encumber themselves at these extremely high rates. Lower interest rates are possible from commercial banks if donor resources are used to buy-down risk through co-investment, loan guarantees, or other mechanisms.

***National Development Banks***

National Development Banks, such as BANDESAL in El Salvador, or Banco Popular in Honduras, are well positioned to provide credit to the water service sector. BANDESAL, for example, has established water service development as a target sector, and is preparing to lend to approximately 25 water service providers who have undergone a thorough vetting process. Given their mission of national development, such banks may be willing to accept a higher level of risk for more moderate interest rates compared to commercial banks. National Development Banks may also be

***International Multi-lateral Donors***

The most likely source of initial capital for the Water Facility are multi-lateral donors such as the World Bank and the Inter-American Development Bank. Both donors are already active in the water sector. Instead of direct investment in infrastructure, donor resources should be used to leverage private capital and to establish sustainable loan mechanisms.

Another important role for multi-lateral donors is to provide technical expertise, especially in governance and financial management, to developing WSPs. These donors have significant in-house expertise that can be transferred to WSP associations, counterparts in government agencies, or even local and international NGOs working in the sector.



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## A successful capital facility will require cooperation and coordination

***Bi-Lateral Donors***

In addition to multi-lateral donors such as the World Bank and the Inter-American Development Bank, bi-lateral donors will also play an important role in the capitalization of the Facility.

AECID is already investing $120 million in the potable water and sanitation sectors. AECID has typically funded water projects through national governments, but has demonstrated a desire for more diversified funding avenues as some national agencies and other donor partners have been slow to spend available resources and have underperformed in achieving targets. AECID should be an important capital resource partner, especially in the early years of the Facility, as "proof of concept" investments and significant risk-buy down mechanisms will be necessary.

The Swiss Agency for Development Cooperation is another important partner for the Facility. Swiss Cooperation has been especially active in the water sector, and can offer important insights and lessons learned in the improvement of water services. Previously, the Swiss Cooperation was primarily focused on expanding water service coverage through new infrastructure, but they have begun to focus more on technical capacity development. Given this shift in focus, Swiss Cooperation is well positioned to take a leadership role in the implementation of technical assistance and capacity development efforts.

***NGOs***

Non-governmental Organizations such as Catholic Relief Services, Water for People, Agua Para Todos, CARE and others are actively working to increase access to improved water services. Although NGOs have significant technical and financial resources, they often lack coordination. The establishment and/or participation in national water and sanitation working groups with all major stakeholders (similar to the Finance Policy working group in Honduras) will increase efficiency of donor/NGO investment in the sector.

***Private Companies***

Private companies have the potential to be a significant source of capital and technical expertise for the WSCF. Beverage companies such as SAB Miller and Coca-Cola are dedicating an increasing amount of effort and financial resources to becoming more responsible water steward partners. This focus is driven not by typical corporate social responsibility needs, but by the need to more sustainably source water needed for beverage production. Further, private companies are realizing that without more responsible stewardship of water resources, relations with local communities can become problematic.
Other private companies may also be interested in contributing to the Facility.





## Composition of the WSCF will evolve over time

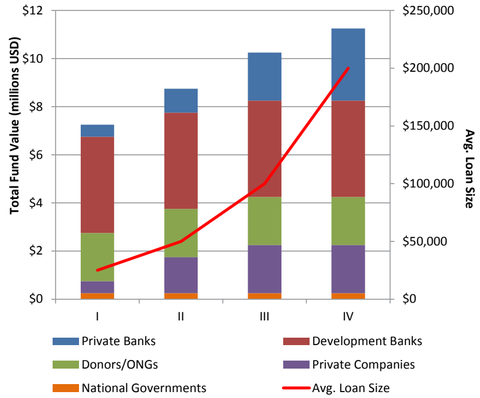
Figure 25 outlines the most realistic capitalization strategy for the Facility. The left-hand Y-axis measures total capitalization, the X-axis represents four tranches that will likely run for two- to three-years each, and the right-hand Y-axis measures average loan size across each funding tranche.

***Capitalization Opportunity and Likely Facility Composition***

Based upon conversations with commercial banks, multilateral donors, national development banks, private companies, and national governments, we set a target initial capitalization of just over $7 million, with contributions expected from the following sources.

- ***Development Banks***. The majority of initial funding will likely come from multi-lateral and national development banks.
- ***Bilateral Donors***. Bilateral donors will likely be the second-largest source of initial capital.
- ***Private Banks.*** Participation of private banks to increase over time as they become more familiar with the sector, as repayment histories are established, and as "proof of concept" investments generate expected returns.
- ***Private Companies.*** Private company investment will start small then expand the financial and public relations benefits of participation becomes more clear.
- ***National Governments.*** Contributions from national governments will come primarily in the form technical assistance, training programs, plus structural reform, as well as some limited financial contributions.

*Figure 25 Likely Composition of Capital Facility Over Time*



## *Composition of the WSCF will evolve over time*

Lastly, Figure 25 on the previous page demonstrates our recommendation that initial loan sizes start quite small. This will allow the facility to understand unanticipated challenges during the first phase (tranche) of funding, and to help water service providers obtain lower-risk loans that have a higher probability of repayment, and to facilitate their graduation into larger loans as repayment histories are established and a track-record of success is established. For those WSPs in the B or C category of the SIASAR ranking, small loans will allow WSPs to strengthen their financial management systems, and improve their managerial capacity in cooperation with NGO and government technical assistance programs. We recommend that initial loans start at $25,000 per loan, increasing to $200,000 maximum loan size by the fourth funding tranche of the Facility.

*Figure 26 Recommended Use of Funds for the WSCF*

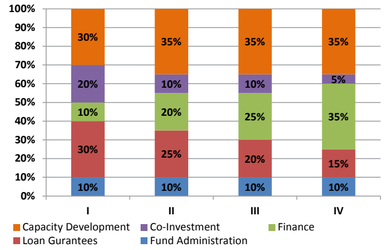



Figure 26 in the left-hand column summarizes our recommended use of funds for the Facility. In order to provide motivational capital that catalyzes private sector investment, a significant percentage (30%) of the initial Facility should be directed towards loan guarantee mechanisms. This share can be reduced overtime (down to 15% by Tranche IV), as repayment histories are established and private finance lower their risk profile for water services. The facility should also provide ample resources for capacity development, with at least 30% of funding in Tranche 1. Capacity development funding should actually increase in subsequent tranches, as many of the highest capacity water service providers would first be identified and approved in the first tranche.

Next, the Facility should budget for co-investments starting at 20% of capital available in the first tranche. The purpose of co-investment funding is two-fold. First, co-investment is an important tool to buy-down risk, which will help achieve lower blended interest rates; 2) co-investment can be used to collaterize third-party loans to minimize risk to WSPs.

We also expect private finance to contribute a growing share of capital for the Facility overtime, starting with roughly 10% initially, and increasing to 35% by the fourth tranche as the business model proves out and a history of successful loans and co-investments have been established.

Lastly, administration costs should total no more than 10% of total capitalization. This will require efficient management and extensive coordination with other development partners.

*Structure of the facility?*

*Management and oversight?*

*What non-financial components are necessary?*



## *Design recommendations for the Water Service Capital Facility*

As the overall goal of the proposed Central American Water Service Capital Facility (WSCF) is to improve water services, the Facility should include several components beyond the provision of credit and capital. Further, given myriad stakeholders in the sector (Figure 27), the management structure should:

- be inclusive, but agile;
- be regional, with significant local governance;
- create multiple access points for stakeholders;
- establish both a Finance Facility and a Technical Institute in each CA4 country;
- include policy analysis and advocacy;
- include a communications and media outreach strategy.

***Regional Fund Administration***

Although capital contributions will likely be primarily at the country-level, we recommend the Facility be managed at a regional level in order to ensure consistency of governance, compliance policies, loan approval procedures, and other Facility regulatory requirements. Further, Facility administration at a regional level will create management efficiencies and minimize administration costs. Instead of having four independent management structures in each CA4 country, many high-level management functions can be centralized.

***Legal Structure***

We recommend the WSCF be registered as a fideicomiso at the regional level. A fideicomiso is a legal trust that offers several advantages, including: 1) provides an independent mechanism for the ownership, direction and governance of public and private capital contributions; 2) creates an effective system of multi-party oversight via agreed upon bi-laws, policies, and procedures; 3) can easily be managed by third-parties (such as banks, fund managers, equity management firms, etc.) and 4); may provide tax savings for interest or income earned through normal business operations. Fideicomisos, and their third party management, are not new to Central America. Several development initiatives utilize

*Figure 27 Key Stakeholders for Improved Water Service*

## Facility design should allow for regional oversight, but local control

Fideicomisos for financial management of donor resources. BANDESAL in El Salvador, for example, manages several fideicomisos on behalf of its donor clients. BANDESAL assumes day-to-day management of the fideicomiso.

***Country-specific Components***

For each country, we recommend that two primary sub-facilities be established:

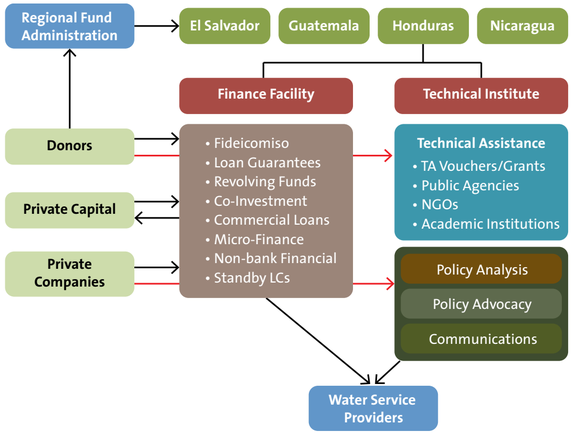
1) Finance Facility
2) Technical Institute

***Finance Facility***

Key components should include:

- Finance Facility Management Staff
- Credit Committee
- External Relations Committee
- Capacity Development Committee

*Figure 28 Recommended WSCF Design*




Finance Facility Management staff should include at least a Facility Manager/CEO, Chief Financial Officer, a Director of Underwriting, a Portfolio Manager, and Loan Officers. We believe that funding decisions should be made in-country, with Regional Facility Administration providing oversight. Country-specific policies, procedures, qualification and approval guidelines should be established by each country-level Finance Facility, in accordance with Regional Facility Administration guidance. The Finance Facility should also coordinate closely with the Technical Institute to identify and implement financial management capacity development activities.



## Technical Institute for technical training, business development, and policy advocacy

***Technical Institute for Water Service Improvement***

Given the low technical and managerial capacity of WSPs, an essential component of the Facility is to establish Technical Institutes to (a) coordinate technical assistance, (b) establish a platform for stakeholder cooperation, (c) to serve as a resource center for WSPs, and (d) to analyze public policy and advocate for improved regulations.

Technical Institutes will ideally augment existing technical resources in each country, marshal knowledge and expertise from public agencies, academic institutions, local and international NGOs, the private sector and WSPs.

Expert interviews indicate that WSPs would benefit from technical assistance in three primary areas:

1) system operations and management;
2) technical repairs and maintenance; and
3) financial management and organizational governance.

These technical assistance focus areas can be executed by a number of different stakeholders, including public agencies such as SAANA in Honduras or ANDA in El Salvador, by NGOs, or by technicians based out of university engineering departments.

***Support to WSP as Small Enterprises***

Technical Institutes should stimulate entrepreneurs and businesses services for the water sector, such as: engineering and design firms, leasing companies

One way to stimulate entrepreneurs is to provide service vouchers, which could serve two purposes: First, vouchers can increase the supply of technical services needed by WSPs. Second, vouchers can catalyze demand for technical services.
The use of vouchers to promote business services has been successful in Africa, Afghanistan, and elsewhere, and provide an interesting mechanism to subsidize technical assistance while developing market channels for service delivery.

***Policy Analysis and Advocacy***

Another important role of the Technical Institutes is Policy Analysis and Advocacy. Public policy significantly effects the development of the potable water sector. Technical Institutes would be well-positioned to analyze the impact of current and pending laws, existing regulations, and to produce evidenced-based position papers in support of recommended policy changes.

***Country-specific Strategic Communications Plans***

Technical Institutes, given their potential policy analysis and advocacy functions, would also be well positioned to coordinate and implement strategic communications plans.

*What are the next steps?*

*Strategies for success: How best to move from feasibility to action?*

# Implementation Strategy

## *Implementation Strategy*

CRS commissioned this study to determine the feasibility of credit for water service providers to improve water service coverage and quality. The goal of CRS is to facilitate the creation of the Facility through building partnerships and by funding research such as this study.

Now that the basic feasibility question has been positively answered, and an initial framework for the Facility has been designed, we present the following recommendations to CRS and its partners in creating the Facility.

***1) Formulate an Initial Communications and Outreach Campaign***

An initial Outreach Strategy should be developed to identify and convene strategic partners, develop messages, develop communication materials, and formulate an action plan tailored to each country.

***2) Conduct Stakeholder Outreach***

CRS and partners should quickly reach out to other NGOs, government counterparts, donors, multilateral agencies (who are not currently partners), and others to present the findings of this study and to solicit feedback on the design of the Facility and its various components, products, and financial mechanisms.

***3) Initiate "Pitch" Presentations to Potential Investors and Lenders***

After receiving feedback from key partners and stakeholders, CRS should initiate discussions with potential investors and lenders. Presentations need to be "investment" grade and delivered by respected individuals from each country, preferably with a finance background.

***4) Formalize Partnerships and Assign Roles***

Partnerships should be formalized. Other partners should be allowed to participate in the Facility as appropriate, but it will be important to determine lead partners relatively early in the process.

***5) Begin Staff Recruitment and Identify Potential Management Staff***

The Facility will require the skills and expertise of seasoned water and finance professionals.

***6) Begin the Fideicomiso Registration Process***

Assuming that stakeholders agree with a fideicomiso as the appropriate legal structure for the Facility, the registration process should begin quickly. As the registration process can be lengthy, and requirements for approval challenging, CRS and partners would do well to begin the process to avoid implementation delays in the future.



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## *Risks and Risk Mitigation Strategies*

CRS and AO have conducted a number of work sessions with key stakeholders to solicit feedback on the findings, conclusions, and recommendations of this study. A number of consistent themes have emerged from stakeholder feedback. We have framed these themes in terms of potential risks to the establishment and execution of a Central America Water Facility. The matrix below summarizes important issues and how stakeholders collectively may best address potential risks.

| Potential Risk | Mitigation Strategies |
|---|---|
| Poor protection of water sources | Water source protection is key. The Facility can provide long-term, low interest, financing for the purchase of micro-watersheds by WSPs. |
| Loss of WSP control of water systems/sources | Finance does not mean privatization. Loan guarantees, alternative collateral mechanisms, and specific non-transfer of ownership or management clauses mitigate the risk of "privatization" should WSPs default on commercial loans. |
| Low financial, managerial, and operational capacity of WSPs | A significant proportion of Facility resources should be dedicated to WSP capacity building. This represents a shift from previous donor investments typically focused on capital infrastructure development and improvement. |
| Lack of government and donor coordination | Most CA4 countries have multiple government agencies , donors, and NGOs working to improve water service quality and access. National coordinating working groups or commissions are effective forums to share lessons learned and coordinate activities. CONASA and the Water Policy Working Group in Honduras are good examples. |
| Resistance to regional oversight of the Facility | The regional oversight infrastructure is intended to create operational efficiencies, not to exert external control. Water Funds should be established and managed locally, with the Regional Facility providing information and technical assistance as needed. |
| Moral hazard and non-payment of loans | Loan guarantees and donor/government involvement in Water Funds may reduce WSP willingness to repay loans. Some level of risk for WSPs must be included in any Fund design. Penalties and/or collateral, however, should not jeopardize WSP sovereignty over community water resources. |


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