

BENCHMARKING WATER UTILITIES: CENTRAL AMERICA

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Measurement and Infrastructure

A recent IADB study reports that investments of \$40 billion for water assets are needed to meet the United Nation's Millennium Development Goals; wastewater treatment would significantly raise that funding requirement¹. A survey of 400 stakeholders included in the study identified inappropriate pricing policy and lack of clarity in regulatory processes as the two major constraints limiting investment in water and sanitation systems (WSS) in Latin America and the Caribbean. Private sector funding could play a role in expanding or improving urban water systems through either equity investments or the issuance of municipal bonds. However, external financial flows are unlikely to increase significantly without (documented) major improvements in system performance and the development of stronger incentives for better WSS performance – in the sense of increased quality of service provision and cost efficiency of the utility system's operation².

Expecting infrastructure investment to grow in Central America, the Inter-American Development Bank (IADB) funded PURC (www.purc.ufl.edu, University of Florida) to prepare a study on *Benchmarking Water Utilities* on the region. Resource allocation issues associated with infrastructure industries are important for Central American countries. The aim of IADB was to gauge the impact of loans on coverage and on service quality and to be able to understand what utilities (and nations) are doing as "best practice" so that incentives can be developed to enhance performance. The project consisted of data collection (from national regulators and utilities) and empirical benchmarking analysis. This work complements and extends the Association of Water Regulators of the Americas' (ADERASA) recent quantitative study that benchmarked Latin American water service providers. While measurement is not sufficient for infrastructure reform, it is necessary.

The Role of Benchmarking on Developing and Implementing Water Policy

Benchmarking represents an important tool for those developing and implementing water policy. Developments over the past decade in quantitative techniques and pressures for sector reform have stimulated interest in identifying and understanding the factors that can contribute to WSS network expansion, improved service quality, and cost containment. An empirical study of water institutions identified four policy elements that explain sector performance: the economic orientation of project selection criteria, level of cost recovery, policy reform linkages, and water law and water policy linkages. Benchmarking is crucial for several of these elements³. Policymakers in developing

countries have begun to collect data that can serve as the basis for performance comparisons—creating yardsticks that help decision-makers identify weak and strong performers. Utility managers, water associations, regulators, and other groups have begun to undertake statistical analyses of water systems—over time, across geographic regions, and across countries.

Empirical procedures allow analysts to measure cost or productivity performance and identify performance gaps. Such metric benchmarking tools are important to:

- Document past performance,
- Establish baselines for gauging productivity improvements, and
- Make comparisons across service providers.

Rankings can inform policymakers, those providing investment funds (multilateral organizations and private investors), and customers regarding the cost effectiveness of different water utilities. Robust performance comparisons require analysts to obtain comparable data across firms, select appropriate empirical methodologies, and check for consistency across different methodologies.

While benchmarking is not a panacea for overcoming the impediments for investment, it does provide key inputs into public policy debates and managerial evaluations, with wide-ranging implications for the following:

- Sustainability of capital inflows, public deficits, and reform initiatives. Typically, investors seek government guarantees, but guarantees can blunt incentives to select efficient projects. In addition, guarantees can become liabilities affecting government budgets⁴
- Poverty reduction and public perceptions regarding infrastructure reforms;⁵
- Development and implementation of incentives for improving WSS service performance;⁶
- Appropriate roles for multinational organizations, donor nations, and regional cooperation in the provision of WSS services.

The IADB/PURC Benchmarking Project

The purposes of the PURC Central America Benchmarking Project were threefold:

1. Assemble verifiable benchmarking data for the Central American nations;
2. Prepare studies that identify the relative performance of utilities in the region;
3. Design and deliver a workshop to promote sustainable data collection procedures, making information available to key stakeholders.

The first objective required the cooperation of government agencies in the region, as well as water utilities. Until recently, data specification, collection, and collation have been the focus of benchmarking programs.⁶ Once researchers have several years of consistent data for an adequate sample of utilities, the issue becomes one of analysis, including model selection. A substantial body of technical literature exists. The PURC *Survey of Benchmarking Methodologies* a project funded by the World Bank, aimed at helping practitioners begin comprehensive analyses on the subject⁷. The bottom line is that without data, managers cannot manage and analysts cannot analyze.

The October 2007 regional workshop was designed to have participation from four groups: utility managers, policy-makers, regulators and academics. These groups have tended to operate in relative isolation when preparing benchmarking studies. The objective of the Workshop besides providing a forum for obtaining feedback on the study is to promote sustainable institutional mechanisms for maintaining data collection, and to develop strategies for future regional collaboration. For example, IBNET serves as a data repository for hundreds of water utilities from around the world. Participants who were involved in data collection served on panels to comment on the strengths and weakness of current data procedures. The workshop proved to be a catalyst for improving procedures for evaluating sector performance.

Main Data Collection Issues

The study (available at www.purc.ufl.edu) includes data obtained and/or reviewed by water service providers from each of the six countries in addition to the participation of the respective country regulatory agency. This approach differed from ADERASA's, which mainly considered data from regulatory agencies. In addition, this study includes Guatemala and El Salvador which were not members of ADERASA. The data collection process was undertaken in two steps. First contacting regulatory agencies and then following up with interactions with water service providers. In all cases, regulatory agencies were made aware of our direct contact to water service providers to follow the information links that exist between the regulatory agency and the utility.

Overall, several factors affect data availability within this region: (1) the on-going water sector restructuring in some nations such as the decentralization of service responsibilities to municipalities in Honduras; (2) low level of water infrastructure in place, and (3) low development of the sector's information technology. El Salvador, Honduras and Nicaragua show a low level of infrastructure in place. In addition, the number of local and independent water providers (such as juntas vecinales de agua) complicate the data collection/correction process⁸.

Note that the development of information technology is central to any data collection initiative. According to United Nations agencies' statistics on measuring *Information and Communication Technologies*⁹, the diffusion index (ICT) for these countries - from high to low - is approximately 40% for Costa Rica; 30% for Guatemala; 25% for Panama and Honduras and 15% for El Salvador and Nicaragua. Information technology is central to any structured data collection procedure. The availability of an information system specific for the sector is crucial for any data collection process within the region¹⁰.

However, the availability of technology is another necessary (but not sufficient) element for improved information on water utility performance. Besides utility managers who are the main ones responsible for collecting appropriate data for running their businesses, the role of other stakeholders (citizens, public officials) should be considered by government when developing rules regarding the sector. For example, it is essential that regulatory agencies are allowed by law to collect (and publish) data from utilities. In the same way

it is important to establish formal communication channels among all the institutions related to the sector, such as environmental regulators, development banks, and municipal development agencies so that responsibilities for data collection and possible data repositories are well identified. NGOs also have a role as they insist on transparency and citizen participation.

Summary of the Project

The project provided overviews of the water sectors for Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. The following table summarizes the set of service providers by country and their water service coverage considered in this study.

Service Providers by Country - summary

Country	Service Provider	Pop. Served
Costa Rica	AYA	51%
	ESPH	0.5%
El Salvador	ANDA	55%
Guatemala	EMAPET	0.005%
Honduras	SANAA	20%
Nicaragua	ENACAL	52%
Panama	IDAAN	66%

The study examines performance patterns across countries, focusing on the following performance indicators:

Operational Performance Indicators:

- Water Lost or commercial efficiency
- Metering
- Coverage
- Network Density
- Water Consumption
- Number of Workers per one thousand connections

Cost Indicators:

- Operating Cost per connection
- Operating Cost per cubic meter of water delivered
- Share of labor and energy costs, and administrative expenses

Quality Indicators:

- Quality of water
- Continuity of service
- Number of complaints per connection
- Number of leaks per km of pipe

Some of these performance indicators are compared to those presented by the ADERASA benchmarking group in its most recent annual report for Latin America. The empirical

analysis considers the mix of inputs used to produce the mix of water and sewerage outputs; the methodology provides a more comprehensive performance assessment than more traditional core performance indicators (simple ratios). Nevertheless, many factors can affect these specific performance indicators, including population density, ability to pay (income levels), topography, and distance from bulk water sources. Identifying best performing water utilities is not an easy process. A firm that performs well on one indicator may do poorly on another, while one company doing reasonably well on all measures may not be viewed as the “most efficient” company.

Thus, the focus of this project moves beyond simple performance indicators to a more comprehensive performance metrics using DEA (data envelopment analysis) frontier calculations and estimation of key production parameters using SFA (stochastic frontier analysis). Analysts apply these quantitative techniques to determine relationships among variables: for example, utilities that produce far less output than other utilities (who are using the same input levels) are deemed to be relatively inefficient. Similarly, a utility might have much higher costs than expected (based on observations of others producing the same output level but having lower costs). A finding of excessively high costs would trigger more in-depth studies to determine the source of such poor performance. The PURC benchmarking study provides insights into the relative performance of water utilities in the region using a set of methodologies. This project establishes a strong case for more comprehensive studies in the future—helping to set the stage for creating strong incentives for improved performance.

¹ “Obstacles and Constraints for Increasing Investment in the Water and Sanitation Sector in Latin America and the Caribbean: Survey,” IADB, Dec 2003, 1-13.

² See Peter Reina (2002), “Latin Lessons for the Private Sector,” *Water21*, April, 19-21.

³ R. Maria Saleth and Ariel Dinar (1999), *Evaluating Water Institutions and Water Sector Performance*, World Bank Technical Paper No. 447.

⁴ For an overview of public and private initiatives, see William Easterly and Luis Servén (2003), *The Limits of Stabilization: Infrastructure, Public Deficits and Growth in Latin America*, World Bank, xv-208.

⁵ *Water Governance for Poverty Reduction: Key Issues and the UNDP Response to Millennium Development Goals* (2004), United Nations Development Programme, 1-93.

⁶ “Review of the water supply and sanitation sector benchmarking practices and models in the EU and other regions”, Report for 6th EU Framework Programme for Research and Technological Development. March 1, 2004.

⁷ Some of the material from that study has been incorporated into <http://www.ib-net.org/>. To obtain more information on benchmarking, see Coelli et. al. (2003), *A Primer on Efficiency Measurement for Utilities and Transport Regulators* (WBI Development Studies)

⁸ Glenn Pearce-Oroz, “The viability of decentralized water and sanitation provision in developing countries: the case of Honduras”, *Water Policy* 8 (2006) 31–50.

⁹ The ICT index includes connectivity and access to computers; <http://www.who.int/ehealth/resources/countries/en/index.html#C>

¹⁰ Recent initiatives within Latin-American countries are the 2004 workshop for the development of a water sector information system hosted by Peru with the assistance of Honduras and in 2006 El Salvador hosted a similar event also with participation from Honduras. http://www.rashon.org.hn/noticias_sept.html .