Local Institutions Matter: Decentralized Provision of Water and Sanitation in Secondary Cities in Honduras

Submitted to:

Urban Research Symposium 2003
The World Bank
Washington DC

Submitted by:

Glenn Pearce-Oroz

USAID/Honduras
Unit 2927
APO, AA 34022
gpearceoroz@usaid.gov

November 30, 2003

Introduction

Despite the relatively high access to water supply and sanitation services by urban populations in Honduras, these coverage rates mask a fragile sector that continues to be challenged by inefficient and unsustainable service delivery. The recent sectoral reforms and new framework law for water and sanitation, passed and signed in late 2003, provide an opportunity to introduce new economic and quality regulations as well as management instruments that can contribute to the long-term effectiveness of service providers.

Honduras provides an example of centralized and decentralized operators existing simultaneously, subject to the same economic, financial, regulatory, and physical constraints. The following analysis of the experiences of 16 different water supply and sanitation systems[1] of comparable size over the past decade in secondary cities in Honduras, will provide insight into the performance, sustainability and efficiency of centralized versus decentralized providers while at the same time identifying the benefits and limitations of decentralized provision of these basic services. These lessons, as well as an identification of areas where improvements are necessary, provide input into the upcoming transition toward the almost universal decentralized provision of these services as legislated by the framework law. Under this law 30 water systems currently operated by the *Servicio Autónomo Nacional de Acueductos y Alcantarillados* (SANAA) must be transferred to municipal operators within five years.

Specifically, the following comparative analysis will focus on three areas among the 16 systems selected: (1) access (coverage, rationing and treatment of water supply); (2) efficiency (production, commercial, and financial); and (3) sustainability (decision-making, tariffs and subsidies, and capital investment capacity). The mixed performance

[1] See Annex 1 for a listing of the selected water and sanitation systems and their corresponding dimensions.

of both centralized and decentralized service providers notwithstanding, the results of this analysis suggest that local institutions are driving change in the water and sanitation sector. They are the most efficient in the provision of basic services, and the more likely of the two to achieve sustainability. Finally, this analysis and the recommendations for strengthening the local institutions aim to fill a research void in Honduras. Studies on operational realities and long-term sustainability of systems in secondary cities are lacking, due in part to the disparate information sources decentralized services providers. Because of the changes in the sector and challenges that await decentralized service providers, greater focus in this area is needed.

An opportunity for sectoral reform: the framework law for water and sanitation

The passage of the framework law (October, 2003) is the most significant reform in the sector in over 40 years and affects both operational and regulatory aspects of water and sanitation delivery. Since its creation in 1961, SANAA has been the single largest service provider of water and operator of the largest urban water systems in the country. (Except for Tegucigalpa's sanitation system, SANAA never assumed the operation of sewerage systems nation-wide as originally provided by law.) A succession of legislative decrees in the 1990s provided for the transfer of a limited number of water systems to municipal authorities, most notably the transfer of the Puerto Cortés, San Pedro Sula, Catacamas, Choluteca, Trinidad, and Marcala systems. The 2003 framework law legally requires the transfer to municipal operators of 30 water supply systems under SANAA's authority (not including Tegucigalpa's water and sanitation system), effectively decentralizing the entire sector outside the capital and dramatically altering SANAA's mission.

Another important reform provided by this law is the institutional disentaglement of policy and regulatory agencies. The current institutional arrangements in Honduras are inefficient, complex, and overlapping in the application of norms and regulations (República de Honduras, 2003): seven executive branch entities make policies for the sector autonomously; five executive entities as well as each municipality establish regulations and norms for the operation of systems; and regulatory oversight and control corresponds to four separate entities of the executive. In an effort to clarify the institutional framework, the water and sanitation law establishes the *Consejo Nacional de Agua Potable y Saneamiento* (CONASA) to coordinate policy-making within the executive branch and the *Ente Regulador*, a single regulatory agency responsible for economic and quality regulation.

The sector now faces an important transition period during which it must implement the reforms outlined in this legislation. In terms of the transfer in ownership and management of the 30 water systems, the immediate challenge is to negotiate the transfer between SANAA and the respective municipalities without causing a disruption in service. The medium- and long-term challenges will involve the sustainable operation of these new systems, which can benefit from proven and existing strategies of locally provided service provision. The *de facto* decentralization of water supply and sanitation[2] that has existed simultaneously with the SANAA system over the past 42 years has stimulated some significant advances in the delivery of basic services. Difficulties, challenges and mixed-results notwithstanding, positive examples exist nationally from municipal management of water and sanitation as well as from autonomous, publicly held local service providers. In both instances, local operators have pursued economies of

[2] An estimated 82 urban water systems and all public sewerage systems except for Tegucigalpa's are managed locally.

scale by combining water and sanitation with the management of other municipal services, such as solid waste and street cleaning. Despite the existing challenges, decentralized systems are better positioned than the SANAA operators to achieve efficient, sustainable provision of water supply and sanitation services in urban areas, achieve universal coverage and respond to local needs.

ACCESS

One of the first challenges facing any policy-based research and policy makers in the sector is the lack of accurate sectoral information and indicators. Although the *Sistema integrado de información de agua y saneamiento* (SINFASH) exists in the Ministry of Health, it is largely obsolete and lacks credibility (RdeH, 2003). SANAA provides data for its systems, but no official repository of information exists for those systems outside of SANAA's control. The only other existing database for decentralized systems, which is limited both in size (46 municipalities, some of which are SANAA systems) and scope (limited number of indicators collected), has been compiled between 1994 and 2003 by the *Fundación para el Desarrollo Municipal* (FUNDEMUN) as part of the USAID Municipal Development Program. In the absence of any national accounting and information system,[3] accurate historical as well as current data are incomplete. Specific efforts by international organizations (PAHO, IDB, UNICEF, USAID) coincide with the 2001 Census to provide similar, if not exact, estimates of access rates to water and sanitation on a national level for both urban and rural populations.

Nationally, access to water supply in urban areas has increased from a coverage of 85% in 1994 (ESIS, 1994) to 94% in 2002 (EPHPM, 2002), while access for urban

[3] The *Instituto Nacional de Estadísticas* (INE), the entity now responsible for conducting permanent household surveys, was created in 2000.

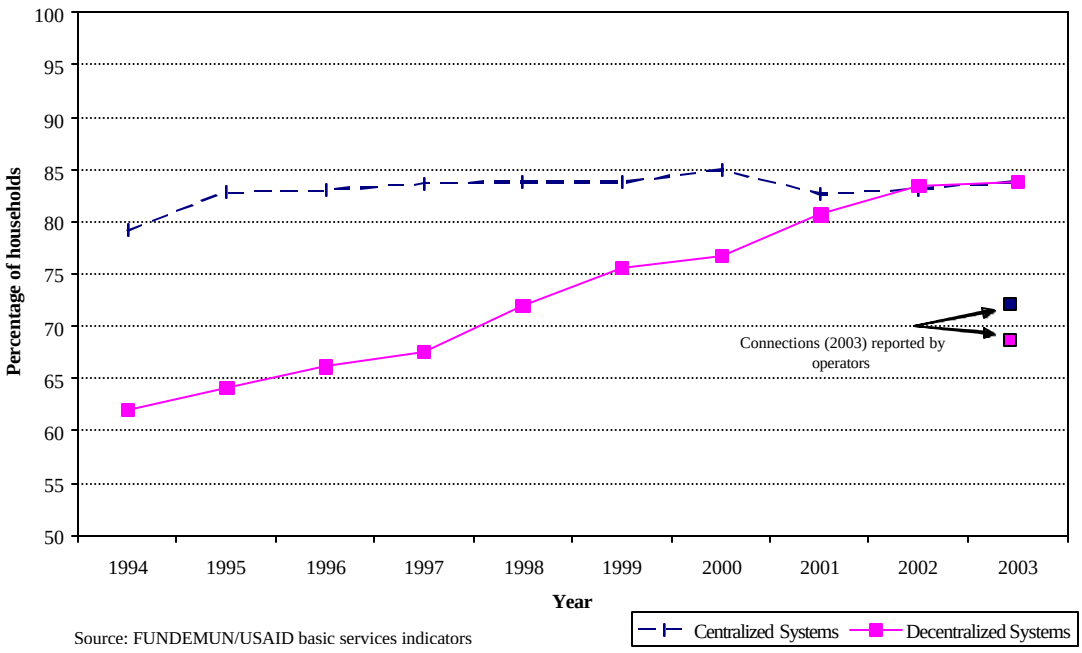
populations outside of Tegucigalpa and San Pedro Sula reaches 85% (EPHPM, 2002). In contrast, according to these sources, access to public sanitation service has improved slightly over the past ten years, increasing from 94% in 1994 (ESIS, 1994) to 95% in 2002 (EPHPM, 2002). Finally, domestic wastewater treatment lags far behind with only a limited number of treatment facilities existing nation-wide that cover a minimal percentage of the urban population.

Compounding the problem of accurate information, definitions of adequate access differ and do not equate with access to public water and sanitation systems. Census and international data suggest that access to water and sanitation solutions is far greater than the connections reported by individual systems. In Tela, for example, FUNDEMUN/USAID indicators estimate that 86% of households have adequate water supply. The *División Municipal de Aguas de Tela* (DIMATELA), however, reports only 5,619 connections of a total of 7,637 homes for a total coverage by the public water system of 74%. The additional 12% coverage being reported can be attributed to private systems in middle and high income areas, improvised systems in peri-urban and low income areas as well as a broad definition of adequate access. No study has been done to assess the quality, efficiency, and sustainability of these alternative systems nor is it likely that smaller, alternative systems are systematically being monitored for compliance with economic and quality regulations.

Broad definitions of access to water and sanitation over-estimate the percentage of households with access to public systems of water and sanitation. Public systems represent the majority of connections, but a percentage of access is provided through alternative systems and strategies. Figure 1 illustrates access to urban domestic water supply (broadly defined) for the 16 systems included in this study. For 2003, the

percentage of household connections to public systems as reported by operators is also included, revealing a difference of between 10 to 14% of households that are covered by alternative methods and systems.

Figure 1. Access (broadly defined) to urban water supply in selected cities



Source: FUNDEMUN/USAID basic services indicators

Even allowing for the differences between broad access to water supply and direct access to a public water system, the data for the 16 systems suggests markedly different trends between centralized and decentralized service providers over the past 10 years. In cities served by centralized SANAA systems, 79% of households in 1994 had access to water supply (broadly defined) as compared to 62% of households in cities with decentralized systems. By 2003, however, coverage is nearly identical with 84% of households in both types of cities having access to water supply. While the access rate by centralized systems increased by only 5% over the past 10 years, the decentralized systems made significant progress in addressing unmet needs (22% increase). On the surface, this may suggest that decentralized systems have an advantage in financing

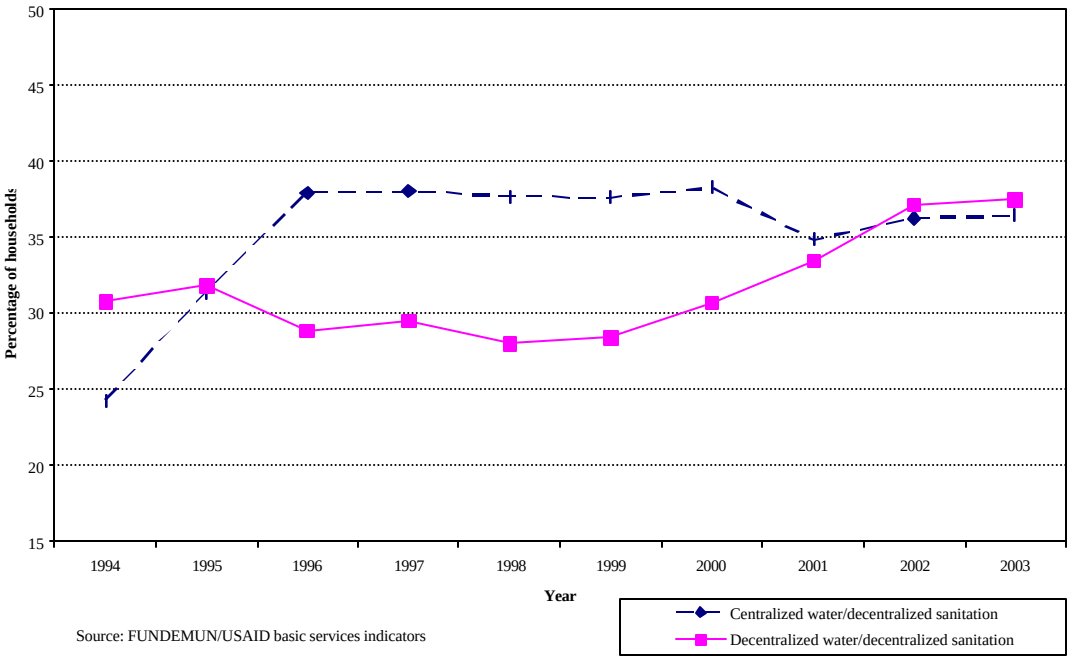
capital investments over their centralized counterparts. This may be true, however, not due to the ability of decentralized systems to finance capital investments on their own since both centralized and decentralized systems depend almost exclusively on donor grants for their major capital investments.

Instead, the difference in trends can be tentatively explained by the improving management capacity and political leadership in the decentralized systems over the past 10 years. Starting in 1994, a number of technical assistance programs were launched to strengthen the management capacity of municipalities (all 16 cities included in this study are beneficiaries of this assistance). The increased management capacity by decentralized service providers made them increasingly eligible for donor-funded infrastructure projects. At the same time, the effectiveness of local political leadership since 1994 can be attributed to the municipal reforms implemented in 1991. The municipal law passed in 1991 provided municipalities with greater management and legal instruments to administer basic services while electoral reforms allowed for the direct election of local officials. In 1993, mayors were elected directly by voters for the first time rather than indirectly through party lists that included national as well as local candidates. This direct election has shifted the power and accountability structure significantly and made mayors and councils increasingly more responsive and accountable to local constituencies. As a result, local needs are prioritized and more aggressively pursued.

Unlike water systems, sanitation service is operated at the local level throughout the country. While in 1994 cities with centralized water systems and decentralized sanitation service had fewer household connections than cities with decentralized water systems, the difference was not as pronounced as with access to water. However, while

decentralized water and decentralized sanitation services maintained constant levels of coverage, centralized water and decentralized sanitation services achieved more substantial increases in coverage over the past decade. These contrasting trends should be interpreted jointly with the water coverage and may reflect a zero sum gain in management and financial capacity as well as other priorities during the first years of the decade. Decentralized water systems focused on increasing access to water, which is almost always a priority over sanitation, during the initial years and may not have been able to dedicate as many financial and political resources to improvements in the sanitation system. Similarly, because cities with centralized water provision did not need to focus on increasing access to water, the decentralized provider could focus more directly on increasing sanitation services. The limited coverage of approximately 37% in both instances by 2003 suggests the financial burden represented by more costly construction of sewer lines and sewerage systems as compared with the typically less costly water distribution system. Much of the increased access can likely be attributed to increased household connections to existing sewer lines and does not necessarily reflect the expansion of the network.

Figure 2. Access to urban domestic sanitation



Source: FUNDEMUN/USAID basic services indicators

Quality of service: rationing and treatment

Access to urban domestic water supply also belies the quality of service being provided to homes. Despite these high coverage rates, the quality of water and sanitation services continues to be deficient and one of the major reasons that diahrreal and intestinal illnesses continue to be the second leading cause of infant mortality and the leading cause of child mortality in urban areas (ENESF, 2001)[4]. In terms of uninterrupted access to water, most households receive rationed service and some go more than one day without service, even with a domestic connection to the public service. With few exceptions, such as in Tela and Tocoa, access to 24-hour water supply does not exist for customers of the 16 systems surveyed. Intermittent or irregular service provision has forced the national urban population to adopt storage and accumulation

[4] In Honduras, infant mortality reached 34 per 1,000 live births in 2001. By comparison, Costa Rica infant reached 10 per 1,000 in 2000, Chile 10 per 1,000 in 1999, and Colombia 13 per 1,000 in 1998 (PAHO, 2001).

strategies. Given this reality, a more realistic parameter for measuring acceptable domestic water supply is daily service with a minimum of 12 hours, combined with hygienic storage. Provision every other day or too few hours per day makes domestic water use difficult even with a variety of catchment and storage strategies, and promotes even greater waste by households during the times they receive water.

Whereas the lack of 24-hour water supply is fairly consistent throughout Honduras, treatment of water supply is more uneven. In Honduras, an estimated 88% of water sources are superficial requiring some degree of treatment (RdeH, 2003). But given the political pressures for providing greater access combined with the lack of enforcement of quality standards, treatment of water supply is not prioritized. The enforcement of standards, incumbent on the Health Ministry, is not systematic over time or throughout the country and focuses its sporadic efforts on SANAA operated systems. In practice, both centralized and decentralized systems test their water to control for quality. Certain systems, such as Juticalpa, have treatment plants, but treated water is not provided to all its customers.

Table 1. Rationing and Treatment of Water Supply

	No treatment	Filter & chlorine	Treatment plant
No rationing		**Tocoa**	**Tela**
Moderate rationing	**Villanueva**	**Catacamas**	**Choluteca** *El Progreso* *Juticalpa*
Heavy Rationing	**Choloma**	**Olanchito**	**Santa Rosa** *Danlí*

Key: decentralized systems in **bold**
centralized systems in *italics*

Table 1 categorizes selected centralized and decentralized service providers based on rationing and treatment of domestic water supply. The systems are classified from the

most deficient category in the bottom left-hand corner--those that have both heavy rationing and no treatment--to the category that provides 24-hour service of chemically treated water. In all systems, service delivery is not consistent for all customers, with different areas receiving different levels of rationing or different types of treatment. For the purposes of the comparison provided in Table 1, each system is classified based on the service being provided to the majority of its customers. None of the systems can be categorized as delivering high quality service. Even in Tela, service is uneven with deficiencies in treatment and rationing to some neighborhoods. As noted in Table 1, centralized systems more consistently provide treated water to households possibly reflecting monitoring mechanisms that are reported systematically to SANAA's central office. Decentralized systems, having confronted lower access rates over the past 10 years, have focused more on expanding coverage than providing treatment. Ideally, future indicators and measurements will go beyond the existence of treatment mechanisms to include the quality of water being delivered.

EFFICIENCY

The efficient operation and maintenance of water and sanitation systems and the simultaneous pursuit of universal, safe access to these basic services are principles that are not always compatible due to the difficulty in achieving and maintaining efficient operational practices when confronted by a large percentage of low-income customers. In Honduras, the mixed performance of water and sanitation systems reflects in part the weak policy and regulatory framework that exists both in terms of economic and quality regulation. In addition, Honduran services face additional constraints due to poorly performing financial markets that offer few financing mechanisms at high interest rates,

and a lack of credible enforcement mechanisms to deal with delinquent customers. Even with the benefit of a coherent policy framework, economically viable tariff regimes, and a functioning regulatory agency, an enabling environment can still be hampered by a weak national economy and poorly functioning financial markets.

Because of the lack of historical data, the operational performance of the 16 systems included in this analysis is limited to 2002. The preliminary conclusions of this analysis should be interpreted in the context that one year's performance may be exceptionally positive or negative and not as representative as a multi-year measure and. The lack of available historical data and studies again suggests the need for greater efforts in systematic data collection and performance monitoring.

Volume billed vs. volume produced

At the heart of efficiency measurements is the ability of water service providers to account for the production and delivery of water supply. While leakage and unaccounted water will never be eliminated altogether, mechanisms to quantify production and identify losses can be introduced. A billing to production ratio comparing the volume billed over the volume produced provides an indicator to determine the extent of losses that each water supply system must subsidize. In terms of this measurement, decentralized service providers in Honduras are unable to accurately determine basic levels of production. None of the nine decentralized systems included in this comparison possess macro-metering of well or surface production, and therefore can only indirectly estimate the amount of water being produced for distribution. The consumption side is equally as deficient with no micro-meters existing for domestic customers of the

decentralized systems.[5] To determine patterns of consumption, the decentralized operator must rely on estimates based on global consumption patterns and standards, usually 35 cubic meters per household per month or 60 gallons per person daily. These standards may not only over-estimate actual metered consumption, but under-estimate the real usage of un-metered households that accumulate beyond their consumption needs as part of their storage strategy. On a month-to-month basis, these decentralized providers have no ability to accurately gauge the volume that is being delivered to customers.

The SANAA systems monitor more accurately their production of water and have incorporated production measurements as a standard indicator and management tool. Although production is measured, the centralized systems are only slightly better equipped than their decentralized counterparts to monitor consumption. Of the 52,138 domestic connections to SANAA systems represented in this sample, only an estimated 4,677 micro-meters are installed, all other domestic consumption is unmetered and consumption is estimated based on the standard consumption rate of 35 cubic meters per connection per month. As indicated by the billing to production ratios of SANAA systems included Table 2, unaccounted water in 2002 for these six systems is estimated at 1.1 million cubic meters, or 34% of production. This loss should be considered

Table 2. Billing to Production Ratio for selected systems, 2002.

System	Ratio	Cubic meters billed annually	Cubic meters produced annually
Comayagua	0.59	4,746,613.00	8,053,666.00
Danlí	1.34	2,221,399.00	1,654,373.00
La Esperanza/Intibucá	0.25	909,466.00	3,659,840.00
Juticalpa	0.49	1,333,034.00	2,724,744.00
La Paz	0.93	1,476,597.00	1,591,560.00
Siguatepeque	1.05	2,815,345.00	2,688,989.00
Average	0.77	2,250,409.00	3,395,528.67

Source: SANAA, 2003; SANAA-División Centro Occidente, 2003.

[5] Only DIMATELA reported metered domestic consumption of exactly one customer.

conservative since many households without metered service utilize more than 35 cubic meters per month.

Billing vs. collection

Similarly, the ability for water service providers to collect tariffs is another parameter that helps measure the commercial efficiency of the business operation. In terms of billing systems, decentralized service providers in Honduras have a distinct advantage over centralized billing operations. Because most decentralized billing systems are able to access other municipal billing records and even integrate their customers within municipal databases, decentralized operators are able to more accurately identify and track customers. In addition, greater economies of scale in billing administration are achieved by including water, sewerage, solid waste, and street cleaning tariffs and fees on the same bill. Greater leverage can also be utilized in terms of tracking and negotiating payment of arrears. Contrary to the recent *Análisis Sectorial de Agua y Saneamiento* (2003), one of the most complete assessments of the water and sanitation sector in Honduras, decentralized providers maintain separate accounts for budgets associated with water and sanitation service provision. All nine decentralized systems included in this study manage separate accounts for their municipal services and can easily identify items such as operating costs, revenue by source, arrear payments, and capital expenditures. In a sample of four decentralized systems, the least effective in collecting tariffs in 2002 was Catacamas (42% of billed amount), with the other three collecting at higher rates (Villanueva 67%, Santa Rosa 97%, and Olanchito 154%).[6]

[6] The surplus generated by tariff collection can be attributed to poor budget projections. Nevertheless, it reflects an important rate of collection.

In contrast, the centralized system manages its billing administration regionally. Each regional office tracks and delivers statements to customers in five to eight local water systems. No economies of scale are present for the SANAA billing operation. Disaggregated financial data was not available for the SANAA systems to determine the percentage of tariffs collected in 2002.

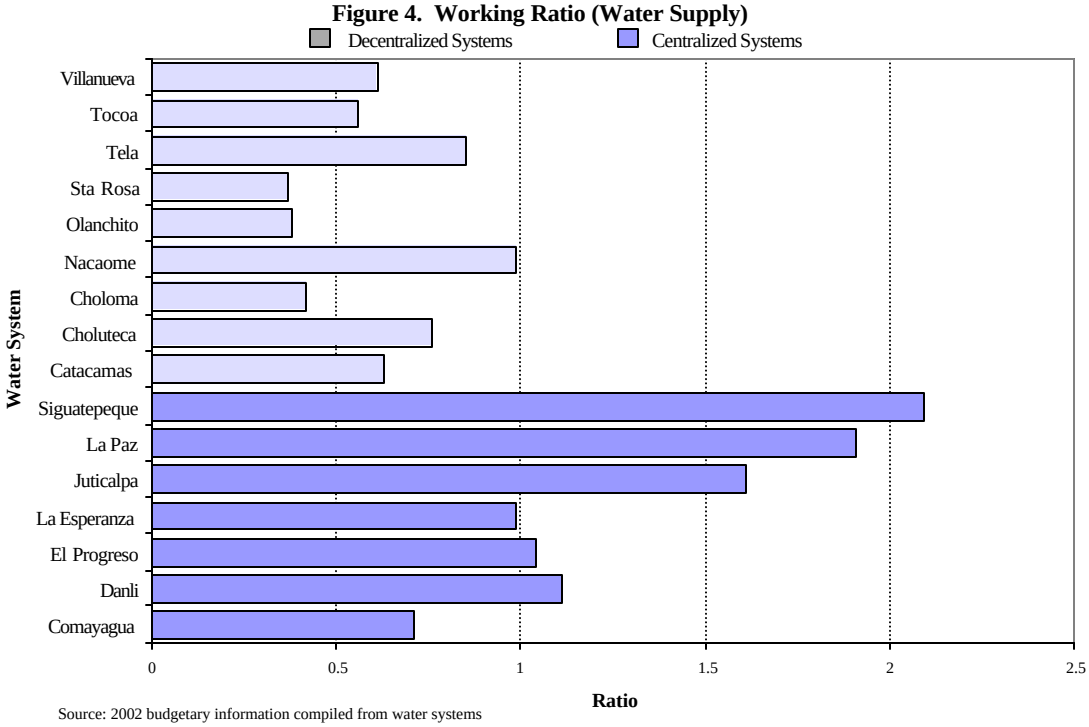
Working Ratio (WR)

Finally, the working ratio (WR) provides a parameter for measuring annual operating costs (excluding depreciation and interest payments) against operating revenues (tariffs, connection fees, arrears) to determine the financial efficiency of a service provider. A comparison of the WR for the 16 systems in 2002 is summarized in Figure 4 and demonstrates a clear difference between centralized and decentralized service providers.

In 2002, all decentralized systems included in this study had separate budget lines or accounts clearly identifying operating costs and revenues of water services. This accounting practice facilitates the calculation of the WR for each system as well as provides an important financial management instrument for planners, politicians, and managers.

Because of separate accounts for water and sanitation systems, decentralized system managers and their boards of directors can easily monitor income and outlays to

Figure 4. Working Ratio (Water Supply)



Source: 2002 budgetary information compiled from water systems

ensure that operating costs do not exceed operating revenues. More importantly, the constraints of the entire municipal budget serve as a strong barrier to maintain costs within budgetary limits. Conversely, if no budget is available, the cost is not incurred. This practice does not necessarily lead to sustainable operations and could likely lead to the exclusion of important capital maintenance activities, but fiscal discipline is maintained. Local politicians would also be held accountable not only for the cost over-runs of the water systems but also for the deficits incurred in other sectors to cover the over-runs. For example, if the water system's deficit is covered by funds budgeted for teachers' salaries or the operation of health clinics, local politicians will still be held accountable. In 2002, none of the nine decentralized service providers operated with a deficit, and several maintained a WR well below 1 indicating sound financial management. These rates are competitive with some other systems worldwide, such as, Seoul (0.75), São Paulo (0.49), and Manila (0.52) (TWUWS, 1996). In large part, this

should be attributed to clarity in the management of financial accounts, as well as a strong incentive for maintaining fiscal discipline.

The management of centralized systems operates according to different incentives. The regional management structure of SANAA promotes the efficiency of the entire region over the efficiency of local systems. Regional managers target the financial efficiency of the aggregated systems rather than each system separately. Any deficits sustained in one water system can be balanced out with surpluses from another within the same region as part of a strategy to subsidize low performers and poorer customers in certain parts of the country with higher performers and wealthier customers in other parts of the country. If receipts from tariffs or debt collection is low in a particular system, there is little incentive to improve the efficiency of that particular system if other systems are producing financial surpluses. Similarly, if an entire region is performing poorly, it can receive additional income transfers from the central office. In contrast to the accountability of local politicians, accountability is not concentrated in the centralized system. If funding SANAA is done at the expense of other services, the responsibility is shared by Congress and the executive branch. These layers of disparate political accountability and the regional incentives overshadow the fiscal discipline required for the financial efficiency of individual systems. The WR for the centralized systems in Figure 4 demonstrates levels of financial inefficiency reached in 2002 per system.

Even if water and sanitation systems were able to monitor their production and consumption, collect 100% of monthly tariffs, and maintain their operating costs below their operating revenues, the sustainability of the system is not automatically assured. Other issues, such as an appropriate tariff structure, capital investment capacity, and

corporate decision-making are three key factors that contribute to the sustainability of any system.

SUSTAINABILITY

Both centralized and decentralized service providers are ill-equipped for sustainability. At the most fundamental level, neither type of operator implements management tools guided by coherent principles of sustainable service delivery. The SANAA systems, for example, monitor production and financial indicators, but have other institutional mechanisms counteracting potentially solid and sustainable management practices. Regional managers can track inefficient local systems but do not have an incentive to address the problem until the entire region is experiencing difficulties or deficits. The experience of decentralized water systems is more heterogeneous and many operators have incorporated management mechanisms or decision-making structures that are sound, but none provide complete models for long-term operation and maintenance, expansion, cost recovery, and capital investment capacity necessary to achieve sustainability.

As discussed in the previous section, most decentralized systems are geared toward short-term financial efficiency and maintain an acceptable working ratio. But short-term efficiency does not guarantee long-term sustainability. The recent sector reforms, the new regulatory agency, and decentralization of nearly all water systems provide an opportunity to correct unsustainable practices and re-orient locally managed systems to adopt principles that promote sustainable provision of water and sanitation. A comparative analysis of centralized and decentralized service providers' decision-making

structures, tariff regimes, and capital investment capacities, indicates where some challenges to sustainability can be found.

Corporate decision-making

In order for the provision of water and sanitation services to adopt and maintain sustainable practices, service providers must have a decision-making structure made up of appropriate personnel and incorporate institutional incentives to address the requirements associated with sustainable service provision. In addition, these corporate decision-making structures must also be responsive to local contexts, interests and needs.

The decision-making and management structure play an important role in making and implementing informed decisions. Given the choices, trade-offs and opportunity costs involved in identifying solutions to water and sanitation needs, politicians, planners, and managers need to be able to identify successful solutions that are both technically appropriate and financially feasible. In order to maintain this continuity, challenges will exist to recruit successive generations of qualified decision-makers and managers guided by basic principles and specific instruments that measure performance.

In comparing centralized and decentralized service providers, both have only partially successful formulas for management and decision-making. The SANAA system has the technical and professional capacity, but lacks the incentive and accountable decision-making structure, whereas decentralized systems tend to have more coherent incentive structures and are more accountable to customers but lack a critical mass of technical and professional personnel.

In terms of being responsive to local contexts and needs, the decentralized providers have the advantage over centralized service providers. For decentralized

providers, either municipal departments or autonomous public authorities, corporate decisions and operational decisions are made by local actors accountable to local constituencies. For municipal service providers, ultimate authority rests with the locally elected *corporación municipal* or city council. In the case of semi-autonomous local authorities, such as *Aguas de Choluteca* or *Servicios Municipales de Catacamas*, ultimate authority rests with a board of directors made up of representatives from the *corporación municipal* as well as citizen or customer representatives elected at membership assemblies. In both cases, the decision-making structure provides direct access for input by local actors and users. Because of this proximity between decision-makers and customers, greater accountability takes place and poor performance is punishable through the electoral process. In addition, decision-makers of decentralized systems are in the best position to coordinate with other relevant local decision-makers, such as real estate developers, social services, agricultural cooperatives, and the municipality.

Most importantly, these local boards possess the authority to approve annual budgets and set their own tariff regimes. For this reason it is necessary that the boards understand the economic principles behind tariff setting, have access to accurate data regarding consumption and the impact of subsidies, and receive appropriate technical advice and guidance. Despite sound institutional arrangements, the lack of technical preparation and experience by local decision-makers and managers is a weakness for decentralized service providers.

An inverted set of strengths and weaknesses holds true for the centralized operators. Decision-making within the SANAA system is much more complex, with several layers of decision makers, most of who are removed from other local decision-makers, responding to incentive structures at a regional or national level. The most basic

operational decisions are taken by the local SANAA manager in each water system. However, most maintenance decisions, especially those requiring budgetary outlays, are taken at the regional level by the regional manager who may have between five and ten water systems under his charge. Strategic and corporate decisions, such as capital investments and improvements over US$550, as well as budget allocations are taken by the SANAA's central office in Tegucigalpa. The annual operating budget formulation is conducted by the Ministry of Finance, in coordination with SANAA, while Congress retains approval authority as part of the national budgeting process. Finally, the *Comisión Nacional de Servicios al Público* is responsible for establishing tariffs for every SANAA operated system in the country. This decision making scheme does not automatically preclude responsiveness to local problems and needs, but it also does not provide a structural mechanism for local inputs to decisions, incentives for accountability, or coordination with other decision-makers at the local level. Political intervention is also a reality for the centralized systems, but with the important difference that political leaders at the central level are not as easily held accountable by the customer base as are elected officials at the local level.

Unlike the decentralized service providers, SANAA has developed a critical mass of technical and professional staff that are familiar with the requirements for maintaining sustainable systems. Structural incentives within the SANAA system and political interests in the decision-making process, however, restrict the implementation of these sustainable practices.

Tariff regimes and subsidies

The tariff regimes of all 16 systems are calculated to cover operation and maintenance costs and attempt to provide subsidies to low-income consumers. These tariffs represent a fraction of the full supply cost because they do not include capital charges or depreciation, and an even smaller fraction of the full economic cost of water. As a result, these tariffs create obstacles for a system's long-term financial sustainability, operation, maintenance, and infrastructure replacement. To become sustainable, tariffs should reflect the full cost of water, including full supply cost, opportunity cost, economic externalities, and environmental externalities (Rogers, et. al., 1998). However, as in the case of the 16 systems, accounting systems are not in place to estimate these disaggregated costs, and therefore are not structured to provide this input in tariff setting.

In terms of subsidies, no explicit policy exists in Honduras (RdeH, 2003). Any attempted subsidy policy would be complicated by the fact that an accurate socio-economic data collection system to identify eligible recipients would have to be created and maintained. In the absence of both current socio-economic data as well as metering, proxies based on property value and/or household surveys are utilized to estimate relative consumption levels across income groups. A higher property value is assumed to consume more water on a monthly basis and is charged a higher monthly tariff than poorer properties. However, as the benchmark tariff analysis demonstrates, tariffs have not been established according to economic principles and poorer customers, while making lower monthly payments, are consistently paying more per cubic meter of water than other income groups.

A final constraint to tariff setting practices among these systems is the lack of annual adjustment that adequately accounts for inflation that, according to World Bank estimates (2003), has averaged between 10 and 15% annually over the past ten years.

A benchmark tariff[7] to estimate the operation and maintenance cost of delivering a cubic meter of water was calculated for each water system included in Table 3. (Because of a lack of data, the calculation of the benchmark tariff does not include either full supply costs or full economic costs of a cubic meter of water.) The benchmark tariff for delivery of a cubic meter of water is then compared to the existing tariff regimes in each of the selected systems. Tariff regimes for these systems are divided into low- middle- and high-income categories.[8] Since nearly all consumption goes unmetered, and in order to differentiate between different income groups, the calculated benchmarks include estimated consumption levels based on metered consumption patterns available in Honduras.[9] Those tariffs that fall below the benchmark are charging a subsidized price for water service, while those tariffs that are above the benchmark include surplus charges. It is worth reiterating that the benchmark tariff is artificially low and would be much higher once capital depreciation, opportunity costs and economic externalities were included. Likewise, a higher benchmark would reveal a higher percentage of users that receive subsidies.

As noted by the shaded cells in Table 3, relatively few tariffs fall below their respective benchmarks and can be considered as subsidized rates. Three of the systems

---

[7] The benchmark tariff methodology used in this analysis is adapted from Walker, Ordoñez, et al, 2000.
[8] Other tariffs exist, but are usually applied only minimally.
[9] Consumption patterns per income group were estimated using existing data of metered consumption of 2,877 households at low, middle, and high income levels in El Progreso, and applied globally as an estimated consumption pattern for users in other systems without micro-meters. This data suggests that poor households actually consume on average 16.66 cubic meters per month, while households in the middle income groups consume 39.69 cubic meters, and upper income groups 96.92 cubic meters per month.

providing subsidized tariffs (Siguatepeque, La Esperanza, and La Paz) do not have disaggregated tariff data available, although it is likely that middle and high income groups are also receiving a subsidy, such as the case of Juticalpa and Danlí. In practice,

Table 3. Benchmark tariff vs. existing tariff for selected systems, 2002

		Existing tariff (Honduran Lempiras)		
	Benchmark Tariff (Lempiras)	Low (% of households)	Middle (% of households)	High (% of households)
Choloma	0.54	2.70 (33%)	1.39 (67%)	-
Choluteca	0.99	2.40 (16%)	1.89 (51%)	1.65 (34%)
Comayagua[10]	1.74	2.21 (100%)		
Danlí	1.85	2.88 (19%)	1.55 (80%)	4.09 (1%)
Siguatepeque	2.63	0.89 (100%)		
Catacamas	1.04	1.68 (87%)	1.23 (11%)	0.73 (1%)
Juticalpa	4.62	2.82 (87%)	0.71 (13%)	5.82 (0%)
Villanueva	2.38	3.60 (97%)	2.52 (2%)	2.89 (0%)
Tocoa	0.43	0.72 (55%)	0.49 (36%)	0.41 (9%)
Tela	0.73	1.80 (42%)	1.13 (46%)	1.60 (12%)
Santa Rosa	0.73	2.85 (49%)	2.02 (26%)	1.11 (25%)
Olanchito	0.34	0.63 (48%)	0.52 (38%)	0.63 (15%)
La Esperanza/ Intibucá	1.32	0.95 (100%)		
La Paz	2.00	0.89 (100%)		
Nacaome	1.30	3.00 (89%)	2.20 (11%)	1.81 (1%)

Source: tariff data, individual systems, 2003

because most of these connections are unmetered, subsidies are achieved due to waste; poor households consume above the 16.66 cubic meters per month indicated by locally metered standards. This tariff analysis also depicts regressive tariff regimes for all 16

[10] Specific existing tariffs were not available for Comayagua, Siguatepeque, La Esperanza and La Paz.

systems. Except for Danlí, all low-income tariffs are higher than the middle and high-income tariffs for the delivery of a cubic meter of water, and two decentralized systems have subsidized rates for the highest income group. Finally, because of the difficulty in targeting low-income users, and not having the benefit of metered consumption, the tariff regimes are not well suited to differentiate among customers. Especially when using proxies based on property value, a flawed property assessment system can lead to artificially low tariff assignments such as the case of economically prosperous cities such as Villanueva where 97% of households are being charged the minimum tariff.

Capital investment capacity

Another important element to consider when evaluating the sustainability of systems is their ability to plan for future expansions, replace obsolete components, and repair or improve the existing system.

Master planning as well as capital investment planning for basic services in Honduras is virtually non-existent. None of the 16 systems reviewed for this analysis maintain updated master plans of how their systems will increase capacity and coverage to keep up with the population growth rates. While nearly all operators are cognizant of the importance of these exercises and the management tool that a master plan and capital investment plan represent, a series of limitations associated with the institutional weaknesses of the operators and macro-economic context work against this practice. For example, the absence of capital investment plans is also related to the scant ability to quantify and manage capital depreciation and inventory. Without a system to manage these costs, it is difficult to identify and program investments, most of which occur only

after systems either are no longer functioning or are destroyed as occurred following Hurricane Mitch in 1998.

A second limitation to capital investment planning is the lack of financing available for water and sanitation infrastructure. Whereas decentralized systems have more diverse sources for financing infrastructure than SANAA, the funds appropriated to SANAA in the national budget are potentially greater. In practice, however, neither decentralized nor centralized systems have made significant investments to improve infrastructure requirements of their systems, relying heavily on grants from donor countries.

For municipal systems, the options available for financing capital investments range from tariff revenues, municipal bond issues, loans from commercial banks, and targeted assessments for capital improvements. In practice, tariff revenues generate sufficient funds for only modest improvements and investments, municipal bond issues are legally permitted but no municipal bond market exists, the rates charged on loans from commercial banks are prohibitive for many systems, and targeted assessments for capital improvements have had limited successes and depend on the capacity of the municipal government for its design and implementation.

For SANAA systems, revenues generated form tariff collection, bond issues, and central government transfers are the sources for capital investment. However, the budget deficit maintained by SANAA as well as a restricted national budget does not allow for these two to be consistent sources of large investments. Bond issues, while legally permitted, have not been utilized to finance infrastructure.

As a result, a heavy reliance exists on donor funding to resolve infrastructure needs in water and sanitation. Because the systems do not pay for the infrastructure

costs, depreciation or replacement costs are often times not included in the tariff structure with the tacit understanding that at the end of the useful life of capital, donors will again be available to contribute to financing these capital costs. Very little has been accomplished in leveraging donor funds to make structural changes in the way the sector operates and in introducing enabling factors that are necessary for domestically generated long-term financing. The sectoral reforms that have recently been passed are one of the few examples of successfully conditioning a multilateral loan (IDB's US$26 million Potable Water and Sanitation Investment Program) to the improved performance of the sector.

Conclusions and Findings

The analysis of the 16 systems selected for this study is aimed at contributing to the still growing understanding of the operational realities of decentralized water and sanitation systems. Nine of the 16 are currently operated locally, while the remaining seven will be under local management within five years. Understanding the challenges faced by decentralized service providers is necessary in order to better guide their long-term sustainability.

Currently, none of the 16 systems can be considered efficient, sustainable providers of water supply and sanitation services in urban areas, with universal coverage and responsiveness to local needs. Instead, each incorporate management practices or institutional frameworks that partially contributes to the efficient and sustainable provision of services. Table 4 below summarizes the performance of centralized and decentralized systems when compared by access, efficiency, and sustainability criteria. For most of these criteria, such as coverage rates or rationing, the difference in

performance between systems is roughly similar. For others, such as subsidies, the findings suggest that

Table 4. Comparative summary

Criteria	Centralized service provider	Decentralized service provider
ACCESS		
coverage (water supply)	85% (broadly defined) 73% (reported connections)	85% (broadly defined) 69% (reported connections)
rationing	common	Common
quality	treatment plants	mixed treatment
EFFICIENCY		
production (billing to production)	metering of production, loss of 34%	no metering of production
commercial (billing to collection)	no data available	ave. 90% collection rate
financial (working ratio)	Inefficient, most systems >1	efficient, all systems < 1
SUSTAINABILITY		
corporate decision-making	Multiple layers, diffuse accountability	concentrated, direct accountability
tariff regime	regressive, not according to economic principles	regressive, not according to economic principles
Subsidies	6 of 10 tariffs reported subsidized, only partially targeted to low-income households	2 of 26 tariffs reported subsidized, targeted to high-income households
capital investment capacity	limited sources available, dependence on donor assistance	multiple sources available, dependence on donor assistance

SANAA systems are offering more subsidized rates, but that these are not necessarily targeted to low-income customers. The two variables where centralized systems reflect a best practice are operational in nature: metering of production and treatment plants. While the four variables where decentralized systems provide best practices focus on business operations (commercial and financial efficiency) and institutional arrangements (corporate decision-making and capital investment capacity).

The water and sanitation sector is in the midst of a structural transition that will culminate with decentralized operators throughout the country. The aim of the following findings is to focus the continuing debate on areas where improvements and reforms are needed if decentralized systems are expected to become efficient and sustainable providers of water:

1. **Performance indicators.** Even though they are not always considered in the decision-making process, SANAA regional managers collect specific operational and management indicators. None of the decentralized systems has adopted this systematic approach to performance monitoring. A minimal set of performance indicators should be identified and incorporated into the decision-making process of decentralized operators.

2. **Capacity building for decision-makers.** The proliferation of decision-making bodies among the decentralized (or soon-to-be decentralized) systems will require capacity building for political leaders and boards of directors. These decision making entities are well placed to remain accountable and responsive to local interests, but need the benefit of increased knowledge and understanding of the requirements for the efficient and sustainable delivery of basic services.

3. **Economic principles in tariff setting.** None of the tariff regimes reviewed reflect the incorporation of economic principles. The resulting tariffs are regressive across income groups without a clear targeting of subsidies. Tariff regimes also lack any systematic incorporation of capital depreciation. Decentralized systems need to review their methodologies for establishing tariffs and include depreciation.

4. Subsidy policy. The initial steps in developing subsidy policies must be taken. Decentralized systems need to begin with a review of their methodologies for targeting income groups and consider systematic surveys to collect socio-economic data that will serve as inputs for water tariffs and other social benefits.

5. Capital maintenance planning. An important part of sustainable practices is the ability to monitor, repair and replace capital infrastructure. None of the systems included in this study have the organizational capacity or accounting classifications needed to keep track of depreciation, inventory, and replacement costs. Capital maintenance planning and expenditures need to be introduced as common practice.

6. Metered production and consumption. SANAA systems monitor the water produced for their systems but are at an equal disadvantage with decentralized systems regarding metered consumption. A highly unpopular measure, the introduction of meters (both for production and consumption) needs to be pursued in decentralized systems. Leveraging donor investment to coincide meter installation with capital investment is one approach to introduce more meters.

7. Storage and accumulation strategies. Because the operational realities require storage and accumulation strategies by an important number of households, decentralized systems should address this reality with programs that help eliminate or minimize wasteful practices. Programs are required to advise households with effective and hygienic storage techniques.

8. Alternative systems and strategies. Not all urban households are connected to a public water system; as many as 15% of households must rely on alternative systems and strategies for their water supply needs. A better understanding is

needed of how these alternative systems work, why these populations choose these systems if public connection is available, and how the alternative systems relate or become annexed by the public service provider.

9. Financial markets. Dependency on donor assistance will continue as long as the financial markets remain weak and do not provide competitive instruments for financing infrastructure. A long-term effort needs to be coordinated by the government, international assistance, and the banking sector to identify the possibilities for increasing financial products for capital investment.

10. Policy coordination among donors. In countries such as Honduras where donor funds play an important role in filling the demand for capital infrastructure, policy coordination to guide grant funds are needed. The sector-wide approach (SWAP) being promoted by the IDB is one promising mechanism for this type of coordination.

Annex 1: Selected Water and Sanitation Systems[11]

City	(A) Population (2001)	(B) No. of homes	(C) No. of water connec.	(D) % coverage	(E) No. of sewerage connec.	(F) % coverage
Choloma	126,402	31,174	17,887	57%	8,453	27%
El Progreso	94,797	22,499	19,714	88%	13,201	59%
Choluteca	76,135	18,069	9,383	52%	2,927	16%
Comayagua	60,078	12,961	9,475	73%	5,390	42%
Danlí	47,310	9,656	6,179	64%	n.d.	n.d.
Siguatepeque	42,853	10,138	5,573	55%	n.d.	n.d.
Catacamas	35,995	6,960	4,221	61%	1,429	21%
Juticalpa	33,698	6,999	6,302	90%	n.d.	n.d.
Villanueva	32,022	7,820	7,604	97%	3,370	43%
Tocoa	30,716	6,965	4,459	64%	237	3%
Tela	29,247	7,637	5,619	74%	2,270	30%
Santa Rosa	28,292	6,610	3,930	59%	3,227	49%
Olanchito	25,040	6,320	5,044	80%	2,785	44%
La Esperanza/ Intibucá[12]	18,277	3,645	1,978	54%	n.d.	n.d.
La Paz	16,947	3,401	2,917	86%	2,717	80%
Nacaome	14,701	3,339	2,470	74%	336	10%

Notes and Sources:

(A) 2001 Census, urban population of municipal seat
(B) 2001 Census, urban homes
(C) Connections to the public water system reported by operator for August-October, 2003
(D) Percentage of homes connected: C/B
(E) Connections to the public sewerage system reported by operator for period August-October, 2003
(F) Percentage of homes connected: E/B

[11] Shaded areas denote decentralized water systems.

[12] The cities of La Esperanza and Intibucá share a common water system. Population data is combined.

References

ENESF (2001). "Encuesta Nacional de Epidemiología y Salud Familiar, 2001." Tegucigalpa: Secretaría de Salud..

EPHPM (2002). "Encuesta Permanente de Hogares de Propósitos Múltiples (EPHPM), Septiembre 2002." Tegucigalpa: INE.

ESIS (1994). "Encuesta sobre indicadores socio-económicos." Tegucigalpa: ADAI-USAID.

FUNDEMUN (2003). "Basic services indicators, 1994-2003." Tegucigalpa: USAID (unpublished).

Instituto Nacional de Estadísticas (INE) (2001). Censo Nacional de Población y Vivienda, 2001. Tegucigalpa: INE.

Ley Marco del Sector de Agua Potable y Saneamiento (2003). Decreto N. 118-2003. Tegucigalpa: La Gaceta Oficial.

Pan American Health Organization (2001). Basic Country Health Profiles for the Americas, Updated 2001. http://www.paho.org/English/SHA/profiles.htm

República de Honduras (2003). Análisis del Sector Agua Potable y Saneamiento. Tegucigalpa: República de Honduras.

Rogers, Peter, Ramesh Bhatia and Annette Huber (1998). "Water as a Social and Economic Good: How to Put the Principle into Practice, Background Paper No. 2." Stockholm: Global Water Partnership/SIDA Technical Advisory Committee (TAC).

SANAA, División Centro Occidente (2002). "Información Básica de Acueductos Regionales (La Esperanza, Siguatepeque, Comayagua, La Paz), Año 2002." Siguatepeque: SANAA.

SANAA (2003). "Evaluación plan operativo anual a diciembre del 2002 de las regionales." Documento No. 244. Tegucigalpa: SANAA.

TWUWS (1996). Water & Wastewater Utilities Indicators, 2nd Edition. Washington DC: The World Bank.

Walker, Ian, Fidel Ordoñez, Pedro Serrano, Jonathan Halpern (2000). "Pricing, Subsidies, and the Poor: Demand for Improved Water Services in Central America." Washington: The World Bank Policy Research Working Paper 2468.

World Bank (2003). "Honduras-at-a-glance." http//www.worldbank.org/data.